stomor
CIVIL ENGINEERING CONSULTANTS

FLOOD RISK ASSESSMENT

GRID REF: 528027E, 193454N

NORTH LONDON BUSINESS PARK

BRUNSWICK PARK ROAD, LONDON, N11 1GN

prepared for

COMER HOMES GROUP

July 2021

REFERENCE: ST3013/FRA-2107
REVISION 1

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Revision	*Author*	*Checked by*	*Issue Date*
0	*JD*	*SJB*	*05.07.21*
1	*JD*	*SJB*	*06.08.21*

CONTENTS

APPENDICES

1 Introduction

1.1 Stomor Ltd have been commissioned by Comer Homes Group to prepare a Flood Risk Assessment (FRA) associated with the proposed redevelopment of North London Business Park in Barnet, London. A Site Location Plan is provided in **Appendix A**.

1.2 The overall area of the site is approximately 16.37 hectares (ha) and currently comprises office buildings, car parking facilities, a Secondary School and numerous other small structures.

1.3 Development proposals comprise a mixed-use development of up to 2,500 residential dwellings, 7,148m^2 of non-residential floorspace, 20,250m^2 of open space and a 5 Form Entry Secondary School. A copy of the Proposed Site Plan is provided in **Appendix B.**

1.4 The site was subject to an Outline Planning Application (REF: 15/07932/OUT) for a mixed-use development of up to 1,350 residential dwellings, 1,162m^2 retail space, 1,010m^2 community space and a 1,050-pupil capacity school. The application was submitted in 2015 and was granted planning permission at appeal in February 2020.

1.5 An FRA was previously prepared by Awcock Ward Partnership (AWP) to support the 2015 planning application. No objections to the FRA or the accompanying drainage strategy were received from the statutory consultees.

1.6 Policy Context

1.6.1 The FRA has been prepared in accordance with the relevant national, regional and local planning policy as follows:

- The National Planning Policy Framework (NPPF) by the Ministry of Housing, Communities and Local Government, and accompanying National Planning Practice Guidance (NPPG).
- Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency (EA) published Guidance for Planning Applications: Assessing Flood Risk.
- The EA Flood Risk Standing Advice (FRSA) version 3.1 (April 2012).
- The EA's Approach to Groundwater Protection (March 2017).
- The London Plan (March 2021).

- London Borough of Barnet (LBB) Strategic Flood Risk Assessment (SFRA) (2018).
- LBB Local Flood Risk Management Strategy (October 2017).

1.6.2 Furthermore, the FRA follows the methodology prescribed in Construction Industry Research and Information Association (CIRIA) document C624: Development and Flood Risk (2004), Guidance for the Construction Industry.

1.7 Vulnerability and the NPPF Sequential Test

1.7.1 The NPPF follows a sequential risk based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas.

1.7.2 The indicative floodplain map obtained from the EA website is provided in **Figure 1.1**. This shows the site to be located within Flood Zone 1.

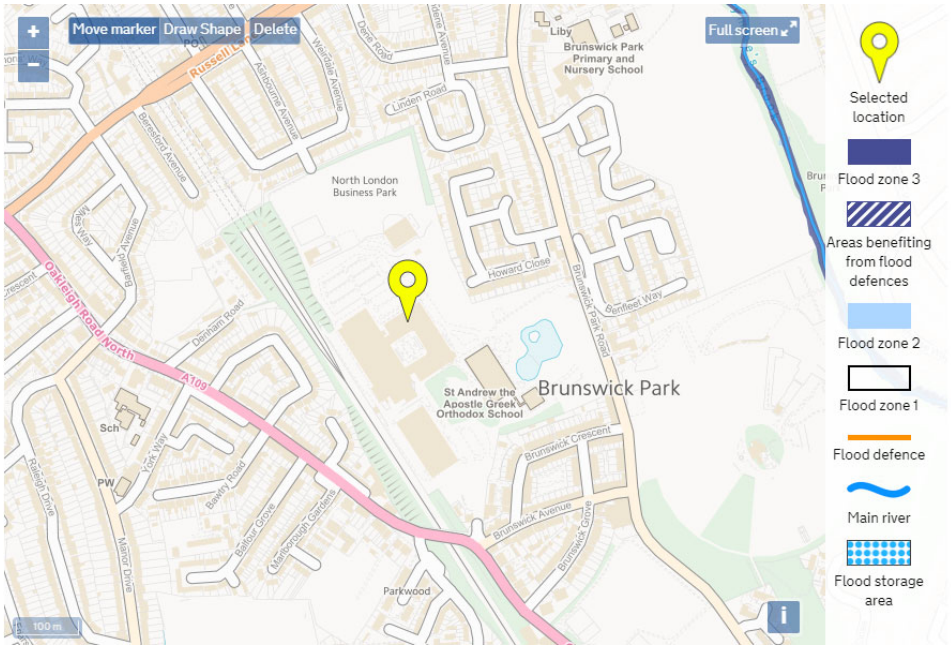


Figure 1.1 - Environment Agency Indicative Floodplain Map

1.7.3 The difference between Flood Zones 1, 2 and 3 are described in the table below:

Zone 1 Low Probability	Land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)
Zone 2 Medium Probability	Land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.55% – 0.1%) in any year.

Zone 3a High Probability	Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Zone 3b The Functional Floodplain	Land where water has to flow or be stored in times of flood. (Land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood or at another probability to be agreed between the LPA and the EA including water conveyance routes).

1.7.4 The Flood Risk and Coastal Change Category (ID 7) of the PPG and associated documents identifies that a Flood Risk Assessment is required for areas at risk of flooding, or for developments of more than 1ha within Flood Zone 1.

1.7.5 The Flood Risk and Coastal Change Category of the NPPG and associated documents identifies that site-specific flood risk assessments should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

1.7.6 The current use of the site for commercial purposes would have an NPPF flood risk vulnerability classification of ‘Less Vulnerable’. Where redevelopment comprises residential units and a new school, the flood risk vulnerability would increase from ‘Less Vulnerable’ to ‘More Vulnerable’.

1.7.7 EA Technical Guidance identifies that ‘Less Vulnerable’ uses of land are appropriate within Flood Zones 1, 2 and 3a, whilst ‘More Vulnerable’ land uses are only appropriate within Flood Zones 1 and 2. Therefore, it is considered that the proposed development would be appropriate in this area.

1.7.8 The DEFRA and EA Guidance for Planning Applications identifies that an FRA will be required for developments more than 1 ha and in Flood Zone 1.

1.7.9 The Flood Risk and Coastal Change Category of the NPPG and associated documents identify that site-specific flood risk assessments should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

2 Site Location

2.1 The application site comprises approximately 16.37ha of previously developed land, to the west of New Southgate.

2.2 Access to the site is currently taken from the A109 Oakleigh Road South, to the south, and from Brunswick Park Road, to the east.

2.3 The development boundary is defined by an existing railway line to the west, Brunswick Park Road to the east and residential development to the north and south.

2.4 The site levels vary significantly, with steep slopes down to the south east and eastern boundaries. The highest point of the site is about 72.53m Above Ordnance Datum (AOD), at the north western corner, adjacent to the residential dwellings to the north.

2.5 The nearest watercourse to the site is Pymmes Brook, located approximately 450m to the east and is identified as an EA designated statutory Main River. A copy of the EA Main River Map is presented in **Figure 2.1.**

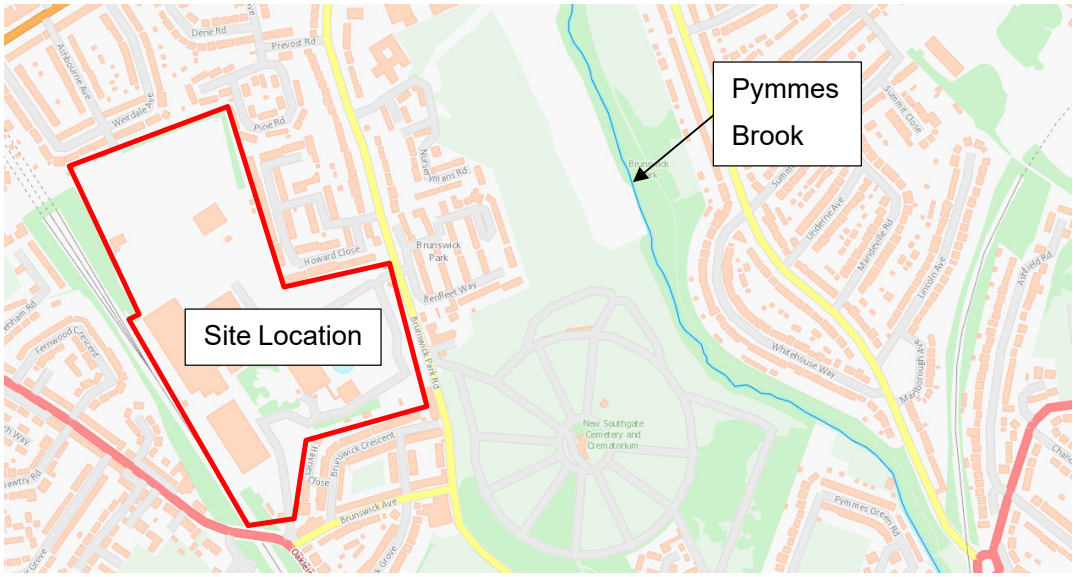


Figure 2.1 - Environment Agency Main River Map

2.6 The site is not located within any Groundwater Source Protection Zones. Therefore, there should be no restrictions on the area discharging via infiltration methods, subject to suitable infiltration rates and levels of water treatment.

3 Site Background

3.1 A level 1 Strategic Flood Risk Assessment (SFRA) for the area was prepared by Metis Consultants Ltd. in April 2018. The SFRA is used as a desk-based study to map all forms of flood risk to provide an evidence basis to locate new development primarily within low risk areas. The information allows the planning authority to identify the level of detail required for site-specific Flood Risk Assessments.

3.2 Inspection of the British Geological Survey (BGS) website identifies that the underlying ground conditions of the site comprise London Clay Formation. Local borehole data from the BGS website confirms the area to be underlain by London Clay.

3.3 Inspection of Cranfield University's Soilscapes Map, obtained from the Land Information System (LandIS) website, identifies that the soil at the application site is base-rich, loamy and clayey with impeded drainage. A copy of the Soilscapes map is provided in **Appendix C.**

3.4 For the purposes of this assessment, it is assumed that infiltration methods at the site will not be feasible. However, it is recommended that infiltration tests to BRE Digest 365 will need to be undertaken during the detailed design stages.

4 Existing Drainage

4.1 Investigations into the existing drainage of the site have been carried out using the above information in conjunction with the topographical survey and site inspection. In addition, existing Thames Water Utilities (TWU) drainage records have been obtained in order to identify the available public sewer networks in the vicinity of the site. A copy of the TWU records is provided in **Appendix D**.

4.2 Surface Water Drainage

4.2.1 Topographical survey information for the site identifies several existing gullies and inspection chambers located across the site. It is presumed that this infrastructure discharges to the public sewer network in the vicinity of the site.

4.2.2 TWU sewer records identify a 525mm diameter public surface water sewer which runs parallel to the western site boundary, before passing through the middle of the site from west to east. TWU records suggest this public sewer serves a culverted watercourse which crosses beneath the existing railway located to the west of the site.

4.2.3 An additional 375mm diameter public surface water sewer runs from west to east through the site. The head of this run appears to be located west of the existing school located on site. The two public sewers passing through the site converge at the eastern site boundary, before joining the public surface water sewer located on Brunswick Park Road

4.2.4 Inspection of the British Geological Survey (BGS) website identifies that the underlying geology of the site comprises London Clay Formation. This information indicates that the underlying soil conditions are unlikely to provide a suitable infiltration rate, although this would need to be confirmed by soil infiltration testing, in accordance with BRE Digest 365.

4.2.5 Considering an existing impermeable area of approximately 6.62ha, brownfield runoff rates for the site during various storm events have been calculated, based upon the Modified Rational Method, as follows:

Storm Event	Rainfall Intensity	Peak Runoff Rate
1 in 1 year	50mm/h	920l/s
1 in 30 years	126mm/h	2,319l/s
1 in 100 years	152mm/h	2,797l/s

4.2.6 Greenfield runoff rates have been calculated based upon IH124 Method, using a total site area of 16.37ha to be positively drained. Geotechnical information indicates that the underlying soil conditions would reflect Winter Rain Acceptance Potential (WRAP) Soil Class 4. A copy of the calculation sheet is provided in **Appendix E**, which gives flow rates as follows:

Greenfield Runoff (l/s)		
Qbar	-	75.1
1 in 1 year	Q1	63.8
1 in 30 years	Q30	172.7
1 in 100 years	Q100	239.5

4.2.7 As previously stated, an FRA and associated drainage strategy were approved as part of the 2015 planning application, with permission received in February 2020. As part of this FRA, the following Greenfield Runoff Rates were identified and approved as discharge rates for the proposed development:

Greenfield Runoff (l/s)		
1 in 2 year	Q2	63.3
1 in 30 years	Q30	152.9
1 in 100 years	Q100	222.7

4.2.8 With the introduction of additional SuDS features, it is proposed to provide betterment on these previously approved rates via a complex flow control for all return periods up to 1 in 100 years plus climate change allowance.

4.3 Foul Drainage

4.3.1 TWU sewer records identify a 225mm public foul water sewer running from north to south along Brunswick Park Road, to the east of the site. The public foul sewer then appears to head east along Benfleet Way, although the sewer records identify the sewers on Benfleet Way as being subject to an adoption agreement.

4.3.2 TWU sewer records do not identify any public foul water manholes located within the application site.

5 Proposed Development

5.1.1 Development proposals comprise a mixed-use development of up to 2,500 residential dwellings, 7,148m^2 of non-residential floorspace, 20,250m^2 of open space and a 5 Form Entry Secondary School.

5.1.2 Vehicular access to the site will be taken from Brunswick Park Road to the east and Oakleigh Road South to the south of the application site.

5.1.3 The proposed development would have a NPPF flood risk vulnerability classification of 'More Vulnerable', which NPPG guidance deems appropriate within Flood Zones 1, 2 and 3a.

6 Proposed Site Drainage

6.1 General

6.1.1 Environment Agency (EA) Flood Risk Assessment (FRA) Guidance Note 1 - Development within a Critical Drainage area or greater than 1 hectare (ha) in Flood Zone 1 (Dated April 2012) states that the applicant should submit, "*Proposals for surface water management that aims to not increase, and where practicable reduce the rate of runoff from the site as a result of the development"*.

6.2 Surface Water Drainage

6.2.1 It is considered that surface water runoff from the site currently discharges into the public surface water sewers which pass through the site.

6.2.2 For the purposes of this assessment, it has been assumed that the proposed development of the site will result in the generation of approximately 6.62ha of impermeable area.

6.2.3 In accordance with EA Guidance, the order of consideration for the disposal of surface water runoff from a development should be as follows; infiltration methods, watercourses then public sewer network.

6.2.4 Inspection of the British Geological Survey (BGS) website identifies that the underlying geology of the site comprise London Clay Formation, which indicates it is unlikely there will be a suitable infiltration rate on site for the use of SuDS. Therefore, for the purpose of this assessment, it is assumed that infiltration methods will not be suitable for the discharge of surface water from the development.

6.2.5 The approved FRA previously prepared for the site identified the surrounding area as being subject to impeded drainage, and subsequently disregarded infiltration as a means of surface water discharge. Therefore, for the purposes of this assessment infiltration has not been deemed feasible.

6.2.6 It is therefore proposed that runoff will connect to the existing public sewer network passing through the site.

6.2.7 A drainage strategy for the site is provided in **Appendix F.** The strategy demonstrates a proposed layout of SuDS to provide sufficient source control and storage to avoid flooding within the site during all storms up to and including the 1 in 100 year storm event plus 40% allowance for climate change.

6.2.8 The proposed drainage strategy incorporates SuDS features which will need to have clear, enforceable maintenance regimes in place so that they provide effective flood protection and water treatment for the long term.

6.2.9 The CIRIA SuDS Manual C753 promotes the use of the Simple Index Approach as a methods of determining water quality risk management and is generally regarded as the accepted method within the industry.

6.2.10 Table 26.2 of The SuDS Manual C753 gives pollution hazard indices for different land use classifications:

Land use	**Pollution hazard level**	**Total suspended solids (TSS)**	**Metals**	**Hydro-carbons**
Residential Roofs	Very Low	0.2	0.2	0.05
Other Roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (unless there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g schools, offices) i.e <300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g hospitals, retail) all roads except low traffic roads and truck roads/ motorways	Medium	0.7	0.6	0.7

6.2.11 Table 26.3 of The SuDS Manual provides typical treatments levels for discharge to surface waters. The proposed drainage strategy for the site incorporates permeable pavement, and a detention basin. An extract of the relevant sections of the table is reproduced below:

	Mitigation indices		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Bioretention System (Rain Gardens)	0.8	0.8	0.8
Detention Basin	0.5	0.5	0.6

6.2.12 To deliver adequate treatment, the selected SuDS components should have a total mitigation indices that equals or is greater than the pollution hazard index. Where a single

SuDS component is insufficient, additional components in a series would be required where:

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

6.2.13 Surface water runoff from residential roofs and low traffic roads will, as a minimum, pass through the detention basin. Therefore, as a minimum, the total SuDS mitigation would be as follows:

	Mitigation indices		
SuDS components	**TSS**	**Metals**	**Hydrocarbons**
1) Detention Basin	0.5	0.5	0.6
Total	**0.5**	**0.5**	**0.6**

6.2.14 Surface water runoff from all other roads (greater than 300 traffic movements a day) will, as a minimum, pass through the proposed rain gardens and the detention basin. Therefore, as a minimum, the total SuDS mitigation would be as follows:

	Mitigation indices		
SuDS components	**TSS**	**Metals**	**Hydrocarbons**
1) Bioretention System (Rain Gardens)	0.8	0.8	0.8
2) Detention Basin	0.25	0.25	0.3
Total	**1.05**	**1.05**	**1.1**

6.2.15 From the above tables the SuDS proposed on the development would provide an adequate level of water treatment for the potential pollution hazards generated by the land uses.

6.2.16 In order to provide a robust assessment, drainage proposals will retain the 1 in 100 year storm event within the site, without generating flood risk to proposed buildings within or adjacent to the development, while also making provision for climate change, relating to a 40% increase in rainfall intensity.

6.2.17 The proposed drainage strategy has been modelled using Micro Drainage. Copies of Micro Drainage output files for the development are provided in **Appendix G**, demonstrating that the proposed SuDS features provide sufficient storage to avoid flooding during the 1 in 100 year storm event plus 40% allowance for climate change.

6.3 Foul Drainage

6.3.1 As previously stated, TWU sewer records do not identify any public foul water manholes located within the application site.

6.3.2 A proposed development of up to 2,500 residential units would be expected to generate a peak foul flow rate of approximately 115.7l/s, based upon 4000 litres/unit dwelling/day, in accordance with Water UK's Design and Construction Guidance.

6.3.3 A school with capacity for 1,050 students would be expected to generate a peak foul flow rate of approximately 3.39l/s, based upon 90 litres per head per day and an 8 hour school day. However, it is considered that the peak foul flow periods for the school and residential units would not occur at the same time due to the schools operational period being within the general working weekday periods of 09:00hrs to 17:00hrs.

6.3.4 A Pre-Planning Enquiry has been submitted to TWU to establish points of connection and to determine any requirement for associated upgrade works.

6.3.5 A drainage strategy for the discharge of foul water flows from the development has been prepared and is provided in **Appendix F**. These drawings show an illustrative drainage layout to demonstrate that the site can be drained based upon the proposed development. These drawings are a strategy only and must not be used for construction purposes.

6.4 Detailed Design and Approvals

6.4.1 The drainage strategy is subject to approval by the Lead Local Flood Authority, BBC and TWU.

6.4.2 During detailed design stage, surface and foul water discharge rates and connections will need to be approved by TWU.

6.4.3 Proposed drainage systems will need to be modelled in MicroDrainage to confirm required pipe sizes and storage volumes.

6.4.4 Overland flow routes have been shown on the drainage strategy through the development towards several wet ponds. Final external levels will be designed to prevent overland flow routes from entering buildings during extreme rainfall events.

6.5 Maintenance of Drainage Features

6.5.1 The design process should consider the maintenance of the components including any corrective maintenance to repair defects or improve performance of SuDS. Inlets, outlets, control structures or other below ground features should be as shallow as reasonably possible to allow easy access for maintenance and to reduce safety risks, while ensuring that sufficient depth is maintained for structural stability.

6.5.2 A SuDS Management Plan will be provided at detailed design stage which will identify the following:

- The function of SuDS;
- How and why it works on the site;
- Impacts on amenity and wildlife, indicating how they can be enhanced;
- Health and safety issues;

6.5.3 Usually, SuDS components are on or near the surface and most can be managed using landscape maintenance techniques. Typical inspection and maintenance requirements for surface SuDS features are identified below:

Activity	**Indicative frequency**	**Typical tasks**
Routine/regular maintenance	Monthly (for normal care of SuDS)	• litter picking • grass cutting (cuttings to compost, wildlife piles or removed from site) Height and frequency dependent upon amenity of grass area. • inspection of inlets, outlets and control structures.
Occasional maintenance	Annually (dependent on the design)	• silt control around components • vegetation management around components • suction sweeping of permeable paving in autumn after leaf fall • silt and debris removal from inlets, outlets, gratings, catchpits, control chambers, soakaways and cellular storage. • strim wet swale or pond edges in September to October or 3-year rotation for wildlife value • wetland vegetation to be cut to 30% height annually and to 100mm on a 3 year rotation • remove overhanging trees or growth within SuDS features
Remedial maintenance	As required (tasks to repair problems due to damage or vandalism)	• inlet/outlet repair • erosion repairs • reinstatement of edgings • reinstatement following pollution • removal of silt build up.

6.5.4 For below-ground SuDS, such as permeable paving, the manufacturer or designer should provide maintenance advice. This should include routine and long-term actions that can be incorporated into the SuDS Management Plan.

6.5.5 Funding for the maintenance of SuDS features on the site should be resolved at the start of the development process to ensure that there is sufficient resources to maintain the systems in the long-term.

6.5.6 If the development is to be constructed in phases, the proposed surface water drainage system is established as soon as reasonably practicable. It will be necessary to ensure sufficient storage is provided for earlier phases of development to avoid flooding during the 1 in 100 year storm event plus 40% allowance for climate change.

7 Potential Sources of Flooding

7.1 Flooding from Rivers or Sea

7.1.1 The EA Indicative Floodplain Map, shown in **Figure 1.1**, identifies that the site lies wholly within Flood Zone 1; land considered to have a Very Low probability of flooding and defined as land having less than 1 in 1,000 annual probability of river or sea flooding.

7.1.2 The primary source of fluvial flooding from the site would be from Pymmes Brook, located approximately 450m east of the site.

7.1.3 The EA Indicative Floodplain Map identifies that fluvial flooding associated with Pymmes Brook would not affect any areas in the immediate vicinity of the site.

7.2 Flooding from Land (Surface Water)

7.2.1 Flooding from land occurs when intense rainfall is unable to soak into the ground or enter drainage systems. Local topography and built form can have a strong influence on the direction and depth of flow.

7.2.2 The EA indicative surface water flood map identifies land to the east of the existing school building on site, and the railway line abutting the western site boundary, are considered to be at a high risk of surface water flooding. A small corridor of land which passes through the middle of the site from north to south, before heading east towards Brunswick Park Road, is considered to be at a low risk of surface water flooding. An extract from the EA website is provided in **Figure 7.1** below.

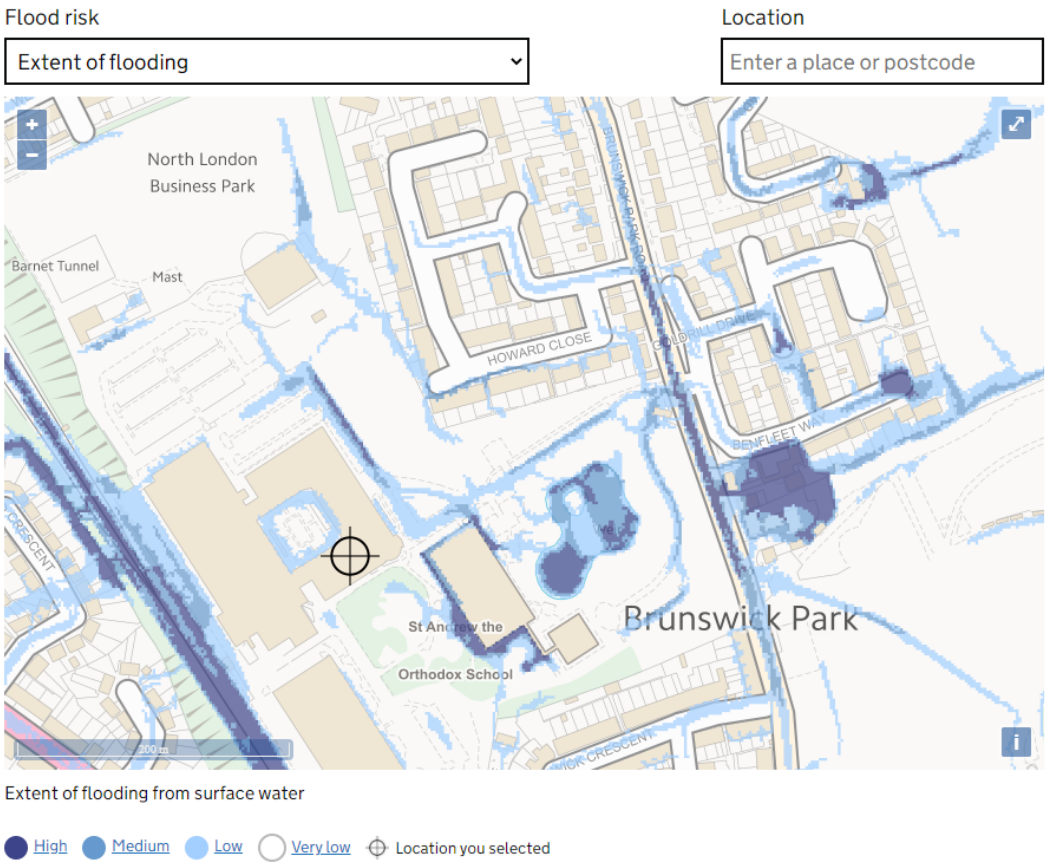


Figure 7.1 – Environment Agency Indicative Surface Water Flood Map

7.2.3 Overland flow paths will be taken into account in design of levels for the proposed development to direct overland flows away from buildings. Overland flow routes are shown on the Indicative Drainage Strategy which is provided in **Appendix F.**

7.2.4 On-site drainage systems will be designed to accommodate runoff volume from a 1 in 100 year plus 40% climate change rainfall event, so as to minimise overland flow routes during such storm events.

7.3 Flooding from Groundwater

7.3.1 Groundwater flooding occurs when water levels in the ground rise above surface elevations. Groundwater flooding events are most likely to occur in low lying areas underlain by permeable rocks (aquifers).

7.3.2 The SFRA identifies land within the eastern half of the site as being <25% susceptible to groundwater flooding. According to the SFRA maps, land to the north west of the site is considered to have no susceptibility to groundwater flooding. A copy of the Susceptibility

to Groundwater Flood Risk Map from the London Borough of Barnet SFRA is provided in **Appendix H**.

7.3.3 It is anticipated that groundwater flooding should not be an issue to the proposed development. However, overland flow routes will be taken into account in the design of levels for the proposed development and, should groundwater flooding occur on the site, flows will tend to run overland towards ponds situated at the low areas of the site.

7.4 Flooding from Sewers

7.4.1 The SFRA identifies between 61-80No. sewer flooding incidents within the N11 1 postcode area. However, the exact location of these incidents has not been specified. A sewer flooding history enquiry was submitted to Thames Water who confirmed that they have no historic recorded flooding incidents for the area in the vicinity of the site. A copy of the TWU sewer flooding history enquiry response in provided in **Appendix I.**

7.4.2 The development layout will be designed with consideration of flood routing, to ensure that new buildings and occupants of the site will not be subject to detrimental impacts in the event of flooding from infrastructure failure within or upstream of the site.

7.5 Flooding from Reservoirs, Canals and Other Artificial Sources

7.5.1 Inspection of the EA flood maps confirms that there are no records of flooding due to reservoirs, canals or other artificial sources in the vicinity of the site.

7.5.2 No other non-natural or artificial sources of flooding where water is retained above natural ground level, operational and redundant industrial processes including mining, quarrying and sand and gravel extraction, would appear to be located in the vicinity of the site which may cause increase floodwater depths or velocities.

8.0 Summary and Recommendations

8.1 Stomor Ltd have been commissioned by Comer Homes Group to prepare a Flood Risk Assessment (FRA) associated with proposed redevelopment North London Business Park in Barnet, London.

8.2 The overall area of the site is approximately 16.37 hectares (ha) and comprises office buildings, car parking facilities, a Secondary School and numerous other small structures.

8.3 Development proposals comprise a mixed-use development of up to 2,500 residential dwellings, 7,148m^2 of non-residential floorspace, 20,250m^2 of open space and a 5 Form Entry Secondary School.

8.4 The nearest watercourse to the site is Pymmes Brook, located approximately 450m east of the site.

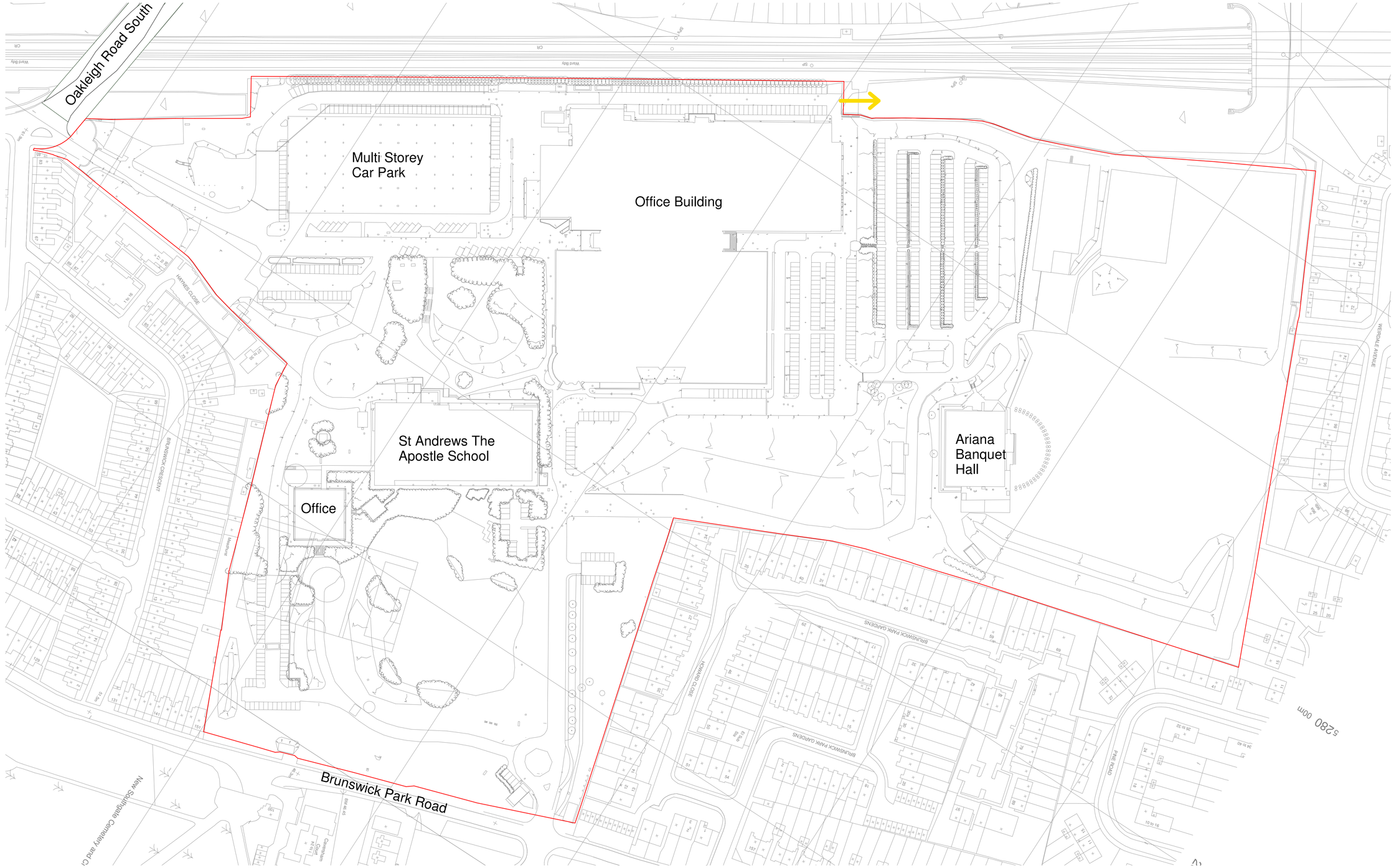
8.5 The proposed development would have an NPPF flood risk vulnerability classification of ‘More Vulnerable’. The proposed development area of the site will be situated mostly within Flood Zone 1. NPPG identifies that ‘More Vulnerable’ uses of land are appropriate within this flood zone.

8.6 It is considered that the site would not be at risk of flooding from surface water, sewer, groundwater or artificial sources.

8.7 A potential surface water outfall from the development would appear to be feasible into the existing public surface water sewer passing through the site.

8.8 The proposed surface water drainage strategy demonstrates a system of SuDS and attenuation features to provide sufficient storage to avoid flooding within the site during the 1 in 100 year storm event + 40% allowance for climate change.

8.9 Overland flow paths will be taken into account in design of levels for the proposed development to direct overland flows away from buildings.



General Notes

1. Development Zones (within which development can occur) and public open spaces are identified on drawing number 211_WS_02_01
2. Access and circulation routes are identified on Drawing number 211_WS_02_02.
3. Landscape treatments are identified on drawing number 211_WS_02_03
4. Allowable uses at ground floor frontages are identified on Drawing number 211_WS_02_04
4. Allowable uses at ground floor frontages are identified on Drawing number 211_WS_02_04
5. Proposed site ground levels, heights, allowable horizontal and vertical deviations are identified on Drawing number 211_WS_02_05

Legend

Planning Application Boundary

NOTES:

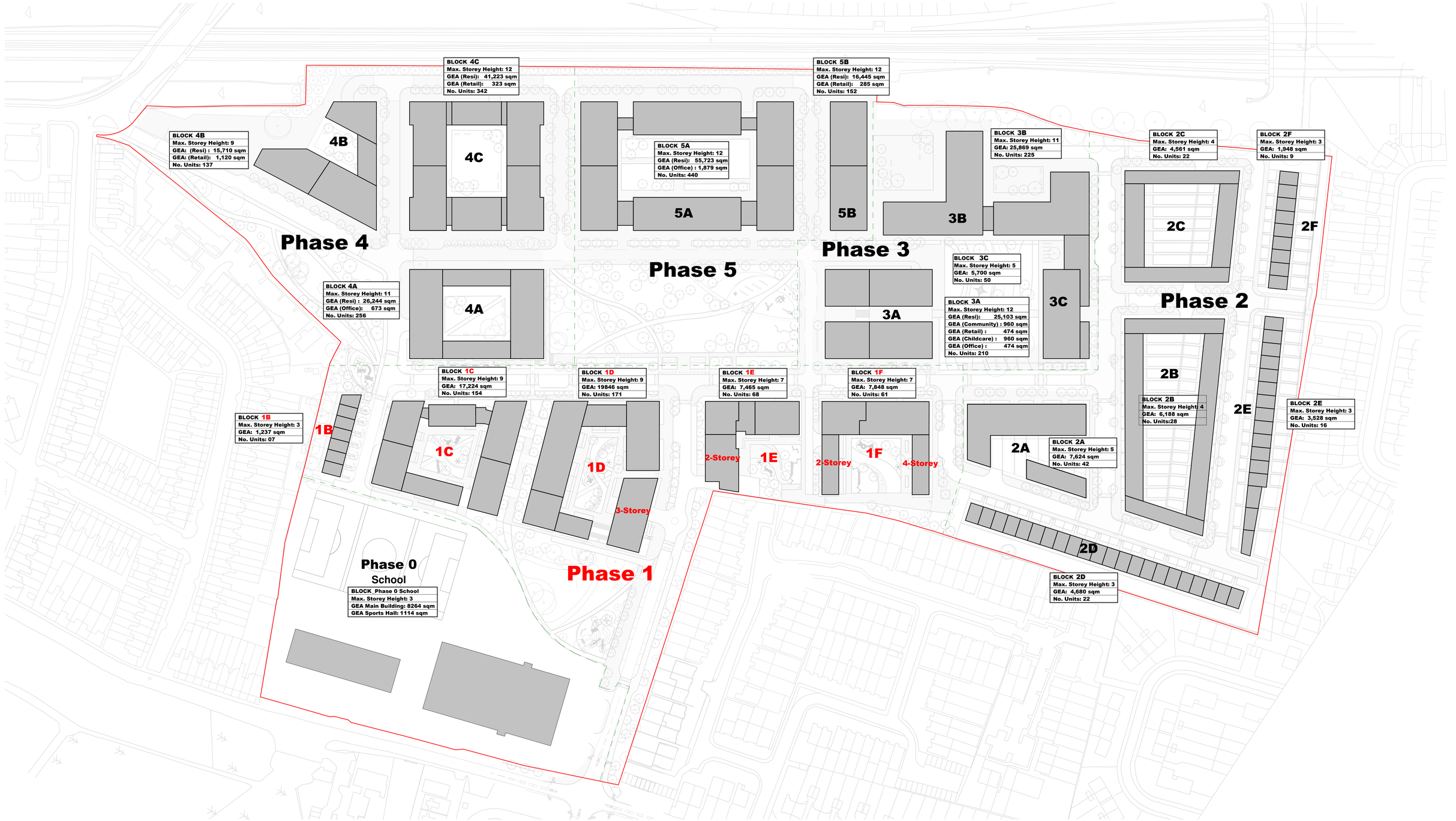
REV.	DATE:	DETAILS:	INITIALS:

NORTH POINT:

KEY PLAN:

PLUSARCHITECTURE
Chancery Lane, Dublin 8, Ireland. W: www.plusarchitecture.ie T: 353 (0) 1 521 3378

PROJECT:	North London Business Park	PROJECT: 211	DATE: 21/06/2021
CLIENT:	The Comer Group	DRAWING NO.: 211_WS_02_00	REVISION NO.:
TITLE:	Existing Site Plan / Red Line Boundary Plan	DRAWN BY.: JG	SCALE AT A1 .: 1 : 1000
ISSUE TYPE:	Planning	CHECKED BY.: DT	SCALE AT A3 .: 1 : 2000



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5. Proposed site ground levels, heights, allowable horizontal and vertical deviations are identified on Drawing number 211_WS_02_05

Additional Notes

1. Refer to the Design Principles Document for further guidance on the Development Zone.
2. Refer to the Design Principles Document for further guidance on the Public Open Space Zones, access routes typologies , and landscaping treatments of streets and spaces.
3. Refer to the Design Principles Document for further guidance on the streets and circulation routes.

Legend

- Planning Application Boundary
- Public Open Space
- Detailed Application Zone Blocks
- Phase 1 — Detailed Application Zone Reference
- 1A — Detailed Application Zone Block Reference
- + 57.00 — Proposed Ground Floor Level
- — — — Detailed Application Phasing boundaries

NOTES:

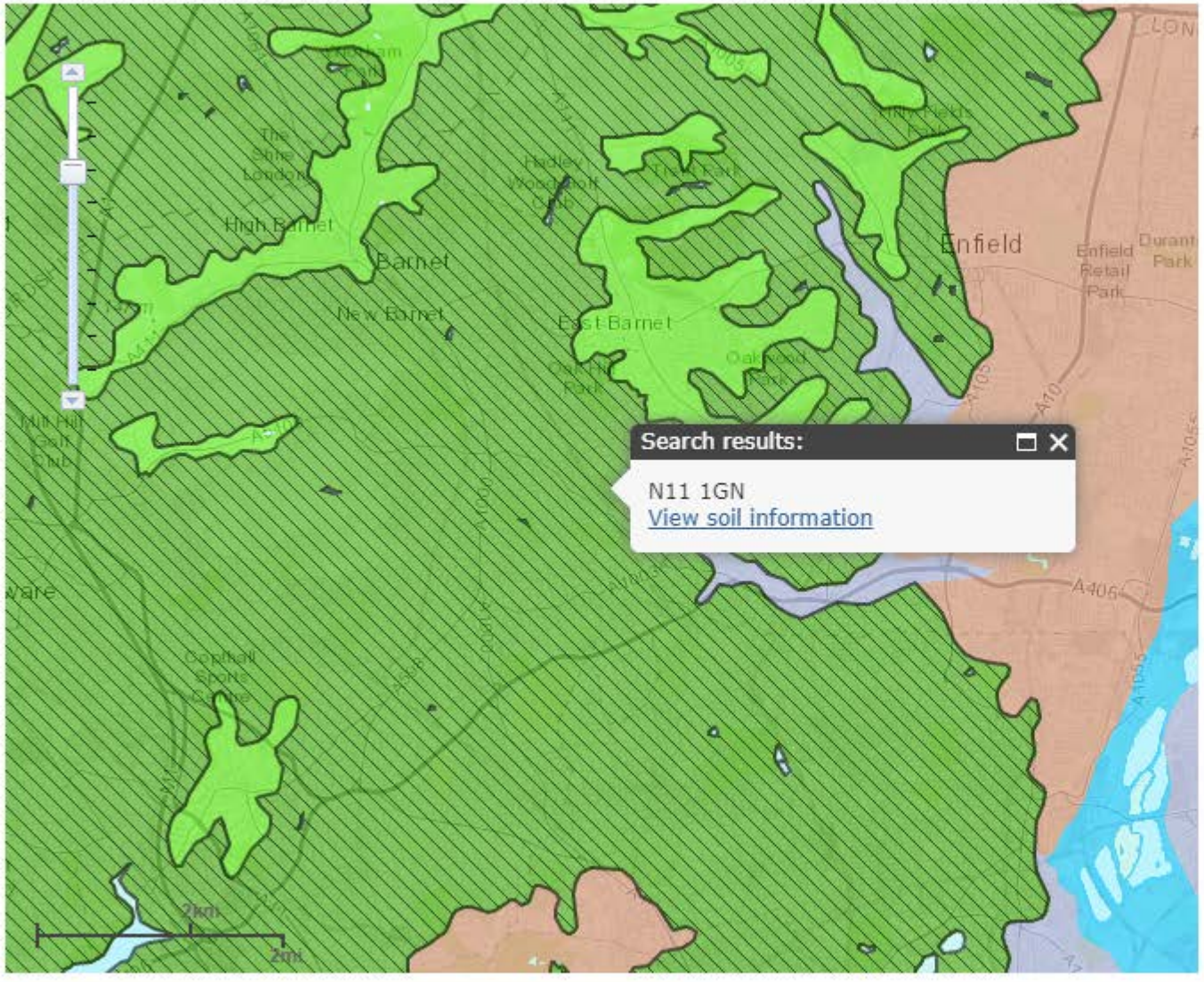
REV.	DATE:	DETAILS:	INITIALS:

NORTH POINT:

KEY PLAN:

PLUS ARCHITECTURE
Chancery Lane, Dublin 8, Ireland. W: www.plusarchitecture.ie T: 353 (0) 1 521 3378

PROJECT: North London Business Park	PROJECT: 211	DATE: 21/06/2021
CLIENT: The Comer Group	DRAWING NO.: 211_WS_02_01	REVISION NO.:
TITLE: Proposed Development Zone Plan	DRAWN BY.: JG	SCALE AT A1 .: 1 : 1000
ISSUE TYPE: Planning	CHECKED BY.: DT	SCALE AT A3 .: 1 : 2000



Adjust transparency

Legend

Search

Soil information

Soilscape 18:
Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils

Texture:
Loamy and clayey

Coverage:
England: 19.9% Wales: 2.4%
England & Wales: 17.5%

Selected area:
483km^2

Drainage:
Impeded drainage

Fertility:
Moderate

Habitats:
Seasonally wet pastures and woodlands

Landcover:
Grassland and arable some woodland

Carbon:
Low

Drains to:

Asset location search

Property Searches

Stomor Ltd
19

HITCHIN
SG4 9SP

Search address supplied

Building 1
Oakleigh Road South
North London Business Park
London
N11 1GN

Your reference ST-3013

Our reference ALS/ALS Standard/2021_4405603

Search date 19 April 2021

Knowledge of features below the surface is essential for every development

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

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

Contact us to find out more.

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

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset location search

Property Searches

Search address supplied: Building 1, Oakleigh Road South, North London Business Park, London, N11 1GN

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

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

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

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

Waste Water Services

Please provide a copy extract from the public sewer map.

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

TQ2893SW
TQ2893NW
TQ2793SE
TQ2793NE

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

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

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

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

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

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

Following examination of our statutory maps, Thames Water has been unable to find

any plans of water mains within this area. If you require a connection to the public water supply system, please write to:

New Connections / Diversions
Thames Water
Network Services Business Centre
Brentford
Middlesex
TW8 0EE

Tel: 0845 850 2777
Fax: 0207 713 3858
Email: developer.services@thameswater.co.uk

The following quartiles have not been printed as they are out of Thames' water catchment area. For details of the assets requested please contact the water company indicated below:

TQ2893SW	Affinity Water
TQ2893NW	Affinity Water
TQ2793SE	Affinity Water
TQ2793NE	Affinity Water

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ

Tel: 0345 3572401

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

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

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

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

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

Clean Water queries

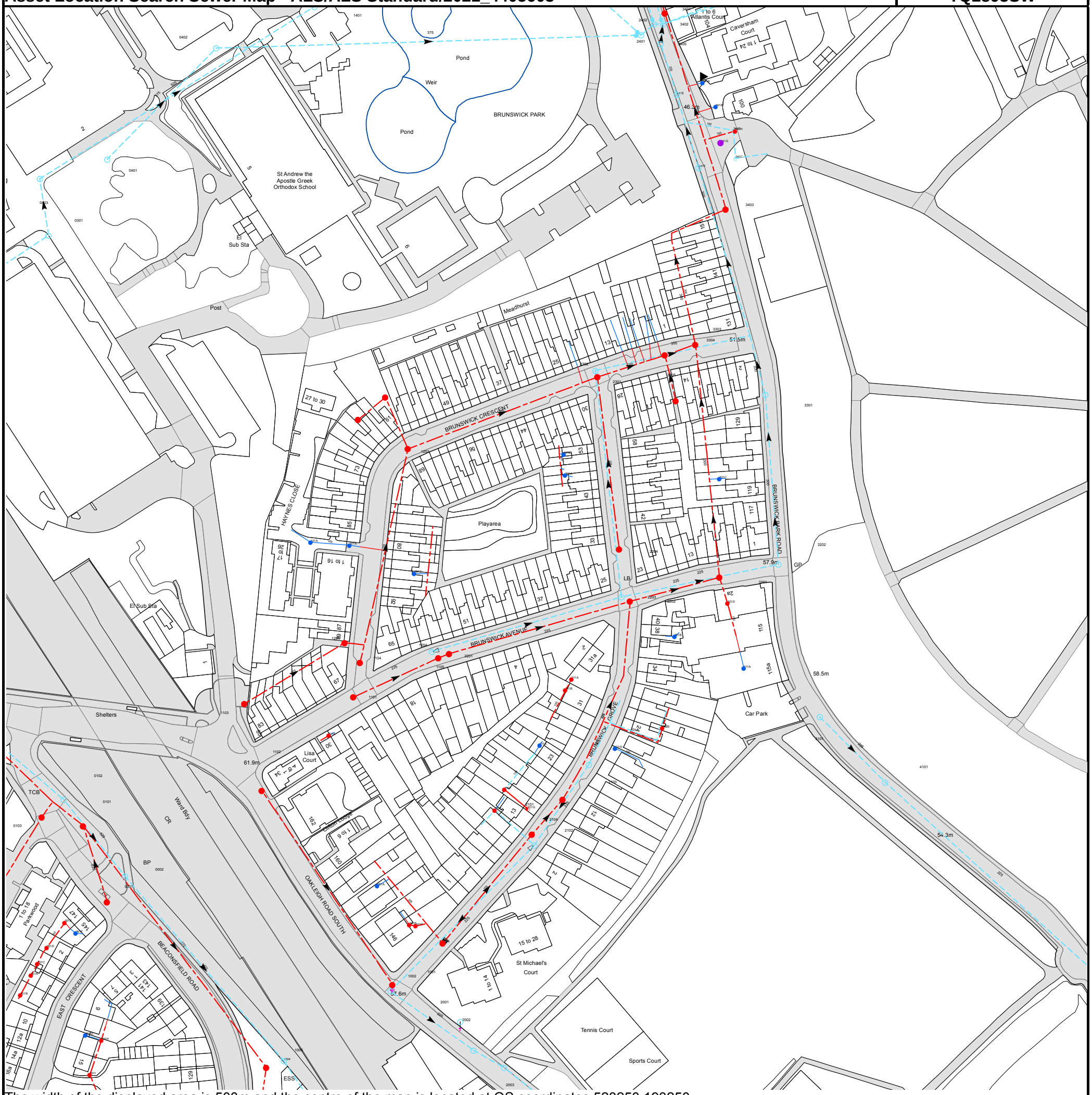
Should you require any advice concerning clean water operational issues or clean water connections, please contact:

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

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

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4405603

TQ2893SW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528250,193250

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2402	45.92	41.04
3405	45.98	44.57
3402	45.99	40.98
3401	45.99	45.08
221B	n/a	n/a
1202	57.7	55.03
3305	54.22	51.9
1301	n/a	n/a
3301	53.24	52.04
2301	55.02	52.99
2302	54.63	53.1
3304	53.15	50.45
3303	52.4	49.68
3403	47.75	46.1
341F	n/a	n/a
341C	n/a	n/a
341G	n/a	n/a
341H	n/a	n/a
341D	n/a	n/a
341B	n/a	n/a
341E	n/a	n/a
341A	n/a	n/a
1401	50.63	47.33
2401	49.38	41.38
4101	55.94	54.16
211D	n/a	n/a
311C	n/a	n/a
311B	n/a	n/a
3101	57.56	55.88
1104	.01	n/a
121C	n/a	n/a
1204	.01	n/a
1105	61.05	58.6
2201	60.94	n/a
221A	n/a	n/a
211A	n/a	n/a
2204	59	n/a
2203	59.86	n/a
2202	59.91	54.67
321B	n/a	n/a
321C	n/a	n/a
3201	58.88	54.08
321D	n/a	n/a
311A	n/a	n/a
3202	58.01	56.76
001I	n/a	n/a
1005	.01	n/a
1004	.01	n/a
2003	54.88	54.11
2002	55.66	54.31
001H	n/a	n/a
001G	n/a	n/a
2001	.01	n/a
1002	57.63	n/a
1001	.01	n/a
2004	58.16	56.18
001F	n/a	n/a
101C	n/a	n/a
101B	n/a	n/a
001E	n/a	n/a
0001	.01	n/a
101A	n/a	n/a
0002	61.18	59.43
2102	59.07	57.86
2101	59.26	55.9
0101	61.88	57.31
211E	n/a	n/a
211G	n/a	n/a
2104	59.59	55.86
1102	61.37	n/a
211F	n/a	n/a
2103	.01	n/a
211C	n/a	n/a
1103	.01	n/a
1101	61.29	59.05
211B	n/a	n/a
001B	n/a	n/a
001A	n/a	n/a
001C	n/a	n/a
0103	62.56	58.07
001D	n/a	n/a
0102	62.34	61.07
111A	n/a	n/a
121A	n/a	n/a
1201	61	59.71
121B	n/a	n/a
1302	n/a	n/a
0402	.01	n/a
0301	57.72	51.12
0403	57.44	51.02
0401	.01	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level

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

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4405603

TQ2893NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528250,193750

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528250,193750

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

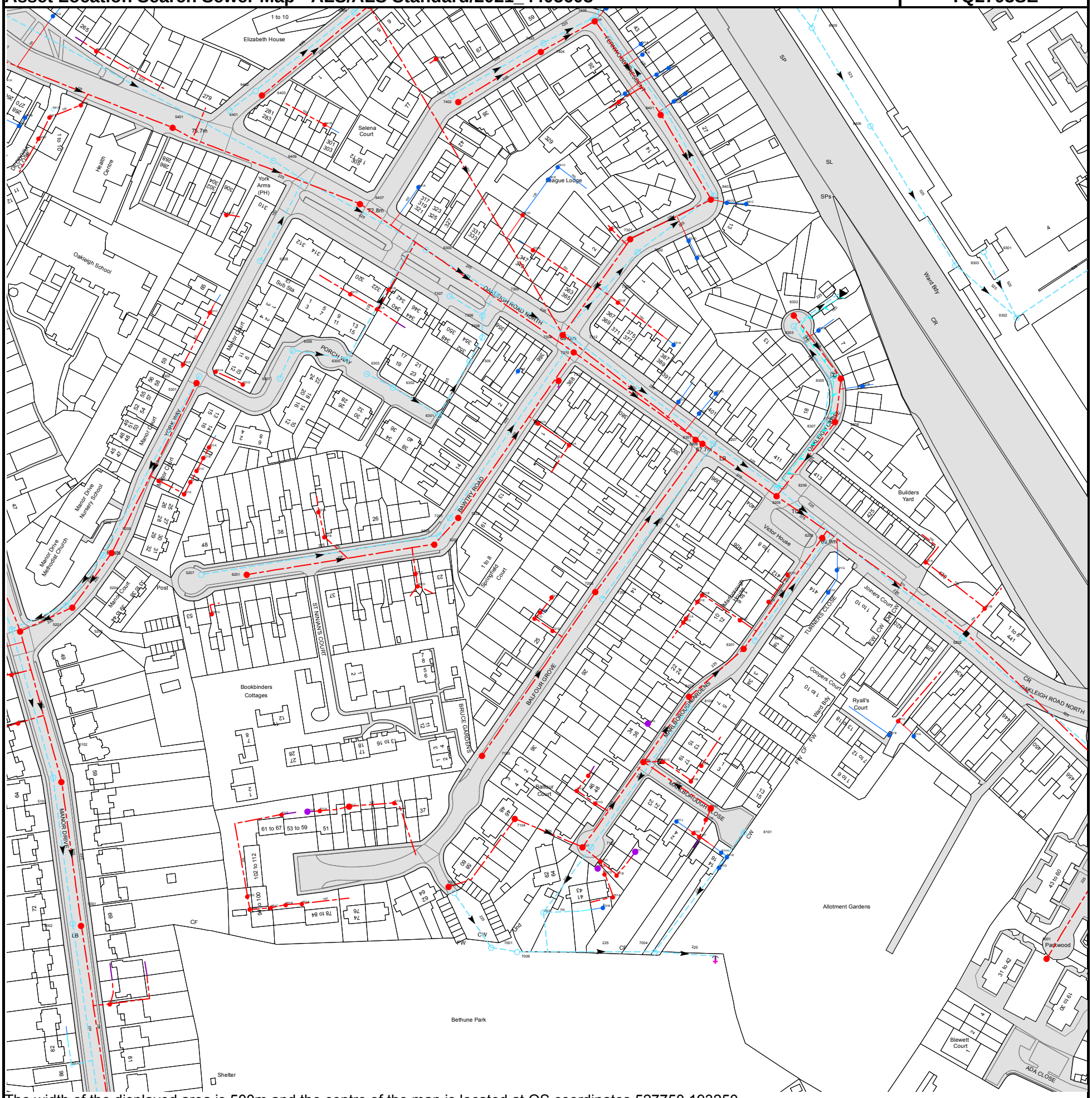
Manhole Reference	Manhole Cover Level	Manhole Invert Level
4706	46.14	43.29
4509	41.3	39.55
451A	n/a	n/a
4501	.01	n/a
4614	n/a	n/a
4508	40.95	39.32
4615	n/a	n/a
4602	45.26	43.07
4616	n/a	n/a
4510	42.89	38.9
4503	42.76	38.51
4502	.01	n/a
4701	43.1	41.5
3723	n/a	n/a
3639	n/a	n/a
3719	n/a	n/a
3724	n/a	n/a
3506	.01	n/a
3640	n/a	n/a
3514	44.75	43
3713	n/a	n/a
4603	n/a	n/a
4702	n/a	n/a
461A	n/a	n/a
4610	n/a	n/a
4506	44.37	42.42
4612	n/a	n/a
451C	n/a	n/a
4708	n/a	n/a
451B	n/a	n/a
4621	43.94	41.39
4611	n/a	n/a
4505	43.57	41.62
4703	n/a	n/a
4704	46.04	43.69
4507	43.72	41.97
4712	n/a	n/a
4711	n/a	n/a
4613	n/a	n/a
4705	45.97	42.12
4801	.01	n/a
4802	.01	n/a
3901	.01	n/a
4901	.01	n/a
2513	46.17	44.87
2507	46.27	45.47
2514	46.96	45.2
3622	n/a	n/a
2505	46.74	44.22
3510	46.76	44.83
3517	46.6	44.84
3509	46.54	44.06
3621	n/a	n/a
3508	46.39	44
3518	46.37	44.6
3603	n/a	n/a
3620	n/a	n/a
3619	n/a	n/a
3513	46.32	43.23
3504	45.6	43.03
3602	45.54	43.09
3507	45.66	43.68
3519	45.58	43.95
3601	44.79	43.09
3516	45.59	43.73
3515	45.66	43.73
3505	.01	n/a
2602	49.49	46.91
2703	49.55	47.32
2615	48.85	47.11
2603	48.79	46.98
2604	48.8	46.6
2605	48.47	n/a
261B	n/a	n/a
261C	n/a	n/a
261A	n/a	n/a
2704	48.79	47.94
371A	n/a	n/a
371B	n/a	n/a
3715	n/a	n/a
371C	n/a	n/a
3721	n/a	n/a
3717	n/a	n/a
3722	n/a	n/a
3607	n/a	n/a
3633	n/a	n/a
3714	n/a	n/a
3802	47.99	46.4
3720	n/a	n/a
3606	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3632	n/a	n/a
3638	n/a	n/a
3718	n/a	n/a
3612	n/a	n/a
161E	n/a	n/a
151D	n/a	n/a
151B	n/a	n/a
1604	52.66	50.37
1602	52.04	51.03
151C	n/a	n/a
161D	n/a	n/a
1603	51.04	49.47
151A	n/a	n/a
2611	50.18	49.16
2614	50.3	48.37
2511	.01	n/a
2610	49.56	48.3
2613	49.55	48.21
2609	49.55	48.1
2608	49.23	47.7
2612	49.26	47.98
2607	48.43	46.6
2606	48.44	46.27
2504	47.75	45.63
2503	46.63	43.88
2502	46.6	n/a
2501	46.58	45.28
261D	n/a	n/a
261E	n/a	n/a
2620	n/a	n/a
251A	n/a	n/a
1914	50.2	47.42
2905	48.53	45.56
1908	n/a	n/a
1916	49.85	47.4
1902	49.8	47.05
1917	50	47.39
1918	49.67	46.98
2902	49.75	46.84
2903	49.8	47
191C	n/a	n/a
1805	59.66	57.74
1806	59.34	n/a
181C	n/a	n/a
2803	n/a	n/a
181B	n/a	n/a
181E	n/a	n/a
181A	n/a	n/a
3803	n/a	n/a
1803	53.53	53.22
1802	53.4	52.11
2804	n/a	n/a
1801	56.57	n/a
1907	52.62	n/a
1906	51.53	n/a
1903	51.2	48.04
1913	50.83	n/a
191A	n/a	n/a
161G	n/a	n/a
161F	n/a	n/a
161I	n/a	n/a
171C	n/a	n/a
171D	n/a	n/a
171F	n/a	n/a
161C	n/a	n/a
1609	54.33	53.5
161B	n/a	n/a
1610	54.28	53.18
161A	n/a	n/a
1608	53.56	52.64
1607	53.43	52.14
1605	52.89	49.52
181D	n/a	n/a
1606	53.39	50.49
171A	n/a	n/a
1807	52.48	50.74
1804	52.35	50.04
2619	50.9	49.49
2618	48.85	47.11
2702	51.3	n/a
2701	51.29	n/a
2601	49.53	47.45
161H	n/a	n/a
0601	59.59	57.76
0602	59.58	58.06
061A	n/a	n/a
071C	n/a	n/a
0701	59.6	n/a
071B	n/a	n/a
071A	n/a	n/a
071H	n/a	n/a
071G	n/a	n/a
171E	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
071D	n/a	n/a
171G	n/a	n/a
0803	62.32	60.23
081B	n/a	n/a
081E	n/a	n/a
081C	n/a	n/a
081D	n/a	n/a
0806	57.86	56.05
0807	57.51	n/a
0808	57.45	n/a
0910	57.9	56.28
0903	55.78	n/a
0911	56.9	53.89
091G	56.13	55.09
0912	55.51	53.62
091H	56.13	54.77
0904	55.51	n/a
0913	55.09	53.47
0902	54.67	51.32
0905	55.05	n/a
0901	53.69	51.26
091D	n/a	n/a
0908	55.12	52.88
0906	54.46	52.89
0907	54.49	53.24
0909	57.94	56.84
091I	58.03	56.81
091F	57.65	56.28
091A	n/a	n/a
091B	n/a	n/a
091C	n/a	n/a
0802	62.47	n/a
081A	n/a	n/a
0804	59.59	n/a
0801	63.16	n/a
3902	46.87	44.48
191B	n/a	n/a
2901	49.06	48.24
1901	48.44	45.49
1912	48.84	46.98

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4405603

TQ2793SE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 527750,193250

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
811H	n/a	n/a
811E	n/a	n/a
8101	64.74	63.58
911B	n/a	n/a
911C	n/a	n/a
911A	n/a	n/a
9001	.01	-1.49
831H	n/a	n/a
821D	n/a	n/a
821A	n/a	n/a
8301	67.66	64.92
821E	n/a	n/a
831F	n/a	n/a
821B	n/a	n/a
8208	67.63	60.12
8207	67.52	66.35
831G	n/a	n/a
821C	n/a	n/a
8201	.01	n/a
8202	68.27	66.75
8206	67.18	65.93
8205	66.72	n/a
8203	66.93	59.75
8307	.01	n/a
821F	n/a	n/a
8308	64.32	60.16
821G	n/a	n/a
831B	n/a	n/a
921A	n/a	n/a
9202	65.8	64.27
921B	n/a	n/a
711I	n/a	n/a
7101	65.91	61.93
711H	n/a	n/a
7004	.01	n/a
811C	n/a	n/a
811J	n/a	n/a
8104	.01	n/a
8103	.01	n/a
811B	n/a	n/a
811I	n/a	n/a
811F	n/a	n/a
811A	n/a	n/a
811G	n/a	n/a
8102	.01	n/a
811D	n/a	n/a
7006	.01	n/a
7001	.01	n/a
7003	.01	n/a
701B	n/a	n/a
701A	n/a	n/a
7002	.01	n/a
701D	n/a	n/a
711B	n/a	n/a
711D	n/a	n/a
711A	n/a	n/a
711C	n/a	n/a
7103	64.28	62.36
7102	68.35	66.78
7104	.01	n/a
711G	n/a	n/a
711F	n/a	n/a
711E	n/a	n/a
7105	.01	n/a
721E	n/a	n/a
721D	n/a	n/a
721C	n/a	n/a
7204	70.93	68.01
721F	n/a	n/a
7203	.01	n/a
6202	73.11	70.82
6203	72.84	71.12
7201	72.84	70.91
7202	.01	n/a
531D	n/a	n/a
521E	n/a	n/a
521D	n/a	n/a
521C	n/a	n/a
5301	.01	n/a
5302	.01	n/a
521B	n/a	n/a
521A	n/a	n/a
531C	n/a	n/a
531A	n/a	n/a
631D	n/a	n/a
6307	.01	n/a
6306	75.41	73.96
6305	74.97	73.14
6303	.01	n/a
631A	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
6302	.01	n/a
6301	73.65	72.18
7309	.01	n/a
7306	70.57	69.41
7308	.01	n/a
731E	n/a	n/a
731D	n/a	n/a
7311	.01	n/a
7304	69.08	60.88
721A	n/a	n/a
7310	88.93	n/a
7312	68.93	n/a
5002	.01	n/a
501B	n/a	n/a
601E	n/a	n/a
601D	n/a	n/a
601C	n/a	n/a
611E	n/a	n/a
601B	n/a	n/a
601A	n/a	n/a
611D	n/a	n/a
611A	n/a	n/a
611C	n/a	n/a
5101	.01	n/a
5102	.01	n/a
501A	n/a	n/a
5001	.01	n/a
511A	n/a	n/a
511B	n/a	n/a
511C	n/a	n/a
5202	76.31	73.98
5201	76.36	74.68
5204	.01	n/a
5203	.01	n/a
621D	n/a	n/a
5207	75.41	73.96
6201	.01	n/a
621C	n/a	n/a
5205	.01	n/a
5206	.01	n/a
621B	n/a	n/a
621A	n/a	n/a
741A	n/a	n/a
741B	n/a	n/a
8405	57.31	53.5
8305	62.89	61.66
8306	.01	n/a
831A	n/a	n/a
831E	n/a	n/a
8303	62.57	61.27
9302	57.3	51.67
8302	62.41	60.49
9303	56.94	51.99
831C	n/a	n/a
9301	57.61	52.03
7302	.01	n/a
831D	n/a	n/a
7301	.01	n/a
841C	n/a	n/a
841D	n/a	n/a
8404	62.58	61.39
8403	.01	n/a
8406	57.03	52.93
8401	.01	n/a
8402	.01	n/a
841F	n/a	n/a
841E	n/a	n/a
741G	n/a	n/a
841G	n/a	n/a
7307	.01	n/a
7401	.01	n/a
7402	.01	n/a
7305	70.22	n/a
741D	n/a	n/a
731C	n/a	n/a
7404	.01	n/a
7403	.01	n/a
741E	n/a	n/a
741C	n/a	n/a
7406	.01	n/a
7405	63.59	60.85
7303	.01	n/a
741H	n/a	n/a
731A	n/a	n/a
731B	n/a	n/a
741F	n/a	n/a
5401	.01	n/a
641C	n/a	n/a
6401	75.37	73.84
6402	74.02	72.37
6308	75.77	74.8
6403	.01	n/a
6406	75.18	73.02

Manhole Reference	Manhole Cover Level	Manhole Invert Level
641B	n/a	n/a
631C	n/a	n/a
6404	68.48	66.91
6407	.01	n/a
6405	68.19	61.24
631B	n/a	n/a
641A	n/a	n/a
6309	.01	n/a
641D	n/a	n/a
541F	n/a	n/a
541H	n/a	n/a
541G	n/a	n/a
521F	n/a	n/a
541D	n/a	n/a
541C	n/a	n/a
541B	n/a	n/a
541A	n/a	n/a
521G	n/a	n/a
821I	n/a	n/a
821H	n/a	n/a
611B	n/a	n/a
541E	n/a	n/a
741I	n/a	n/a

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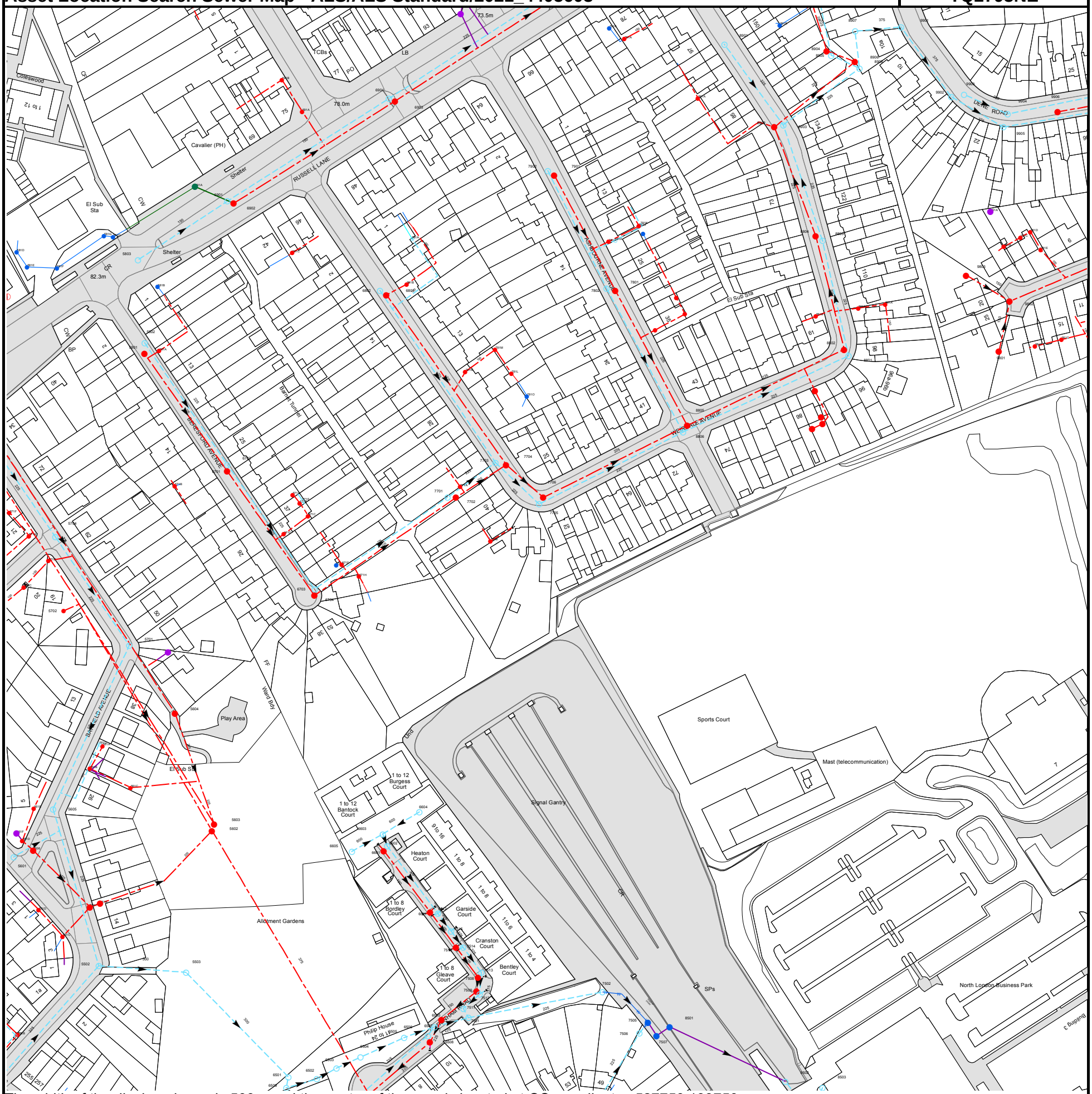
Asset Location Search Sewer Map - ALS/ALS Standard/2021_4405603

TQ2793NE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 527750,193750

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9905	59.5	57.12
9904	59.36	58.21
9906	58.91	57.42
9902	60.51	58.28
9903	60.26	58.48
8908	64.86	63.91
9901	61.81	59.64
9801	.01	n/a
981F	n/a	n/a
981G	n/a	n/a
881A	n/a	n/a
981A	n/a	n/a
9802	62.64	61.17
9803	.01	n/a
981E	n/a	n/a
981B	n/a	n/a
981C	n/a	n/a
981D	n/a	n/a
991A	n/a	n/a
7506	.01	n/a
7505	n/a	n/a
7507	n/a	n/a
8501	n/a	n/a
8806	72.66	n/a
8805	72.58	69.68
8502	n/a	n/a
8807	n/a	n/a
8809	n/a	n/a
8810	n/a	n/a
8503	57.72	53.87
8808	n/a	n/a
8801	68.04	66.11
8802	68	65.75
7804	n/a	n/a
881B	n/a	n/a
8811	n/a	n/a
8812	n/a	n/a
8803	66.32	64.45
8804	66.26	n/a
7803	n/a	n/a
781J	n/a	n/a
781K	n/a	n/a
8902	66.34	63.96
8903	66.31	64.18
891A	n/a	n/a
8906	64.9	63.71
8905	65.13	63.82
8904	65.15	63.63
8901	68.09	66.8
8907	.01	n/a
891B	n/a	n/a
7515	66.2	64.432
7510	66.267	64.72
7514	65.82	64.22
7511	65.5	62.6
7501	65.8	62.22
7509	65.7	64.33
7508	65.82	64.38
7512	65.55	63.623
7513	65.648	63.87
7502	n/a	n/a
6704	76.33	74.83
6703	76.32	74.85
671H	n/a	n/a
671G	n/a	n/a
671F	n/a	n/a
771B	n/a	n/a
671C	n/a	n/a
7705	75.17	72.93
671B	n/a	n/a
671E	n/a	n/a
7706	75.12	72.59
7701	76.44	n/a
7702	76.46	n/a
771A	n/a	n/a
7704	75.65	n/a
7703	75.67	n/a
781O	n/a	n/a
781L	n/a	n/a
781N	n/a	n/a
781M	n/a	n/a
6801	77.5	75.63
7801	72.38	n/a
6802	77.56	75.97
7802	72.36	n/a
681B	n/a	n/a
781H	n/a	n/a
781A	n/a	n/a
681A	n/a	n/a
5503	.01	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
6509	.01	n/a
6501	69.93	68.9
6502	67.94	67.04
6503	.01	n/a
6504	.01	n/a
6505	65.9	63.73
6506	65.71	64.11
6508	65.84	63.85
6507	65.43	n/a
6510	65.28	64
5702	.01	n/a
571C	n/a	n/a
571D	n/a	n/a
5704	81.76	n/a
571A	n/a	n/a
671D	n/a	n/a
671A	n/a	n/a
571B	n/a	n/a
6701	79.84	77.86
6702	79.89	78.2
5801	81.78	79.91
581A	n/a	n/a
5802	81.81	80.31
5804	n/a	n/a
581B	n/a	n/a
581F	n/a	n/a
581E	n/a	n/a
5803	81.87	80.72
681C	n/a	n/a
581D	n/a	n/a
581H	n/a	n/a
581G	n/a	n/a
591A	n/a	n/a
6512	66.634	64.685
6511	66.756	65.34
551D	n/a	n/a
5501	76.19	73.49
551E	n/a	n/a
5601	78.18	76.33
6605	n/a	65.34
6601	67.58	66.25
5606	77.63	75.45
6602	67.675	65.187
561D	n/a	n/a
6603	n/a	65.3
561F	n/a	n/a
5602	72.66	62.8
5603	72.83	n/a
6604	n/a	65.348
5605	77.22	75.85
561E	n/a	n/a
561C	n/a	n/a
561B	n/a	n/a
561A	n/a	n/a
5604	76.72	n/a
571E	n/a	n/a
5701	78.82	n/a
551A	n/a	n/a
551B	n/a	n/a
5502	76.28	74.53
551C	n/a	n/a
571F	n/a	n/a
561G	n/a	n/a
6902	80.43	n/a
7901	72.89	n/a
7902	77.84	n/a
691A	n/a	n/a
6903	76.6	n/a
6904	76.51	n/a
691B	n/a	n/a
791A	n/a	n/a
791B	n/a	n/a
7904	n/a	n/a
7903	n/a	n/a
6901	80.48	n/a

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ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

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

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2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
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7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

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

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

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

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Jack Dudmish
Site name:	NLBP
Site location:	Barnet

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.62536° N
Longitude:	0.15124° W
Reference:	1884100542
Date:	Jul 05 2021 17:14

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 16.37

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	670	670
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	75.08	75.08
1 in 1 year (l/s):	63.82	63.82
1 in 30 years (l/s):	172.69	172.69
1 in 100 year (l/s):	239.52	239.52
1 in 200 years (l/s):	280.81	280.81

Rev	Description	Date	Drawn	Checked	Apvd.

Project

ROYAL BRUNSWICK PARK - NEW SOUTHGATE

Drawing Description

DRAINAGE STRATEGY - WHOLE SITE - SHEET 1 OF 3

Project Number	*Drawing Number*
ST-3013	501

Scale	*Date*	*Drawn*	*Checked*	*Approved*
1:500@A1	04.05.21	TJW	SB	NJM

Client

Architect

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ATTENUATION TANK 3
10.0x15.0x2.0 MODULAR TANK
INVERT LEVEL - 55.950m AOD
STORAGE VOLUME - 285m³

COMPLEX FLOW CONTROL CHAMBER
LIMITING FLOWS FROM PHASE 5 INTO
THE PHASE 1 INFRASTRUCTURE

ATTENUATION TANK 5
20.0x30.0x2.0 MODULAR TANK
INVERT LEVEL - 54.500m AOD
STORAGE VOLUME - 1140m³

COMPLEX FLOW CONTROL CHAMBER
LIMITING FLOWS FROM PHASE 4 INTO
THE PHASE 1 INFRASTRUCTURE

ATTENUATION TANK 4
15.0x25.0x2.0 MODULAR TANK
INVERT LEVEL - 50.600m AOD
STORAGE VOLUME - 712.5m³

KEY

- SITE BOUNDARY
- EXISTING PUBLIC FOUL WATER SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- PROPOSED DETENTION BASIN WITH PERMANENT WATER LEVEL
- PROPOSED POROUS PAVING
- PROPOSED SURFACE WATER PIPE RUN
- PROPOSED SURFACE WATER INSPECTION CHAMBER
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER PIPE RUN
- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER INSPECTION CHAMBER
- PROPOSED FOUL WATER DRAINAGE FOR FUTURE PHASES
- PROPOSED SURFACE WATER DRAINAGE FOR FUTURE PHASES
- PROPOSED MODULAR STORAGE TANK
- PROPOSED GREEN ROOF
- PROPOSED GRANULAR STORAGE AREA TO COURTYARDS
- PROPOSED PERFORATED PIPE WITHIN COURTYARD STORAGE
- PROPOSED RAIN GARDEN - PRIMARY TREATMENT FOR HIGHWAY RUNOFF

THIS IS AN INDICATIVE DRAINAGE & LEVELS STRATEGY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES. DRAINAGE PROPOSALS ARE SUBJECT TO DETAILED DESIGN. THE ACTUAL POSITION AND DETAILS OF ANY EXISTING SERVICES ARE SUBJECT TO A DETAILED SURVEY.

0 5 10 15 20 25m
SCALE BAR 1:500

Rev	Description	Date	Drawn	Checked	Apvd.

Project

ROYAL BRUNSWICK PARK - NEW SOUTHGATE

Drawing Description

DRAINAGE STRATEGY - WHOLE SITE - SHEET 2 OF 3

Project Number	Drawing Number
ST-3013	502

Scale	Date	Drawn	Checked	Approved
1:500@A1	04.05.21	TJW	SB	NJM

Client

Architect

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KEY

- SITE BOUNDARY
- EXISTING PUBLIC FOUL WATER SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- PROPOSED DETENTION BASIN WITH PERMANENT WATER LEVEL
- PROPOSED POROUS PAVING
- PROPOSED SURFACE WATER PIPE RUN
- PROPOSED SURFACE WATER INSPECTION CHAMBER
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER PIPE RUN
- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER INSPECTION CHAMBER
- PROPOSED FOUL WATER DRAINAGE FOR FUTURE PHASES
- PROPOSED SURFACE WATER DRAINAGE FOR FUTURE PHASES
- PROPOSED MODULAR STORAGE TANK
- PROPOSED GREEN ROOF
- PROPOSED GRANULAR STORAGE AREA TO COURTYARDS
- PROPOSED PERFORATED PIPE WITHIN COURTYARD STORAGE
- PROPOSED RAIN GARDEN - PRIMARY TREATMENT FOR HIGHWAY RUNOFF

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ATTENUATION TANK 2
15.0x25.0x2.0 MODULAR TANK
INVERT LEVEL - 62.200m AOD
STORAGE VOLUME - 712.5m³

ATTENUATION TANK 3
10.0x15.0x2.0 MODULAR TANK
INVERT LEVEL - 55.950m AOD
STORAGE VOLUME - 285m³

ATTENUATION TANK 5
20.0x30.0x2.0 MODULAR TANK
INVERT LEVEL - 54.500m AOD
STORAGE VOLUME - 1140m³

COMPLEX FLOW CONTROL CHAMBER LIMITING FLOWS FROM PHASE 3 INTO THE PHASE 1 INFRASTRUCTURE

COMPLEX FLOW CONTROL CHAMBER LIMITING FLOWS FROM PHASE 5 INTO THE PHASE 1 INFRASTRUCTURE

SCALE BAR 1:500
0 5 10 15 20 25m

KEY

- SITE BOUNDARY
- EXISTING PUBLIC FOUL WATER SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- PROPOSED DETENTION BASIN WITH PERMANENT WATER LEVEL
- PROPOSED SURFACE WATER PIPE RUN
- PROPOSED SURFACE WATER INSPECTION CHAMBER
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER PIPE RUN
- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER INSPECTION CHAMBER
- PROPOSED FOUL WATER DRAINAGE FOR FUTURE PHASES
- PROPOSED SURFACE WATER DRAINAGE FOR FUTURE PHASES
- PROPOSED MODULAR STORAGE TANK
- PROPOSED RAIN GARDEN - PRIMARY TREATMENT FOR HIGHWAY RUNOFF

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THE APPROVED FLOOD RISK ASSESSMENT SUGGESTS THAT INFILTRATION MAY BE A VIABLE SOLUTION IN THE WESTERN PARTS OF THE SITE. THE USE OF INFILTRATION TECHNIQUES IS FAVORED OVER TRADITIONAL PIPED NETWORKS AND MAY RESULT IN REDUCED PIPE SIZES AND REDUCED STORAGE REQUIREMENTS

Rev	Description	Date	Drawn	Checked	Apvd.

Project

ROYAL BRUNSWICK PARK - NEW SOUTHGATE

Drawing Description

DRAINAGE STRATEGY - WHOLE SITE - SHEET 3 OF 3

Project Number	*Drawing Number*			
ST-3013	503			
Scale	*Date*	*Drawn*	*Checked*	*Approved*
1:500@A1	04.05.21	TJW	SB	NJM

Client *Architect*

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COMPLEX FLOW CONTROL CHAMBERS LIMITING FLOWS FROM PHASE 2 INTO THE PHASE 1 INFRASTRUCTURE

ATTENUATION TANK 2
15.0x25.0x2.0 MODULAR TANK
INVERT LEVEL - 62.200m AOD
STORAGE VOLUME - 712.5m³

ATTENUATION TANK 6
13.0x25.0x1.6 MODULAR TANK
INVERT LEVEL -62.800m AOD
STORAGE VOLUME - 494m³

COMPLEX FLOW CONTROL CHAMBER LIMITING FLOWS FROM PHASE 3 INTO THE PHASE 1 INFRASTRUCTURE

ATTENUATION TANK 3
10.0x15.0x2.0 MODULAR TANK
INVERT LEVEL - 55.950m AOD
STORAGE VOLUME - 285m³

0 5 10 15 20 25m
SCALE BAR 1:500

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.441	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 1

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.779	4-8	5.070	8-12	0.769

Total Area Contributing (ha) = 6.618

Total Pipe Volume (m³) = 632.547

Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	44.357	0.554	80.1	0.152	5.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	43.867	0.548	80.0	0.159	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.002	9.405	0.118	79.7	0.082	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.000	19.091	0.239	79.9	0.024	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.36	67.868	0.152	0.0	0.0	0.0	2.03	223.8	20.6
1.001	50.00	5.73	67.313	0.311	0.0	0.0	0.0	2.03	223.8	42.1
1.002	50.00	5.80	66.765	0.393	0.0	0.0	0.0	2.03	224.3	53.2
2.000	50.00	5.22	66.961	0.024	0.0	0.0	0.0	1.46	58.2	3.2

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	30.750	0.384	80.1	0.058	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.004	37.745	0.472	80.0	0.063	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	31.211	0.624	50.0	0.046	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	8.078	0.162	49.9	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	54.677	2.187	25.0	0.151	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	21.894	0.876	25.0	0.202	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	6.559	0.262	25.0	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	43.775	1.751	25.0	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	24.098	0.482	50.0	0.026	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	51.405	1.028	50.0	0.087	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	45.790	0.458	100.0	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	32.407	0.324	100.0	0.176	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	48.910	1.223	40.0	0.113	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	26.892	0.672	40.0	0.025	5.00	0.0	0.600	o	300	Pipe/Conduit	
5.001	31.130	0.778	40.0	0.071	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	6.06	66.647	0.475	0.0	0.0	0.0	2.03	223.8	64.3
1.004	50.00	6.37	66.263	0.538	0.0	0.0	0.0	2.03	224.0	72.9
3.000	50.00	5.28	66.652	0.046	0.0	0.0	0.0	1.85	73.7	6.2
3.001	50.00	5.35	66.028	0.055	0.0	0.0	0.0	1.86	73.8	7.4
1.005	50.00	6.62	65.791	0.744	0.0	0.0	0.0	3.64	401.7	100.7
1.006	50.00	6.72	63.604	0.946	0.0	0.0	0.0	3.64	401.7	128.1
1.007	50.00	6.75	62.728	0.984	0.0	0.0	0.0	3.16	223.0	133.2
1.008	50.00	6.98	62.466	1.025	0.0	0.0	0.0	3.16	223.2	138.8
4.000	50.00	5.22	69.532	0.026	0.0	0.0	0.0	1.85	73.7	3.5
4.001	50.00	5.68	69.050	0.113	0.0	0.0	0.0	1.85	73.7	15.3
4.002	50.00	6.16	67.947	0.162	0.0	0.0	0.0	1.57	111.1	21.9
4.003	50.00	6.51	67.489	0.338	0.0	0.0	0.0	1.57	111.1	45.8
5.000	50.00	5.39	70.389	0.113	0.0	0.0	0.0	2.07	82.5	15.3
6.000	50.00	5.18	69.763	0.025	0.0	0.0	0.0	2.49	176.2	3.4
5.001	50.00	5.60	69.091	0.209	0.0	0.0	0.0	2.49	176.2	28.3

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.002	45.922	1.148	40.0	0.158	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	46.195	1.155	40.0	0.037	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.005	56.494	3.860	14.6	0.259	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	8.300	0.200	41.5	0.000	5.00	0.0	0.600	oo	300	Double Pipe	
4.006	25.898	1.210	21.4	0.172	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	32.830	2.189	15.0	0.094	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.010	42.779	2.852	15.0	0.070	0.00	0.0	0.600	o	300	Pipe/Conduit	
8.000	20.244	1.012	20.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	33.031	0.661	50.0	0.064	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.000	9.111	0.628	14.5	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	31.845	0.623	51.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
10.000	34.971	0.437	80.0	0.145	5.00	0.0	0.600	o	300	Pipe/Conduit	
11.000	12.982	0.052	250.0	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.002	50.00	5.91	68.313	0.367	0.0	0.0	0.0	2.49	176.2	49.7
4.004	50.00	6.78	67.090	0.742	0.0	0.0	0.0	2.87	317.3	100.5
4.005	50.00	6.95	65.860	1.001	0.0	0.0	0.0	5.34	848.6	135.5
7.000	50.00	5.06	62.200	0.000	0.0	0.0	0.0	2.45	346.0	0.0
4.006	50.00	7.10	62.000	1.173	0.0	0.0	0.0	2.84	113.0«	158.8
1.009	50.00	7.24	60.715	2.292	0.0	0.0	0.0	4.08	288.4«	310.4
1.010	50.00	7.41	58.526	2.362	0.0	0.0	0.0	4.08	288.4«	319.8
8.000	50.00	5.11	58.045	0.000	0.0	0.0	0.0	2.94	116.9	0.0
8.001	50.00	5.41	57.032	0.064	0.0	0.0	0.0	1.85	73.7	8.7
9.000	50.00	5.04	57.000	0.000	0.0	0.0	0.0	3.45	137.3	0.0
8.002	50.00	5.65	56.297	0.064	0.0	0.0	0.0	2.20	155.7	8.7
10.000	50.00	5.33	56.340	0.145	0.0	0.0	0.0	1.76	124.3	19.6
11.000	50.00	5.22	55.955	0.000	0.0	0.0	0.0	0.99	70.0	0.0

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
10.001	18.274	0.228	80.1	0.126	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.011	68.102	1.362	50.0	0.161	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.000	25.033	0.125	200.3	0.089	5.00	0.0	0.600	o	300	Pipe/Conduit	
12.001	47.773	0.239	199.9	0.085	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.002	28.455	0.142	200.4	0.070	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.003	58.355	0.167	349.4	0.057	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.004	35.927	0.103	348.8	0.163	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.005	33.904	0.097	349.5	0.053	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.006	35.813	0.102	351.1	0.088	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.000	23.645	0.118	200.4	0.073	5.00	0.0	0.600	o	300	Pipe/Conduit	
13.001	43.782	0.175	250.2	0.056	0.00	0.0	0.600	o	375	Pipe/Conduit	
13.002	51.798	0.207	250.2	0.177	0.00	0.0	0.600	o	375	Pipe/Conduit	
14.000	25.137	1.676	15.0	0.465	5.00	0.0	0.600	oo	375	Double Pipe	
14.001	34.597	2.300	15.0	0.110	0.00	0.0	0.600	o	375	Pipe/Conduit	
13.003	37.429	0.150	250.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
13.004	30.468	0.122	249.7	0.239	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
10.001	50.00	5.50	55.903	0.271	0.0	0.0	0.0	1.76	124.2	36.7
1.011	50.00	7.81	55.524	2.858	0.0	0.0	0.0	2.88	458.1	387.0
12.000	50.00	5.38	55.680	0.089	0.0	0.0	0.0	1.11	78.3	12.1
12.001	50.00	5.93	55.404	0.174	0.0	0.0	0.0	1.43	228.1	23.6
12.002	50.00	6.26	55.166	0.244	0.0	0.0	0.0	1.43	227.8	33.0
12.003	50.00	7.16	55.023	0.301	0.0	0.0	0.0	1.08	172.1	40.8
12.004	50.00	7.71	54.857	0.464	0.0	0.0	0.0	1.08	172.2	62.8
12.005	50.00	8.24	54.754	0.517	0.0	0.0	0.0	1.08	172.0	70.0
12.006	50.00	8.79	54.657	0.605	0.0	0.0	0.0	1.08	171.6	81.9
13.000	50.00	5.36	55.627	0.073	0.0	0.0	0.0	1.11	78.3	9.9
13.001	50.00	6.00	55.434	0.129	0.0	0.0	0.0	1.14	126.0	17.5
13.002	50.00	6.75	55.258	0.306	0.0	0.0	0.0	1.14	126.0	41.4
14.000	50.00	5.09	59.102	0.465	0.0	0.0	0.0	4.70	1038.0	63.0
14.001	50.00	5.21	57.352	0.575	0.0	0.0	0.0	4.69	518.2	77.9
13.003	50.00	7.16	54.826	0.881	0.0	0.0	0.0	1.54	434.2	119.3
13.004	50.00	7.49	54.677	1.120	0.0	0.0	0.0	1.54	434.4	151.7

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
12.007	27.000	0.077	350.6	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
15.000	3.549	0.014	253.5	0.000	5.00	0.0	0.600	oo	450	Double Pipe	
12.008	40.609	0.165	245.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.012	47.485	0.935	50.8	0.139	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	32.402	1.620	20.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	26.817	1.341	20.0	0.136	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.015	21.217	1.166	18.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.016	38.832	0.100	388.3	0.000	0.00	0.0	0.600	1.5 _/	150	1:1.5 Ditch	
16.000	36.353	1.454	25.0	0.038	5.00	0.0	0.600	o	225	Pipe/Conduit	
16.001	36.536	1.461	25.0	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.002	46.990	1.880	25.0	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.003	38.485	1.539	25.0	0.160	0.00	0.0	0.600	o	225	Pipe/Conduit	
17.000	51.133	0.341	150.0	0.090	5.00	0.0	0.600	o	225	Pipe/Conduit	
18.000	18.746	0.937	20.0	0.079	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
12.007	50.00	9.09	54.555	1.725	0.0	0.0	0.0	1.49	657.7	233.6
15.000	50.00	5.05	54.492	0.000	0.0	0.0	0.0	1.27	404.7	0.0
12.008	50.00	9.77	54.478	1.725	0.0	0.0	0.0	1.00	70.6«	233.6
1.012	50.00	10.05	54.162	4.722	0.0	0.0	0.0	2.86	454.6«	639.4
1.013	50.00	10.17	53.227	4.722	0.0	0.0	0.0	4.56	725.6	639.4
1.014	50.00	10.26	51.607	4.858	0.0	0.0	0.0	4.56	725.6	657.8
1.015	50.00	10.34	50.266	4.858	0.0	0.0	0.0	4.78	760.9	657.8
1.016	50.00	10.87	49.100	4.858	0.0	0.0	0.0	1.21	217.7«	657.8
16.000	50.00	5.23	60.351	0.038	0.0	0.0	0.0	2.63	104.5	5.1
16.001	50.00	5.46	58.897	0.080	0.0	0.0	0.0	2.63	104.5	10.8
16.002	50.00	5.76	57.436	0.130	0.0	0.0	0.0	2.63	104.5	17.6
16.003	50.00	6.00	55.556	0.290	0.0	0.0	0.0	2.63	104.5	39.3
17.000	50.00	5.80	55.695	0.090	0.0	0.0	0.0	1.07	42.4	12.2
18.000	50.00	5.11	56.291	0.079	0.0	0.0	0.0	2.94	116.9	10.7

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
17.001	57.670	0.384	150.2	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.002	37.023	0.714	51.9	0.164	0.00	0.0	0.600	o	300	Pipe/Conduit	
19.000	44.560	0.891	50.0	0.189	5.00	0.0	0.600	o	300	Pipe/Conduit	
19.001	30.979	1.057	29.3	0.170	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.003	7.884	0.238	33.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
16.004	31.683	2.437	13.0	0.054	0.00	0.0	0.600	o	450	Pipe/Conduit	
16.005	16.233	1.011	16.1	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.000	17.832	0.119	149.8	0.000	5.00	0.0	0.600	oo	300	Double Pipe	
16.006	10.162	0.094	108.1	0.164	0.00	0.0	0.600	o	150	Pipe/Conduit	
16.007	40.473	0.202	200.4	0.091	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.008	36.443	0.182	200.2	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit	
21.000	25.365	1.812	14.0	0.041	5.00	0.0	0.600	o	300	Pipe/Conduit	
21.001	24.222	1.726	14.0	0.107	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.009	12.603	0.063	200.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
16.010	72.051	0.360	200.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
17.001	50.00	6.55	55.279	0.214	0.0	0.0	0.0	1.28	90.5	29.0
17.002	50.00	6.83	54.894	0.378	0.0	0.0	0.0	2.19	154.7	51.2
19.000	50.00	5.33	56.128	0.189	0.0	0.0	0.0	2.23	157.5	25.6
19.001	50.00	5.51	55.237	0.359	0.0	0.0	0.0	2.92	206.1	48.6
17.003	50.00	6.87	54.030	0.737	0.0	0.0	0.0	3.55	563.8	99.8
16.004	50.00	6.96	53.792	1.081	0.0	0.0	0.0	5.66	900.5	146.4
16.005	50.00	7.02	51.354	1.125	0.0	0.0	0.0	5.09	810.1	152.3
20.000	50.00	5.23	50.612	0.000	0.0	0.0	0.0	1.28	181.3	0.0
16.006	50.00	7.19	50.344	1.289	0.0	0.0	0.0	0.97	17.1«	174.5
16.007	50.00	7.80	50.100	1.380	0.0	0.0	0.0	1.11	78.3«	186.9
16.008	50.00	8.35	49.898	1.485	0.0	0.0	0.0	1.11	78.3«	201.1
21.000	50.00	5.10	53.253	0.041	0.0	0.0	0.0	4.22	298.6	5.6
21.001	50.00	5.20	51.441	0.148	0.0	0.0	0.0	4.22	298.2	20.0
16.009	50.00	8.50	49.565	1.633	0.0	0.0	0.0	1.43	228.1	221.1
16.010	50.00	9.33	49.502	1.633	0.0	0.0	0.0	1.43	228.1	221.1

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
22.000	47.943	0.197	243.4	0.066	5.00	0.0	0.600	o	300	Pipe/Conduit	
22.001	56.803	0.227	250.2	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit	
23.000	18.405	0.470	39.2	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
22.002	24.752	0.099	250.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.011	17.409	0.053	330.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
16.012	41.144	0.089	462.3	0.000	0.00	0.0	0.600	1.5 _/	150	1:1.5 Ditch	
24.000	23.675	2.900	8.2	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
24.001	34.352	0.100	343.5	0.000	0.00	0.0	0.600	1.5 _/	150	1:1.5 Ditch	
1.017	7.858	0.097	81.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.018	34.255	2.744	12.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
25.000	90.710	0.454	200.0	0.000	5.00	0.0	0.600	o	525	Pipe/Conduit	
25.001	67.852	0.336	202.1	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
25.002	68.459	5.860	11.7	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
26.000	60.167	0.241	250.0	0.000	5.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
22.000	50.00	5.80	49.815	0.066	0.0	0.0	0.0	1.00	70.9	8.9
22.001	50.00	6.75	49.618	0.127	0.0	0.0	0.0	0.99	69.9	17.2
23.000	50.00	5.15	50.000	0.000	0.0	0.0	0.0	2.10	83.4	0.0
22.002	50.00	7.17	49.391	0.127	0.0	0.0	0.0	0.99	69.9	17.2
16.011	50.00	9.59	49.142	1.760	0.0	0.0	0.0	1.11	177.1«	238.3
16.012	50.00	10.21	49.089	1.760	0.0	0.0	0.0	1.11	199.4«	238.3
24.000	50.00	5.09	52.000	0.000	0.0	0.0	0.0	4.61	183.2	0.0
24.001	50.00	5.53	49.100	0.000	0.0	0.0	0.0	1.29	231.7	0.0
1.017	50.00	10.95	48.800	6.618	0.0	0.0	0.0	1.75	123.6«	896.2
1.018	50.00	11.06	48.000	6.618	0.0	0.0	0.0	5.15	569.0«	896.2
25.000	50.00	5.96	53.629	0.000	0.0	0.0	0.0	1.58	342.1	0.0
25.001	50.00	6.68	53.176	0.000	0.0	0.0	0.0	1.57	340.2	0.0
25.002	50.00	6.85	52.840	0.000	0.0	0.0	0.0	6.58	1424.2	0.0
26.000	50.00	5.71	47.518	0.000	0.0	0.0	0.0	1.41	305.7	0.0

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
26.001	69.422	0.278	250.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
26.002	2.329	0.005	500.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
26.003	45.223	0.129	349.7	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
25.003	52.408	0.150	350.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
25.004	23.251	0.066	350.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
25.005	84.676	1.694	50.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.019	64.370	1.287	50.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.020	87.290	2.144	40.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
26.001	50.00	6.53	47.278	0.000	0.0	0.0	0.0	1.41	305.7	0.0
26.002	50.00	6.57	47.000	0.000	0.0	0.0	0.0	0.99	215.4	0.0
26.003	50.00	7.20	46.995	0.000	0.0	0.0	0.0	1.19	258.1	0.0
25.003	50.00	7.87	46.791	0.000	0.0	0.0	0.0	1.30	366.4	0.0
25.004	50.00	8.17	46.641	0.000	0.0	0.0	0.0	1.30	366.4	0.0
25.005	50.00	8.58	46.575	0.000	0.0	0.0	0.0	3.45	975.3	0.0
1.019	50.00	11.37	44.881	6.618	0.0	0.0	0.0	3.45	975.3	896.2
1.020	50.00	11.75	43.594	6.618	0.0	0.0	0.0	3.82	1081.2	896.2

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S61	70.003	2.135	Open Manhole	1350	1.000	67.868	375				
S62	69.257	1.944	Open Manhole	1350	1.001	67.313	375	1.000	67.314	375	1
S63	70.390	3.625	Open Manhole	1350	1.002	66.765	375	1.001	66.765	375	
S68	68.755	1.794	Open Manhole	1200	2.000	66.961	225				
S64	68.521	1.874	Open Manhole	1350	1.003	66.647	375	1.002	66.647	375	
								2.000	66.722	225	
S65	68.132	1.869	Open Manhole	1350	1.004	66.263	375	1.003	66.263	375	
S69	68.127	1.475	Open Manhole	1200	3.000	66.652	225				
S70	67.821	1.793	Open Manhole	1200	3.001	66.028	225	3.000	66.028	225	
S66	67.661	1.870	Open Manhole	1350	1.005	65.791	375	1.004	65.791	375	
								3.001	65.866	225	
S67	66.029	2.425	Open Manhole	1350	1.006	63.604	375	1.005	63.604	375	
S1	64.918	2.190	Open Manhole	1350	1.007	62.728	300	1.006	62.728	375	
S2	64.537	2.071	Open Manhole	1200	1.008	62.466	300	1.007	62.466	300	
S50	71.802	2.270	Open Manhole	1200	4.000	69.532	225				
S51	71.045	1.995	Open Manhole	1200	4.001	69.050	225	4.000	69.050	225	
S52	69.303	1.356	Open Manhole	1200	4.002	67.947	300	4.001	68.022	225	
S53	69.266	1.777	Open Manhole	1200	4.003	67.489	300	4.002	67.489	300	
S57	72.225	1.836	Open Manhole	1200	5.000	70.389	225				
S60	71.286	1.523	Open Manhole	1200	6.000	69.763	300				
S58	71.539	2.448	Open Manhole	1200	5.001	69.091	300	5.000	69.166	225	
								6.000	69.091	300	
S59	71.198	2.885	Open Manhole	1200	5.002	68.313	300	5.001	68.313	300	
S54	68.947	1.857	Open Manhole	1350	4.004	67.090	375	4.003	67.165	300	
								5.002	67.165	300	
S55	68.487	2.627	Open Manhole	1350	4.005	65.860	450	4.004	65.935	375	
TANK 2	65.200	3.000	Open Manhole	1200	7.000	62.200	300				
S56	65.177	3.177	Open Manhole	1800	4.006	62.000	225	4.005	62.000	450	
								7.000	62.000	300	
S3	63.329	2.614	Open Manhole	1200	1.009	60.715	300	1.008	60.715	300	
								4.006	60.790	225	
S4	60.981	2.455	Open Manhole	1200	1.010	58.526	300	1.009	58.526	300	
BLOCK D	59.675	1.630	Open Manhole	1200	8.000	58.045	225				
S10	59.000	1.968	Open Manhole	1200	8.001	57.032	225	8.000	57.032	225	
BLOCK C	58.800	1.800	Open Manhole	1200	9.000	57.000	225				
S10A	58.618	2.322	Open Manhole	1200	8.002	56.297	300	8.001	56.371	225	
								9.000	56.372	225	
S100	58.700	2.360	Open Manhole	1200	10.000	56.340	300				

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
TANK 3	58.500	2.545	Open Manhole	1200	11.000	55.955	300				
S101	58.500	2.597	Open Manhole	1800	10.001	55.903	300	10.000	55.903	300	
								11.000	55.903	300	
S5	58.345	2.821	Open Manhole	1350	1.011	55.524	450	1.010	55.674	300	
								8.002	55.674	300	
								10.001	55.675	300	1
S309	56.886	1.206	Open Manhole	900 x 750	12.000	55.680	300				
S310	56.767	1.363	Open Manhole	900 x 900	12.001	55.404	450	12.000	55.555	300	1
S311	59.136	3.971	Open Manhole	1350	12.002	55.166	450	12.001	55.165	450	
S312	56.883	1.860	Open Manhole	1350	12.003	55.023	450	12.002	55.024	450	1
S313	57.413	2.557	Open Manhole	1350	12.004	54.857	450	12.003	54.856	450	
S314	57.782	3.028	Open Manhole	1350	12.005	54.754	450	12.004	54.754	450	
S315	56.957	2.300	Open Manhole	1350	12.006	54.657	450	12.005	54.657	450	
S300	57.228	1.601	Open Manhole	1200	13.000	55.627	300				
S301	57.046	1.612	Open Manhole	1200	13.001	55.434	375	13.000	55.509	300	
S302	57.693	2.435	Open Manhole	1350	13.002	55.258	375	13.001	55.259	375	1
S307	62.267	3.165	Open Manhole	1200	14.000	59.102	375				
S308	60.000	2.648	Open Manhole	1200	14.001	57.352	375	14.000	57.426	375	74
S303	57.503	2.677	Open Manhole	1500	13.003	54.826	600	13.002	55.051	375	
								14.001	55.052	375	1
S304	57.734	3.057	Open Manhole	1500	13.004	54.677	600	13.003	54.677	600	
S305	57.769	3.214	Open Manhole	1500	12.007	54.555	750	12.006	54.555	450	
								13.004	54.555	600	
TANK 5	57.785	3.293	Open Manhole	1200	15.000	54.492	450				
S306	57.777	3.299	Open Manhole	1500	12.008	54.478	300	12.007	54.478	750	
								15.000	54.478	450	
S6	56.963	2.801	Open Manhole	1350	1.012	54.162	450	1.011	54.162	450	
								12.008	54.312	300	
S7	55.839	2.612	Open Manhole	1350	1.013	53.227	450	1.012	53.227	450	
S8	53.691	2.084	Open Manhole	1350	1.014	51.607	450	1.013	51.607	450	
S9	52.051	1.785	Open Manhole	1240 x 900	1.015	50.266	450	1.014	50.266	450	
HW1	50.000	0.900	Open Manhole	900 x 900	1.016	49.100	150	1.015	49.100	450	
S210	62.450	2.099	Open Manhole	1200	16.000	60.351	225				
S211	61.153	2.256	Open Manhole	1200	16.001	58.897	225	16.000	58.897	225	
S212	59.340	1.904	Open Manhole	1200	16.002	57.436	225	16.001	57.436	225	
S213	57.444	1.888	Open Manhole	1200	16.003	55.556	225	16.002	55.556	225	
S200	57.130	1.435	Open Manhole	1200	17.000	55.695	225				
S209	57.640	1.349	Open Manhole	1200	18.000	56.291	225				

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdro (mm)
S201	57.528	2.249	Open Manhole	1200	17.001	55.279	300	17.000	55.354	225	
								18.000	55.354	225	
S202	58.094	3.200	Open Manhole	1200	17.002	54.894	300	17.001	54.895	300	
S207	57.357	1.229	Open Manhole	900 x 750	19.000	56.128	300				
S208	57.606	2.369	Open Manhole	1200	19.001	55.237	300	19.000	55.237	300	
S203	56.544	2.514	Open Manhole	1350	17.003	54.030	450	17.002	54.180	300	
								19.001	54.180	300	
S204	55.981	2.189	Open Manhole	1350	16.004	53.792	450	16.003	54.017	225	
								17.003	53.792	450	
S205	53.716	2.362	Open Manhole	1350	16.005	51.354	450	16.004	51.355	450	
TANK 4	53.350	2.738	Open Manhole	1200	20.000	50.612	300				
S206	52.549	2.206	Open Manhole	1800	16.006	50.344	150	16.005	50.343	450	
								20.000	50.493	300	29
S13	51.986	1.886	Open Manhole	1200	16.007	50.100	300	16.006	50.250	150	
S14	52.323	2.425	Open Manhole	1200	16.008	49.898	300	16.007	49.898	300	
S11	55.455	2.202	Open Manhole	1200	21.000	53.253	300				
S12	53.769	2.328	Open Manhole	1200	21.001	51.441	300	21.000	51.441	300	
S15	52.671	3.106	Open Manhole	1350	16.009	49.565	450	16.008	49.716	300	
								21.001	49.715	300	
S16	52.300	2.798	Open Manhole	1350	16.010	49.502	450	16.009	49.502	450	
S18	51.711	1.896	Open Manhole	1200	22.000	49.815	300				
S19	51.115	1.497	Open Manhole	1200	22.001	49.618	300	22.000	49.618	300	
BLOCK B	52.000	2.000	Open Manhole	900 x 675	23.000	50.000	225				
S20	51.000	1.609	Open Manhole	1200	22.002	49.391	300	22.001	49.391	300	
								23.000	49.530	225	6
S17	50.600	1.458	Open Manhole	1240 x 900	16.011	49.142	450	16.010	49.142	450	
								22.002	49.292	300	
HW2	50.100	1.011	Open Manhole	900 x 900	16.012	49.089	150	16.011	49.089	450	
BLOCK A	54.000	2.000	Open Manhole	900 x 675	24.000	52.000	225				
HW4	50.062	0.962	Open Manhole	900 x 675	24.001	49.100	150	24.000	49.100	225	
HW3	50.100	1.300	Open Manhole	900 x 750	1.017	48.800	300	1.016	49.000	150	20
								16.012	49.000	150	20
								24.001	49.000	150	20
S21	50.100	2.100	Open Manhole	2400	1.018	48.000	375	1.017	48.703	300	62
SD11	57.027	3.398	Open Manhole	1500	25.000	53.629	525				
SD12	57.510	4.335	Open Manhole	1500	25.001	53.176	525	25.000	53.176	525	
SD13	58.364	5.524	Open Manhole	1500	25.002	52.840	525	25.001	52.840	525	
SD1	52.929	5.411	Open Manhole	1500	26.000	47.518	525				

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SD2	52.373	5.096	Open Manhole	1500	26.001	47.278	525	26.000	47.278	525	
SD3	54.270	7.270	Open Manhole	1240 x 975	26.002	47.000	525	26.001	47.000	525	
SD4	54.426	7.431	Open Manhole	1240 x 975	26.003	46.995	525	26.002	46.995	525	
SD5	56.963	10.172	Open Manhole	1240 x 1050	25.003	46.791	600	25.002	46.980	525	114
								26.003	46.866	525	
SD6	55.695	9.053	Open Manhole	1240 x 1050	25.004	46.641	600	25.003	46.641	600	
SD7	54.119	7.545	Open Manhole	1240 x 1050	25.005	46.575	600	25.004	46.575	600	
SD8	49.963	5.082	Open Manhole	1500	1.019	44.881	600	1.018	45.256	375	150
								25.005	44.881	600	
SD9	48.255	4.661	Open Manhole	1500	1.020	43.594	600	1.019	43.594	600	
SD10	48.285	6.835	Open Manhole	1240 x 1050		OUTFALL		1.020	41.450	600	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S61	527886.005	193751.953	527886.005	193751.953	Required	
S62	527925.417	193772.304	527925.417	193772.304	Required	
S63	527964.364	193792.490	527964.364	193792.490	Required	
S68	527968.909	193811.716	527968.909	193811.716	Required	
S64	527973.738	193793.246	527973.738	193793.246	Required	
S65	527981.919	193763.605	527981.919	193763.605	Required	
S69	527957.739	193711.584	527957.739	193711.584	Required	
S70	527983.824	193728.722	527983.824	193728.722	Required	
S66	527991.751	193727.162	527991.751	193727.162	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S67	528006.447	193674.497	528006.447	193674.497	Required	
S1	528011.904	193653.295	528011.904	193653.295	Required	
S2	528009.182	193647.327	528009.182	193647.327	Required	
S50	527782.943	193688.152	527782.943	193688.152	Required	
S51	527796.151	193667.996	527796.151	193667.996	Required	
S52	527823.924	193624.740	527823.924	193624.740	Required	
S53	527862.328	193649.677	527862.328	193649.677	Required	
S57	527804.716	193710.290	527804.716	193710.290	Required	
S60	527835.319	193756.241	527835.319	193756.241	Required	
S58	527848.218	193732.645	527848.218	193732.645	Required	
S59	527864.451	193706.082	527864.451	193706.082	Required	
S54	527889.383	193667.517	527889.383	193667.517	Required	
S55	527928.074	193692.754	527928.074	193692.754	Required	
TANK 2	527951.526	193640.622	527951.526	193640.622	Required	
S56	527958.486	193645.144	527958.486	193645.144	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S3	527972.533	193623.387	527972.533	193623.387	Required	
S4	527990.498	193595.909	527990.498	193595.909	Required	
BLOCK D	528057.792	193612.045	528057.792	193612.045	Required	
S10	528068.848	193595.086	528068.848	193595.086	Required	
BLOCK C	528048.959	193573.372	528048.959	193573.372	Required	
S10A	528040.860	193577.544	528040.860	193577.544	Required	
S100	527969.631	193530.999	527969.631	193530.999	Required	
TANK 3	528005.869	193539.239	528005.869	193539.239	Required	
S101	527998.875	193550.176	527998.875	193550.176	Required	
S5	528014.123	193560.246	528014.123	193560.246	Required	
S309	527897.412	193441.043	527897.412	193441.043	Required	
S310	527911.349	193420.249	527911.349	193420.249	Required	
S311	527937.535	193380.292	527937.535	193380.292	Required	
S312	527953.446	193356.702	527953.446	193356.702	Required	
S313	528002.450	193388.387	528002.450	193388.387	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S314	528032.725	193407.731	528032.725	193407.731	Required	
S315	528014.251	193436.159	528014.251	193436.159	Required	
S300	527865.722	193490.995	527865.722	193490.995	Required	
S301	527878.208	193470.916	527878.208	193470.916	Required	
S302	527914.694	193495.116	527914.694	193495.116	Required	
S307	527924.486	193572.727	527924.486	193572.727	Required	
S308	527938.393	193551.788	527938.393	193551.788	Required	
S303	527958.113	193523.361	527958.113	193523.361	Required	
S304	527978.495	193491.968	527978.495	193491.968	Required	
S305	527994.932	193466.314	527994.932	193466.314	Required	
TANK 5	528018.863	193477.784	528018.863	193477.784	Required	
S306	528017.538	193481.076	528017.538	193481.076	Required	
S6	528051.510	193503.324	528051.510	193503.324	Required	
S7	528091.298	193529.243	528091.298	193529.243	Required	
S8	528121.461	193541.077	528121.461	193541.077	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	528147.306	193548.233	528147.306	193548.233	Required	
HW1	528158.860	193530.438	528158.860	193530.438	Required	
S210	528103.111	193180.633	528103.111	193180.633	Required	
S211	528098.867	193216.738	528098.867	193216.738	Required	
S212	528095.030	193253.071	528095.030	193253.071	Required	
S213	528091.027	193299.891	528091.027	193299.891	Required	
S200	527973.563	193325.146	527973.563	193325.146	Required	
S209	528012.071	193266.836	528012.071	193266.836	Required	
S201	528001.922	193282.597	528001.922	193282.597	Required	
S202	528050.376	193313.871	528050.376	193313.871	Required	
S207	528039.730	193396.939	528039.730	193396.939	Required	
S208	528063.992	193359.563	528063.992	193359.563	Required	
S203	528081.462	193333.981	528081.462	193333.981	Required	
S204	528088.082	193338.263	528088.082	193338.263	Required	
S205	528114.565	193355.654	528114.565	193355.654	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
TANK 4	528128.028	193346.718	528128.028	193346.718	Required	
S206	528128.145	193364.549	528128.145	193364.549	Required	
S13	528136.695	193370.041	528136.695	193370.041	Required	
S14	528114.828	193404.099	528114.828	193404.099	Required	
S11	528067.592	193475.991	528067.592	193475.991	Required	
S12	528081.239	193454.611	528081.239	193454.611	Required	
S15	528094.996	193434.674	528094.996	193434.674	Required	
S16	528105.544	193441.571	528105.544	193441.571	Required	
S18	528153.109	193371.359	528153.109	193371.359	Required	
S19	528198.540	193386.674	528198.540	193386.674	Required	
BLOCK B	528162.998	193434.659	528162.998	193434.659	Required	
S20	528180.446	193440.517	528180.446	193440.517	Required	
S17	528173.888	193464.384	528173.888	193464.384	Required	
HW2	528176.637	193481.575	528176.637	193481.575	Required	
BLOCK A	528139.093	193506.650	528139.093	193506.650	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
HW4	528161.528	193514.212	528161.528	193514.212	Required	
HW3	528195.664	193518.055	528195.664	193518.055	Required	
S21	528198.900	193525.216	528198.900	193525.216	Required	
SD11	527879.904	193470.510	527879.904	193470.510	Required	
SD12	527955.878	193520.070	527955.878	193520.070	Required	
SD13	528013.035	193556.634	528013.035	193556.634	Required	
SD1	528146.490	193350.465	528146.490	193350.465	Required	
SD2	528113.664	193400.889	528113.664	193400.889	Required	
SD3	528075.789	193459.068	528075.789	193459.068	Required	
SD4	528074.493	193461.003	528074.493	193461.003	Required	
SD5	528050.543	193499.364	528050.543	193499.364	Required	
SD6	528094.256	193528.273	528094.256	193528.273	Required	
SD7	528115.743	193537.155	528115.743	193537.155	Required	
SD8	528197.434	193559.440	528197.434	193559.440	Required	
SD9	528259.484	193576.566	528259.484	193576.566	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SD10	528284.924	193493.065			No Entry	

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	375	S61	70.003	67.868	1.760	Open Manhole	1350
1.001	o	375	S62	69.257	67.313	1.569	Open Manhole	1350
1.002	o	375	S63	70.390	66.765	3.250	Open Manhole	1350
2.000	o	225	S68	68.755	66.961	1.569	Open Manhole	1200
1.003	o	375	S64	68.521	66.647	1.499	Open Manhole	1350
1.004	o	375	S65	68.132	66.263	1.494	Open Manhole	1350
3.000	o	225	S69	68.127	66.652	1.250	Open Manhole	1200
3.001	o	225	S70	67.821	66.028	1.568	Open Manhole	1200
1.005	o	375	S66	67.661	65.791	1.495	Open Manhole	1350
1.006	o	375	S67	66.029	63.604	2.050	Open Manhole	1350
1.007	o	300	S1	64.918	62.728	1.890	Open Manhole	1350
1.008	o	300	S2	64.537	62.466	1.771	Open Manhole	1200
4.000	o	225	S50	71.802	69.532	2.045	Open Manhole	1200
4.001	o	225	S51	71.045	69.050	1.770	Open Manhole	1200
4.002	o	300	S52	69.303	67.947	1.056	Open Manhole	1200
4.003	o	300	S53	69.266	67.489	1.477	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	44.357	80.1	S62	69.257	67.314	1.568	Open Manhole	1350
1.001	43.867	80.0	S63	70.390	66.765	3.250	Open Manhole	1350
1.002	9.405	79.7	S64	68.521	66.647	1.499	Open Manhole	1350
2.000	19.091	79.9	S64	68.521	66.722	1.574	Open Manhole	1350
1.003	30.750	80.1	S65	68.132	66.263	1.494	Open Manhole	1350
1.004	37.745	80.0	S66	67.661	65.791	1.495	Open Manhole	1350
3.000	31.211	50.0	S70	67.821	66.028	1.568	Open Manhole	1200
3.001	8.078	49.9	S66	67.661	65.866	1.570	Open Manhole	1350
1.005	54.677	25.0	S67	66.029	63.604	2.050	Open Manhole	1350
1.006	21.894	25.0	S1	64.918	62.728	1.815	Open Manhole	1350
1.007	6.559	25.0	S2	64.537	62.466	1.771	Open Manhole	1200
1.008	43.775	25.0	S3	63.329	60.715	2.314	Open Manhole	1200
4.000	24.098	50.0	S51	71.045	69.050	1.770	Open Manhole	1200
4.001	51.405	50.0	S52	69.303	68.022	1.056	Open Manhole	1200
4.002	45.790	100.0	S53	69.266	67.489	1.477	Open Manhole	1200
4.003	32.407	100.0	S54	68.947	67.165	1.482	Open Manhole	1350

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.000	o	225	S57	72.225	70.389	1.611	Open Manhole	1200
6.000	o	300	S60	71.286	69.763	1.223	Open Manhole	1200
5.001	o	300	S58	71.539	69.091	2.148	Open Manhole	1200
5.002	o	300	S59	71.198	68.313	2.585	Open Manhole	1200
4.004	o	375	S54	68.947	67.090	1.482	Open Manhole	1350
4.005	o	450	S55	68.487	65.860	2.177	Open Manhole	1350
7.000	oo	300	TANK 2	65.200	62.200	2.700	Open Manhole	1200
4.006	o	225	S56	65.177	62.000	2.952	Open Manhole	1800
1.009	o	300	S3	63.329	60.715	2.314	Open Manhole	1200
1.010	o	300	S4	60.981	58.526	2.155	Open Manhole	1200
8.000	o	225	BLOCK D	59.675	58.045	1.405	Open Manhole	1200
8.001	o	225	S10	59.000	57.032	1.743	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.000	48.910	40.0	S58	71.539	69.166	2.148	Open Manhole	1200
6.000	26.892	40.0	S58	71.539	69.091	2.148	Open Manhole	1200
5.001	31.130	40.0	S59	71.198	68.313	2.585	Open Manhole	1200
5.002	45.922	40.0	S54	68.947	67.165	1.482	Open Manhole	1350
4.004	46.195	40.0	S55	68.487	65.935	2.177	Open Manhole	1350
4.005	56.494	14.6	S56	65.177	62.000	2.727	Open Manhole	1800
7.000	8.300	41.5	S56	65.177	62.000	2.877	Open Manhole	1800
4.006	25.898	21.4	S3	63.329	60.790	2.314	Open Manhole	1200
1.009	32.830	15.0	S4	60.981	58.526	2.155	Open Manhole	1200
1.010	42.779	15.0	S5	58.345	55.674	2.371	Open Manhole	1350
8.000	20.244	20.0	S10	59.000	57.032	1.743	Open Manhole	1200
8.001	33.031	50.0	S10A	58.618	56.371	2.022	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
9.000	o	225	BLOCK C	58.800	57.000	1.575	Open Manhole	1200
8.002	o	300	S10A	58.618	56.297	2.022	Open Manhole	1200
10.000	o	300	S100	58.700	56.340	2.060	Open Manhole	1200
11.000	o	300	TANK 3	58.500	55.955	2.245	Open Manhole	1200
10.001	o	300	S101	58.500	55.903	2.297	Open Manhole	1800
1.011	o	450	S5	58.345	55.524	2.371	Open Manhole	1350
12.000	o	300	S309	56.886	55.680	0.906	Open Manhole	900 x 750
12.001	o	450	S310	56.767	55.404	0.913	Open Manhole	900 x 900
12.002	o	450	S311	59.136	55.166	3.520	Open Manhole	1350
12.003	o	450	S312	56.883	55.023	1.410	Open Manhole	1350
12.004	o	450	S313	57.413	54.857	2.106	Open Manhole	1350
12.005	o	450	S314	57.782	54.754	2.578	Open Manhole	1350
12.006	o	450	S315	56.957	54.657	1.850	Open Manhole	1350
13.000	o	300	S300	57.228	55.627	1.301	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
9.000	9.111	14.5	S10A	58.618	56.372	2.022	Open Manhole	1200
8.002	31.845	51.2	S5	58.345	55.674	2.371	Open Manhole	1350
10.000	34.971	80.0	S101	58.500	55.903	2.297	Open Manhole	1800
11.000	12.982	250.0	S101	58.500	55.903	2.297	Open Manhole	1800
10.001	18.274	80.1	S5	58.345	55.675	2.370	Open Manhole	1350
1.011	68.102	50.0	S6	56.963	54.162	2.351	Open Manhole	1350
12.000	25.033	200.3	S310	56.767	55.555	0.912	Open Manhole	900 x 900
12.001	47.773	199.9	S311	59.136	55.165	3.521	Open Manhole	1350
12.002	28.455	200.4	S312	56.883	55.024	1.409	Open Manhole	1350
12.003	58.355	349.4	S313	57.413	54.856	2.107	Open Manhole	1350
12.004	35.927	348.8	S314	57.782	54.754	2.578	Open Manhole	1350
12.005	33.904	349.5	S315	56.957	54.657	1.850	Open Manhole	1350
12.006	35.813	351.1	S305	57.769	54.555	2.764	Open Manhole	1500
13.000	23.645	200.4	S301	57.046	55.509	1.237	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.001	o	375	S301	57.046	55.434	1.237	Open Manhole	1200
13.002	o	375	S302	57.693	55.258	2.060	Open Manhole	1350
14.000	oo	375	S307	62.267	59.102	2.790	Open Manhole	1200
14.001	o	375	S308	60.000	57.352	2.273	Open Manhole	1200
13.003	o	600	S303	57.503	54.826	2.077	Open Manhole	1500
13.004	o	600	S304	57.734	54.677	2.457	Open Manhole	1500
12.007	o	750	S305	57.769	54.555	2.464	Open Manhole	1500
15.000	oo	450	TANK 5	57.785	54.492	2.843	Open Manhole	1200
12.008	o	300	S306	57.777	54.478	2.999	Open Manhole	1500
1.012	o	450	S6	56.963	54.162	2.351	Open Manhole	1350
1.013	o	450	S7	55.839	53.227	2.162	Open Manhole	1350
1.014	o	450	S8	53.691	51.607	1.634	Open Manhole	1350
1.015	o	450	S9	52.051	50.266	1.335	Open Manhole	1240 x 900
1.016	1.5 _/	150	HW1	50.000	49.100	0.600	Open Manhole	900 x 900

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.001	43.782	250.2	S302	57.693	55.259	2.059	Open Manhole	1350
13.002	51.798	250.2	S303	57.503	55.051	2.077	Open Manhole	1500
14.000	25.137	15.0	S308	60.000	57.426	2.199	Open Manhole	1200
14.001	34.597	15.0	S303	57.503	55.052	2.076	Open Manhole	1500
13.003	37.429	250.0	S304	57.734	54.677	2.457	Open Manhole	1500
13.004	30.468	249.7	S305	57.769	54.555	2.614	Open Manhole	1500
12.007	27.000	350.6	S306	57.777	54.478	2.549	Open Manhole	1500
15.000	3.549	253.5	S306	57.777	54.478	2.849	Open Manhole	1500
12.008	40.609	245.5	S6	56.963	54.312	2.351	Open Manhole	1350
1.012	47.485	50.8	S7	55.839	53.227	2.162	Open Manhole	1350
1.013	32.402	20.0	S8	53.691	51.607	1.634	Open Manhole	1350
1.014	26.817	20.0	S9	52.051	50.266	1.335	Open Manhole	1240 x 900
1.015	21.217	18.2	HW1	50.000	49.100	0.450	Open Manhole	900 x 900
1.016	38.832	388.3	HW3	50.100	49.000	0.800	Open Manhole	900 x 750

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.000	o	225	S210	62.450	60.351	1.874	Open Manhole	1200
16.001	o	225	S211	61.153	58.897	2.031	Open Manhole	1200
16.002	o	225	S212	59.340	57.436	1.679	Open Manhole	1200
16.003	o	225	S213	57.444	55.556	1.663	Open Manhole	1200
17.000	o	225	S200	57.130	55.695	1.210	Open Manhole	1200
18.000	o	225	S209	57.640	56.291	1.124	Open Manhole	1200
17.001	o	300	S201	57.528	55.279	1.949	Open Manhole	1200
17.002	o	300	S202	58.094	54.894	2.900	Open Manhole	1200
19.000	o	300	S207	57.357	56.128	0.929	Open Manhole	900 x 750
19.001	o	300	S208	57.606	55.237	2.069	Open Manhole	1200
17.003	o	450	S203	56.544	54.030	2.064	Open Manhole	1350
16.004	o	450	S204	55.981	53.792	1.739	Open Manhole	1350
16.005	o	450	S205	53.716	51.354	1.912	Open Manhole	1350
20.000	oo	300	TANK 4	53.350	50.612	2.438	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.000	36.353	25.0	S211	61.153	58.897	2.031	Open Manhole	1200
16.001	36.536	25.0	S212	59.340	57.436	1.679	Open Manhole	1200
16.002	46.990	25.0	S213	57.444	55.556	1.663	Open Manhole	1200
16.003	38.485	25.0	S204	55.981	54.017	1.739	Open Manhole	1350
17.000	51.133	150.0	S201	57.528	55.354	1.949	Open Manhole	1200
18.000	18.746	20.0	S201	57.528	55.354	1.949	Open Manhole	1200
17.001	57.670	150.2	S202	58.094	54.895	2.899	Open Manhole	1200
17.002	37.023	51.9	S203	56.544	54.180	2.064	Open Manhole	1350
19.000	44.560	50.0	S208	57.606	55.237	2.069	Open Manhole	1200
19.001	30.979	29.3	S203	56.544	54.180	2.064	Open Manhole	1350
17.003	7.884	33.1	S204	55.981	53.792	1.739	Open Manhole	1350
16.004	31.683	13.0	S205	53.716	51.355	1.911	Open Manhole	1350
16.005	16.233	16.1	S206	52.549	50.343	1.756	Open Manhole	1800
20.000	17.832	149.8	S206	52.549	50.493	1.756	Open Manhole	1800

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.006	o	150	S206	52.549	50.344	2.055	Open Manhole	1800
16.007	o	300	S13	51.986	50.100	1.586	Open Manhole	1200
16.008	o	300	S14	52.323	49.898	2.125	Open Manhole	1200
21.000	o	300	S11	55.455	53.253	1.902	Open Manhole	1200
21.001	o	300	S12	53.769	51.441	2.028	Open Manhole	1200
16.009	o	450	S15	52.671	49.565	2.656	Open Manhole	1350
16.010	o	450	S16	52.300	49.502	2.348	Open Manhole	1350
22.000	o	300	S18	51.711	49.815	1.596	Open Manhole	1200
22.001	o	300	S19	51.115	49.618	1.197	Open Manhole	1200
23.000	o	225	BLOCK B	52.000	50.000	1.775	Open Manhole	900 x 675
22.002	o	300	S20	51.000	49.391	1.309	Open Manhole	1200
16.011	o	450	S17	50.600	49.142	1.008	Open Manhole	1240 x 900
16.012	1.5 _/	150	HW2	50.100	49.089	0.711	Open Manhole	900 x 900

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.006	10.162	108.1	S13	51.986	50.250	1.586	Open Manhole	1200
16.007	40.473	200.4	S14	52.323	49.898	2.125	Open Manhole	1200
16.008	36.443	200.2	S15	52.671	49.716	2.655	Open Manhole	1350
21.000	25.365	14.0	S12	53.769	51.441	2.028	Open Manhole	1200
21.001	24.222	14.0	S15	52.671	49.715	2.656	Open Manhole	1350
16.009	12.603	200.0	S16	52.300	49.502	2.348	Open Manhole	1350
16.010	72.051	200.0	S17	50.600	49.142	1.008	Open Manhole	1240 x 900
22.000	47.943	243.4	S19	51.115	49.618	1.197	Open Manhole	1200
22.001	56.803	250.2	S20	51.000	49.391	1.309	Open Manhole	1200
23.000	18.405	39.2	S20	51.000	49.530	1.245	Open Manhole	1200
22.002	24.752	250.3	S17	50.600	49.292	1.008	Open Manhole	1240 x 900
16.011	17.409	330.0	HW2	50.100	49.089	0.561	Open Manhole	900 x 900
16.012	41.144	462.3	HW3	50.100	49.000	0.800	Open Manhole	900 x 750

PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
24.000	o	225	BLOCK A	54.000	52.000	1.775	Open Manhole	900 x 675
24.001	1.5 _/	150	HW4	50.062	49.100	0.662	Open Manhole	900 x 675
1.017	o	300	HW3	50.100	48.800	1.000	Open Manhole	900 x 750
1.018	o	375	S21	50.100	48.000	1.725	Open Manhole	2400
25.000	o	525	SD11	57.027	53.629	2.873	Open Manhole	1500
25.001	o	525	SD12	57.510	53.176	3.810	Open Manhole	1500
25.002	o	525	SD13	58.364	52.840	4.999	Open Manhole	1500
26.000	o	525	SD1	52.929	47.518	4.886	Open Manhole	1500
26.001	o	525	SD2	52.373	47.278	4.571	Open Manhole	1500
26.002	o	525	SD3	54.270	47.000	6.745	Open Manhole	1240 x 975
26.003	o	525	SD4	54.426	46.995	6.906	Open Manhole	1240 x 975
25.003	o	600	SD5	56.963	46.791	9.572	Open Manhole	1240 x 1050
25.004	o	600	SD6	55.695	46.641	8.453	Open Manhole	1240 x 1050
25.005	o	600	SD7	54.119	46.575	6.945	Open Manhole	1240 x 1050
1.019	o	600	SD8	49.963	44.881	4.482	Open Manhole	1500
1.020	o	600	SD9	48.255	43.594	4.061	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
24.000	23.675	8.2	HW4	50.062	49.100	0.737	Open Manhole	900 x 675
24.001	34.352	343.5	HW3	50.100	49.000	0.800	Open Manhole	900 x 750
1.017	7.858	81.0	S21	50.100	48.703	1.097	Open Manhole	2400
1.018	34.255	12.5	SD8	49.963	45.256	4.332	Open Manhole	1500
25.000	90.710	200.0	SD12	57.510	53.176	3.810	Open Manhole	1500
25.001	67.852	202.1	SD13	58.364	52.840	4.999	Open Manhole	1500
25.002	68.459	11.7	SD5	56.963	46.980	9.458	Open Manhole	1240 x 1050
26.000	60.167	250.0	SD2	52.373	47.278	4.571	Open Manhole	1500
26.001	69.422	250.0	SD3	54.270	47.000	6.745	Open Manhole	1240 x 975
26.002	2.329	500.0	SD4	54.426	46.995	6.906	Open Manhole	1240 x 975
26.003	45.223	349.7	SD5	56.963	46.866	9.572	Open Manhole	1240 x 1050
25.003	52.408	350.0	SD6	55.695	46.641	8.453	Open Manhole	1240 x 1050
25.004	23.251	350.0	SD7	54.119	46.575	6.945	Open Manhole	1240 x 1050
25.005	84.676	50.0	SD8	49.963	44.881	4.482	Open Manhole	1500
1.019	64.370	50.0	SD9	48.255	43.594	4.061	Open Manhole	1500
1.020	87.290	40.7	SD10	48.285	41.450	6.235	Open Manhole	1240 x 1050

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.020	SD10	48.285	41.450	0.000	1240	1050

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	4.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	4
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.441		

Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S1, DS/PN: 1.007, Volume (m³): 5.4

Unit Reference	MD-SHE-0184-2000-2000-2000
Design Head (m)	2.000
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	184
Invert Level (m)	62.728
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	20.0
Flush-Flo™	0.579	20.0
Kick-Flo®	1.234	15.9
Mean Flow over Head Range	-	17.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.4	1.200	16.5	3.000	24.2	7.000	36.4
0.200	16.6	1.400	16.9	3.500	26.1	7.500	37.7
0.300	18.6	1.600	18.0	4.000	27.8	8.000	38.9
0.400	19.5	1.800	19.0	4.500	29.5	8.500	40.0
0.500	19.9	2.000	20.0	5.000	31.0	9.000	41.1
0.600	20.0	2.200	20.9	5.500	32.4	9.500	42.2
0.800	19.6	2.400	21.8	6.000	33.8		
1.000	18.7	2.600	22.6	6.500	35.2		

Complex Manhole: S56, DS/PN: 4.006, Volume (m³): 17.8

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0131-1000-2000-1000
Design Head (m)	2.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	62.000

Hydro-Brake® Optimum

Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	10.0
Flush-Flo™	0.569	9.8
Kick-Flo®	1.167	7.8
Mean Flow over Head Range	-	8.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	7.9	3.000	12.1	7.000	18.1
0.200	8.3	1.400	8.5	3.500	13.0	7.500	18.7
0.300	9.2	1.600	9.0	4.000	13.9	8.000	19.3
0.400	9.6	1.800	9.5	4.500	14.7	8.500	19.9
0.500	9.8	2.000	10.0	5.000	15.4	9.000	20.5
0.600	9.8	2.200	10.5	5.500	16.2	9.500	21.0
0.800	9.6	2.400	10.9	6.000	16.8		
1.000	9.0	2.600	11.3	6.500	17.5		

Weir

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 64.600

Hydro-Brake® Optimum Manhole: S101, DS/PN: 10.001, Volume (m³): 9.8

Unit Reference	MD-SHE-0098-5000-1500-5000
Design Head (m)	1.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	98
Invert Level (m)	55.903
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0
Flush-Flo™	0.431	4.9
Kick-Flo®	0.878	3.9
Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a

Hydro-Brake® Optimum Manhole: S101, DS/PN: 10.001, Volume (m³): 9.8

Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	4.5	3.000	6.9	7.000	10.3
0.200	4.4	1.400	4.8	3.500	7.4	7.500	10.7
0.300	4.8	1.600	5.1	4.000	7.9	8.000	11.0
0.400	4.9	1.800	5.4	4.500	8.4	8.500	11.3
0.500	4.9	2.000	5.7	5.000	8.8	9.000	11.6
0.600	4.8	2.200	6.0	5.500	9.2	9.500	11.9
0.800	4.3	2.400	6.2	6.000	9.6		
1.000	4.1	2.600	6.5	6.500	10.0		

Complex Manhole: S306, DS/PN: 12.008, Volume (m³): 17.8

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0137-1090-2000-1090
Design Head (m)	2.000
Design Flow (l/s)	10.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	137
Invert Level (m)	54.478
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	10.9
Flush-Flo™	0.593	10.9
Kick-Flo®	1.213	8.6
Mean Flow over Head Range	-	9.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.9	1.000	10.1	2.400	11.9	5.500	17.6
0.200	9.0	1.200	8.8	2.600	12.3	6.000	18.4
0.300	10.1	1.400	9.2	3.000	13.2	6.500	19.1
0.400	10.6	1.600	9.8	3.500	14.2	7.000	19.8
0.500	10.8	1.800	10.4	4.000	15.1	7.500	20.5
0.600	10.9	2.000	10.9	4.500	16.0	8.000	21.1
0.800	10.7	2.200	11.4	5.000	16.8	8.500	21.7

Hydro-Brake® Optimum

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
9.000	22.3	9.500	22.9				

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0185-1700-1000-1700
Design Head (m)	1.000
Design Flow (l/s)	17.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	185
Invert Level (m)	55.078
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	17.0
Flush-Flo™	0.330	17.0
Kick-Flo®	0.711	14.4
Mean Flow over Head Range	-	14.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.5	1.200	18.5	3.000	28.7	7.000	43.2
0.200	16.3	1.400	19.9	3.500	30.9	7.500	44.7
0.300	16.9	1.600	21.2	4.000	33.0	8.000	46.1
0.400	16.9	1.800	22.5	4.500	34.9	8.500	47.5
0.500	16.5	2.000	23.6	5.000	36.7	9.000	48.8
0.600	16.0	2.200	24.7	5.500	38.4	9.500	50.1
0.800	15.3	2.400	25.8	6.000	40.1		
1.000	17.0	2.600	26.8	6.500	41.7		

Weir

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 56.078

Complex Manhole: S206, DS/PN: 16.006, Volume (m³): 10.3

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0140-1000-1400-1000
Design Head (m)	1.400
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	140
Invert Level (m)	50.344
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	10.0
Flush-Flo™	0.410	10.0
Kick-Flo®	0.879	8.0
Mean Flow over Head Range	-	8.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.0	1.200	9.3	3.000	14.3	7.000	21.5
0.200	9.2	1.400	10.0	3.500	15.4	7.500	22.2
0.300	9.8	1.600	10.6	4.000	16.5	8.000	22.9
0.400	10.0	1.800	11.3	4.500	17.4	8.500	23.6
0.500	9.9	2.000	11.8	5.000	18.3	9.000	24.3
0.600	9.8	2.200	12.4	5.500	19.2	9.500	24.9
0.800	8.9	2.400	12.9	6.000	20.0		
1.000	8.5	2.600	13.4	6.500	20.8		

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0186-1600-0500-1600
Design Head (m)	0.500
Design Flow (l/s)	16.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	186
Invert Level (m)	51.444
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	16.0
Flush-Flo™	0.266	16.0

Hydro-Brake® Optimum

Control Points	Head (m)	Flow (l/s)
Kick-Flo®	0.419	14.7
Mean Flow over Head Range	-	12.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.5	1.200	24.3	3.000	37.7	7.000	56.8
0.200	15.7	1.400	26.1	3.500	40.6	7.500	58.8
0.300	15.9	1.600	27.9	4.000	43.3	8.000	60.8
0.400	15.1	1.800	29.5	4.500	45.9	8.500	62.6
0.500	16.0	2.000	31.0	5.000	48.3	9.000	64.5
0.600	17.4	2.200	32.5	5.500	50.2	9.500	66.3
0.800	20.0	2.400	33.9	6.000	52.5		
1.000	22.2	2.600	35.2	6.500	54.7		

Weir

Discharge Coef 0.544 Width (m) 1.800 Invert Level (m) 51.844

Complex Manhole: S21, DS/PN: 1.018, Volume (m³): 9.9

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0315-6120-1500-6120
Design Head (m)	1.500
Design Flow (l/s)	61.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	315
Invert Level (m)	48.000
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	61.2
Flush-Flo™	0.529	61.2
Kick-Flo®	1.087	52.4
Mean Flow over Head Range	-	51.3

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

Hydro-Brake® Optimum

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.5	1.200	54.9	3.000	85.6	7.000	129.3
0.200	32.3	1.400	59.2	3.500	92.2	7.500	133.7
0.300	56.2	1.600	63.1	4.000	98.4	8.000	138.0
0.400	60.3	1.800	66.8	4.500	104.2	8.500	142.2
0.500	61.1	2.000	70.3	5.000	109.7	9.000	146.2
0.600	61.0	2.200	73.6	5.500	114.9	9.500	150.1
0.800	59.4	2.400	76.8	6.000	119.9		
1.000	55.8	2.600	79.8	6.500	124.7		

Weir

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 49.250

Storage Structures for Surface Network 1

Cellular Storage Manhole: S1, DS/PN: 1.007

Invert Level (m) 62.728 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	325.0	325.0	1.610	0.0	446.6
1.600	325.0	446.6			

Cellular Storage Manhole: TANK 2, DS/PN: 7.000

Invert Level (m) 62.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	375.0	375.0	2.010	0.0	535.0
2.000	375.0	535.0			

Cellular Storage Manhole: TANK 3, DS/PN: 11.000

Invert Level (m) 55.955 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	150.0	1.610	0.0	230.0
1.600	150.0	230.0			

Cellular Storage Manhole: TANK 5, DS/PN: 15.000

Invert Level (m) 54.492 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	600.0	600.0	2.010	0.0	800.0
2.000	600.0	800.0			

Cellular Storage Manhole: TANK 4, DS/PN: 20.000

Invert Level (m) 50.612 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Cellular Storage Manhole: TANK 4, DS/PN: 20.000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	375.0	375.0	2.010	0.0	535.0
2.000	375.0	535.0			

Tank or Pond Manhole: HW3, DS/PN: 1.017

Invert Level (m) 48.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	843.0	1.300	1610.0

Time Area Diagram for Green Roof at Pipe Number 8.000 (Surface Network 1)

Area (m³) 3307 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.060095	32	36	0.012133	64	68	0.002450	96	100	0.000495
4	8	0.049201	36	40	0.009934	68	72	0.002006	100	104	0.000405
8	12	0.040283	40	44	0.008133	72	76	0.001642	104	108	0.000332
12	16	0.032981	44	48	0.006659	76	80	0.001344	108	112	0.000271
16	20	0.027002	48	52	0.005452	80	84	0.001101	112	116	0.000222
20	24	0.022108	52	56	0.004463	84	88	0.000901	116	120	0.000182
24	28	0.018100	56	60	0.003654	88	92	0.000738			
28	32	0.014819	60	64	0.002992	92	96	0.000604			

Time Area Diagram for Green Roof at Pipe Number 9.000 (Surface Network 1)

Area (m³) 2497 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.045375	32	36	0.009161	64	68	0.001850	96	100	0.000373
4	8	0.037150	36	40	0.007501	68	72	0.001514	100	104	0.000306
8	12	0.030416	40	44	0.006141	72	76	0.001240	104	108	0.000250
12	16	0.024903	44	48	0.005028	76	80	0.001015	108	112	0.000205
16	20	0.020388	48	52	0.004116	80	84	0.000831	112	116	0.000168
20	24	0.016693	52	56	0.003370	84	88	0.000680	116	120	0.000137
24	28	0.013667	56	60	0.002759	88	92	0.000557			
28	32	0.011189	60	64	0.002259	92	96	0.000456			

Time Area Diagram for Green Roof at Pipe Number 23.000 (Surface Network 1)

Area (m³) 3817 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.069362	32	36	0.014004	64	68	0.002827	96	100	0.000571
4	8	0.056789	36	40	0.011466	68	72	0.002315	100	104	0.000467
8	12	0.046495	40	44	0.009387	72	76	0.001895	104	108	0.000383
12	16	0.038067	44	48	0.007686	76	80	0.001552	108	112	0.000313
16	20	0.031167	48	52	0.006292	80	84	0.001270	112	116	0.000256
20	24	0.025517	52	56	0.005152	84	88	0.001040	116	120	0.000210
24	28	0.020892	56	60	0.004218	88	92	0.000852			
28	32	0.017105	60	64	0.003453	92	96	0.000697			

Time Area Diagram for Green Roof at Pipe Number 24.000 (Surface Network 1)

Area (m³) 4762 Evaporation (mm/day) 3
Depression Storage (mm) 5 Decay Coefficient 0.050

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.086535	32	36	0.017471	64	68	0.003527	96	100	0.000712
4	8	0.070849	36	40	0.014304	68	72	0.002888	100	104	0.000583
8	12	0.058006	40	44	0.011711	72	76	0.002364	104	108	0.000477
12	16	0.047491	44	48	0.009588	76	80	0.001936	108	112	0.000391
16	20	0.038883	48	52	0.007850	80	84	0.001585	112	116	0.000320
20	24	0.031834	52	56	0.006427	84	88	0.001298	116	120	0.000262
24	28	0.026064	56	60	0.005262	88	92	0.001062			
28	32	0.021339	60	64	0.004308	92	96	0.000870			

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	4.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	4
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.438
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 10, 40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S61	15 Winter	2	+0%	100/15 Summer				67.963
1.001	S62	15 Winter	2	+0%	100/15 Summer				67.446
1.002	S63	15 Winter	2	+0%	30/15 Summer				66.955
2.000	S68	15 Winter	2	+0%	100/15 Summer				67.006
1.003	S64	15 Winter	2	+0%	100/15 Summer				66.815
1.004	S65	15 Winter	2	+0%	30/15 Winter				66.441
3.000	S69	15 Winter	2	+0%					66.706
3.001	S70	15 Winter	2	+0%	100/15 Summer				66.093
1.005	S66	15 Winter	2	+0%	100/15 Summer				65.942
1.006	S67	15 Winter	2	+0%	30/15 Summer				63.784
1.007	S1	60 Winter	2	+0%	2/30 Winter				63.057
1.008	S2	30 Winter	2	+0%					62.531
4.000	S50	15 Winter	2	+0%	100/15 Summer				69.573
4.001	S51	15 Winter	2	+0%	100/15 Summer				69.131
4.002	S52	15 Winter	2	+0%	100/15 Summer				68.052

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S61	-0.280	0.000	0.14			29.1	OK	
1.001	S62	-0.242	0.000	0.27			55.4	OK	
1.002	S63	-0.185	0.000	0.51			68.8	OK	
2.000	S68	-0.180	0.000	0.09			4.7	OK	
1.003	S64	-0.207	0.000	0.42			82.5	OK	
1.004	S65	-0.197	0.000	0.45			91.6	OK	
3.000	S69	-0.171	0.000	0.13			8.9	OK	
3.001	S70	-0.160	0.000	0.18			10.4	OK	
1.005	S66	-0.224	0.000	0.33			124.6	OK	
1.006	S67	-0.195	0.000	0.46			155.9	OK	
1.007	S1	0.029	0.000	0.15		61	18.9	SURCHARGED	
1.008	S2	-0.235	0.000	0.10			21.5	OK	
4.000	S50	-0.184	0.000	0.07			5.1	OK	
4.001	S51	-0.144	0.000	0.27			19.3	OK	
4.002	S52	-0.195	0.000	0.26			27.2	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.003	S53	15 Winter	2	+0%	30/15 Summer			
5.000	S57	15 Winter	2	+0%	100/15 Summer			
6.000	S60	15 Winter	2	+0%	100/15 Winter			
5.001	S58	15 Winter	2	+0%	100/15 Summer			
5.002	S59	15 Winter	2	+0%	100/15 Summer			
4.004	S54	15 Winter	2	+0%	100/15 Summer			
4.005	S55	15 Winter	2	+0%				
7.000	TANK 2	120 Winter	2	+0%	2/30 Winter			
4.006	S56	15 Winter	2	+0%	2/15 Summer			
1.009	S3	30 Winter	2	+0%				
1.010	S4	30 Winter	2	+0%				
8.000	BLOCK D	60 Winter	2	+0%				
8.001	S10	60 Winter	2	+0%	100/15 Summer			
9.000	BLOCK C	60 Winter	2	+0%				
8.002	S10A	60 Winter	2	+0%				
10.000	S100	15 Winter	2	+0%	100/15 Summer			
11.000	TANK 3	60 Winter	2	+0%	30/15 Winter			
10.001	S101	15 Summer	2	+0%	2/15 Summer			
1.011	S5	15 Winter	2	+0%				
12.000	S309	15 Winter	2	+0%	100/15 Summer			
12.001	S310	15 Winter	2	+0%	100/15 Summer			
12.002	S311	15 Winter	2	+0%	30/15 Winter			
12.003	S312	15 Winter	2	+0%	30/15 Summer			
12.004	S313	15 Winter	2	+0%	30/15 Summer			
12.005	S314	15 Winter	2	+0%	30/15 Summer			
12.006	S315	15 Winter	2	+0%	30/15 Summer			
13.000	S300	15 Winter	2	+0%	100/15 Summer			
13.001	S301	15 Winter	2	+0%	100/15 Summer			
13.002	S302	15 Winter	2	+0%	30/15 Winter			
14.000	S307	15 Winter	2	+0%				
14.001	S308	15 Winter	2	+0%	100/15 Winter			
13.003	S303	15 Winter	2	+0%	30/15 Summer			
13.004	S304	15 Winter	2	+0%	30/15 Summer			
12.007	S305	15 Winter	2	+0%	100/15 Summer			
15.000	TANK 5	180 Winter	2	+0%	30/15 Winter			
12.008	S306	180 Winter	2	+0%	2/15 Summer			
1.012	S6	15 Winter	2	+0%	100/15 Summer			
1.013	S7	15 Winter	2	+0%				
1.014	S8	15 Winter	2	+0%				
1.015	S9	15 Winter	2	+0%				
1.016	HW1	15 Winter	2	+0%				
16.000	S210	15 Winter	2	+0%				
16.001	S211	15 Winter	2	+0%				
16.002	S212	15 Winter	2	+0%	100/15 Summer			
16.003	S213	15 Winter	2	+0%	30/15 Summer	100/15 Summer		
17.000	S200	15 Winter	2	+0%	100/15 Summer			
18.000	S209	15 Winter	2	+0%	100/15 Summer			
17.001	S201	15 Winter	2	+0%	100/15 Summer			

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.003	S53	67.648	-0.141	0.000	0.54			55.2	OK
5.000	S57	70.470	-0.144	0.000	0.27			21.7	OK
6.000	S60	69.797	-0.266	0.000	0.03			4.9	OK
5.001	S58	69.191	-0.200	0.000	0.24			38.2	OK
5.002	S59	68.444	-0.169	0.000	0.39			64.4	OK
4.004	S54	67.261	-0.204	0.000	0.43			124.8	OK
4.005	S55	66.001	-0.309	0.000	0.21			166.2	OK
7.000	TANK 2	62.579	0.079	0.000	0.07			15.3	SURCHARGED
4.006	S56	62.618	0.393	0.000	0.09			9.6	SURCHARGED
1.009	S3	60.795	-0.220	0.000	0.16			41.7	OK
1.010	S4	58.614	-0.212	0.000	0.19			50.1	OK
8.000	BLOCK D	58.107	-0.163	0.000	0.17			17.7	OK
8.001	S10	57.118	-0.139	0.000	0.31			21.4	OK
9.000	BLOCK C	57.053	-0.172	0.000	0.12			13.5	OK
8.002	S10A	56.397	-0.199	0.000	0.24			34.8	OK
10.000	S100	56.441	-0.199	0.000	0.24			27.8	OK
11.000	TANK 3	56.112	-0.142	0.000	0.07		54	4.1	OK
10.001	S101	56.317	0.114	0.000	0.05			4.9	SURCHARGED
1.011	S5	55.664	-0.310	0.000	0.21			89.2	OK
12.000	S309	55.782	-0.198	0.000	0.25			17.2	OK
12.001	S310	55.521	-0.333	0.000	0.15			30.9	OK
12.002	S311	55.307	-0.309	0.000	0.21			41.5	OK
12.003	S312	55.197	-0.276	0.000	0.30			48.2	OK
12.004	S313	55.099	-0.208	0.000	0.43			64.5	OK
12.005	S314	55.044	-0.160	0.000	0.47			70.8	OK
12.006	S315	55.002	-0.105	0.000	0.55			83.2	OK
13.000	S300	55.719	-0.208	0.000	0.20			14.0	OK
13.001	S301	55.548	-0.261	0.000	0.20			22.9	OK
13.002	S302	55.432	-0.201	0.000	0.43			50.2	OK
14.000	S307	59.179	-0.298	0.000	0.10			90.8	OK
14.001	S308	57.475	-0.252	0.000	0.23			108.1	OK
13.003	S303	55.110	-0.317	0.000	0.42			153.7	OK
13.004	S304	55.012	-0.265	0.000	0.52			183.1	OK
12.007	S305	54.948	-0.357	0.000	0.47			232.9	OK
15.000	TANK 5	54.879	-0.063	0.000	0.05			13.0	OK
12.008	S306	54.885	0.108	0.000	0.16			10.6	SURCHARGED
1.012	S6	54.329	-0.283	0.000	0.29			121.0	OK
1.013	S7	53.361	-0.316	0.000	0.19			121.1	OK
1.014	S8	51.754	-0.303	0.000	0.23			141.8	OK
1.015	S9	50.414	-0.303	0.000	0.23			142.2	OK
1.016	HW1	49.365	-0.635	0.000	0.07			142.6	OK
16.000	S210	60.392	-0.184	0.000	0.07			7.4	OK
16.001	S211	58.954	-0.168	0.000	0.14			14.3	OK
16.002	S212	57.509	-0.152	0.000	0.23			22.5	OK
16.003	S213	55.669	-0.112	0.000	0.49			48.8	OK
17.000	S200	55.799	-0.121	0.000	0.42			17.0	OK
18.000	S209	56.348	-0.168	0.000	0.15			15.4	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
17.001	S201	55.422	-0.157	0.000	0.44			38.2	OK

PN	US/MH Name	Level Exceeded
4.003	S53	
5.000	S57	
6.000	S60	
5.001	S58	
5.002	S59	
4.004	S54	
4.005	S55	
7.000	TANK 2	
4.006	S56	
1.009	S3	
1.010	S4	
8.000	BLOCK D	
8.001	S10	
9.000	BLOCK C	
8.002	S10A	
10.000	S100	
11.000	TANK 3	
10.001	S101	
1.011	S5	
12.000	S309	
12.001	S310	
12.002	S311	
12.003	S312	
12.004	S313	
12.005	S314	
12.006	S315	
13.000	S300	
13.001	S301	
13.002	S302	
14.000	S307	
14.001	S308	
13.003	S303	
13.004	S304	
12.007	S305	
15.000	TANK 5	
12.008	S306	
1.012	S6	
1.013	S7	
1.014	S8	
1.015	S9	
1.016	HW1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Level Exceeded
16.000	S210	
16.001	S211	
16.002	S212	
16.003	S213	2
17.000	S200	
18.000	S209	
17.001	S201	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
17.002	S202	15 Winter	2	+0%	100/15 Summer			
19.000	S207	15 Winter	2	+0%	100/15 Summer			
19.001	S208	15 Winter	2	+0%	100/15 Summer			
17.003	S203	15 Winter	2	+0%	30/15 Winter			
16.004	S204	15 Winter	2	+0%	100/15 Summer			
16.005	S205	15 Winter	2	+0%	30/15 Summer			
20.000	TANK 4	120 Winter	2	+0%	2/30 Summer			
16.006	S206	15 Winter	2	+0%	2/15 Summer	100/15 Summer		
16.007	S13	15 Winter	2	+0%	30/15 Summer			
16.008	S14	15 Winter	2	+0%	30/15 Summer			
21.000	S11	15 Winter	2	+0%				
21.001	S12	15 Winter	2	+0%				
16.009	S15	15 Winter	2	+0%	100/15 Summer			
16.010	S16	15 Winter	2	+0%	100/15 Summer			
22.000	S18	15 Winter	2	+0%	100/15 Summer			
22.001	S19	15 Winter	2	+0%	100/15 Summer			
23.000	BLOCK B	60 Winter	2	+0%	100/15 Summer			
22.002	S20	60 Winter	2	+0%	30/15 Winter			
16.011	S17	15 Winter	2	+0%	30/15 Summer			
16.012	HW2	15 Winter	2	+0%				
24.000	BLOCK A	60 Winter	2	+0%				
24.001	HW4	240 Winter	2	+0%				
1.017	HW3	240 Winter	2	+0%	2/60 Winter			
1.018	S21	360 Winter	2	+0%	2/30 Summer			
25.000	SD11	15 Summer	2	+0%				
25.001	SD12	15 Summer	2	+0%				
25.002	SD13	15 Summer	2	+0%				
26.000	SD1	15 Summer	2	+0%				
26.001	SD2	15 Summer	2	+0%				
26.002	SD3	15 Summer	2	+0%				
26.003	SD4	15 Summer	2	+0%				
25.003	SD5	15 Summer	2	+0%				
25.004	SD6	15 Summer	2	+0%				
25.005	SD7	15 Summer	2	+0%				
1.019	SD8	1440 Summer	2	+0%				
1.020	SD9	960 Winter	2	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
17.002	S202	55.036	-0.158	0.000	0.45			63.8	OK
19.000	S207	56.230	-0.198	0.000	0.25			36.2	OK
19.001	S208	55.359	-0.178	0.000	0.34			64.3	OK
17.003	S203	54.245	-0.235	0.000	0.46			127.9	OK
16.004	S204	53.940	-0.302	0.000	0.24			185.2	OK
16.005	S205	51.534	-0.270	0.000	0.34			191.5	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
20.000	TANK 4	51.031	0.119	0.000	0.06			9.7	SURCHARGED
16.006	S206	51.104	0.610	0.000	0.65			9.9	SURCHARGED
16.007	S13	50.218	-0.182	0.000	0.32			23.5	OK
16.008	S14	50.059	-0.139	0.000	0.56			40.2	OK
21.000	S11	53.287	-0.266	0.000	0.03			8.0	OK
21.001	S12	51.504	-0.237	0.000	0.10			25.6	OK
16.009	S15	49.760	-0.255	0.000	0.39			65.4	OK
16.010	S16	49.672	-0.280	0.000	0.30			64.0	OK
22.000	S18	49.905	-0.210	0.000	0.19			12.5	OK
22.001	S19	49.737	-0.181	0.000	0.32			21.3	OK
23.000	BLOCK B	50.081	-0.144	0.000	0.27			20.4	OK
22.002	S20	49.533	-0.158	0.000	0.45			28.3	OK
16.011	S17	49.392	-0.200	0.000	0.59			82.4	OK
16.012	HW2	49.301	-0.799	0.000	0.03			82.9	OK
24.000	BLOCK A	52.060	-0.165	0.000	0.15			25.8	OK
24.001	HW4	49.279	-0.783	0.000	0.01			14.6	OK
1.017	HW3	49.279	0.179	0.000	0.92			71.7	SURCHARGED
1.018	S21	49.203	0.828	0.000	0.12			61.2	SURCHARGED
25.000	SD11	53.629	-0.525	0.000	0.00			0.0	OK
25.001	SD12	53.176	-0.525	0.000	0.00			0.0	OK
25.002	SD13	52.840	-0.525	0.000	0.00			0.0	OK
26.000	SD1	47.518	-0.525	0.000	0.00			0.0	OK
26.001	SD2	47.278	-0.525	0.000	0.00			0.0	OK
26.002	SD3	47.000	-0.525	0.000	0.00			0.0	OK
26.003	SD4	46.995	-0.525	0.000	0.00			0.0	OK
25.003	SD5	46.791	-0.600	0.000	0.00			0.0	OK
25.004	SD6	46.641	-0.600	0.000	0.00			0.0	OK
25.005	SD7	46.575	-0.600	0.000	0.00			0.0	OK
1.019	SD8	44.985	-0.497	0.000	0.07			61.2	OK
1.020	SD9	43.690	-0.504	0.000	0.06			61.2	OK

PN	US/MH Name	Level Exceeded
17.002	S202	
19.000	S207	
19.001	S208	
17.003	S203	
16.004	S204	
16.005	S205	
20.000	TANK 4	
16.006	S206	4
16.007	S13	
16.008	S14	
21.000	S11	
21.001	S12	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Level Exceeded
16.009	S15	
16.010	S16	
22.000	S18	
22.001	S19	
23.000	BLOCK B	
22.002	S20	
16.011	S17	
16.012	HW2	
24.000	BLOCK A	
24.001	HW4	
1.017	HW3	
1.018	S21	
25.000	SD11	
25.001	SD12	
25.002	SD13	
26.000	SD1	
26.001	SD2	
26.002	SD3	
26.003	SD4	
25.003	SD5	
25.004	SD6	
25.005	SD7	
1.019	SD8	
1.020	SD9	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	4.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	4
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.438
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 10, 40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S61	15 Winter	30	+10%	100/15 Summer				68.010
1.001	S62	15 Winter	30	+10%	100/15 Summer				67.532
1.002	S63	15 Winter	30	+10%	30/15 Summer				67.186
2.000	S68	15 Winter	30	+10%	100/15 Summer				67.027
1.003	S64	15 Winter	30	+10%	100/15 Summer				66.983
1.004	S65	15 Winter	30	+10%	30/15 Winter				66.645
3.000	S69	15 Winter	30	+10%					66.732
3.001	S70	15 Winter	30	+10%	100/15 Summer				66.127
1.005	S66	15 Winter	30	+10%	100/15 Summer				66.040
1.006	S67	15 Winter	30	+10%	30/15 Summer				64.069
1.007	S1	120 Winter	30	+10%	2/30 Winter				63.529
1.008	S2	15 Winter	30	+10%					62.549
4.000	S50	15 Winter	30	+10%	100/15 Summer				69.591
4.001	S51	15 Winter	30	+10%	100/15 Summer				69.188
4.002	S52	15 Winter	30	+10%	100/15 Summer				68.156

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S61	-0.233	0.000	0.30			60.7	OK	
1.001	S62	-0.156	0.000	0.62			126.8	OK	
1.002	S63	0.046	0.000	1.21			162.6	SURCHARGED	
2.000	S68	-0.159	0.000	0.19			9.8	OK	
1.003	S64	-0.039	0.000	0.96			190.4	OK	
1.004	S65	0.007	0.000	1.01			205.1	SURCHARGED	
3.000	S69	-0.145	0.000	0.27			18.6	OK	
3.001	S70	-0.126	0.000	0.39			22.3	OK	
1.005	S66	-0.126	0.000	0.76			282.6	OK	
1.006	S67	0.090	0.000	1.05			359.4	SURCHARGED	
1.007	S1	0.501	0.000	0.16		112	20.0	SURCHARGED	
1.008	S2	-0.217	0.000	0.16			34.0	OK	
4.000	S50	-0.166	0.000	0.16			10.6	OK	
4.001	S51	-0.087	0.000	0.68			47.8	OK	
4.002	S52	-0.091	0.000	0.63			65.9	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.003	S53	15 Winter	30	+10%	30/15 Summer			
5.000	S57	15 Winter	30	+10%	100/15 Summer			
6.000	S60	15 Winter	30	+10%	100/15 Winter			
5.001	S58	15 Winter	30	+10%	100/15 Summer			
5.002	S59	15 Winter	30	+10%	100/15 Summer			
4.004	S54	15 Winter	30	+10%	100/15 Summer			
4.005	S55	15 Winter	30	+10%				
7.000	TANK 2	180 Winter	30	+10%	2/30 Winter			
4.006	S56	15 Winter	30	+10%	2/15 Summer			
1.009	S3	15 Winter	30	+10%				
1.010	S4	15 Winter	30	+10%				
8.000	BLOCK D	30 Winter	30	+10%				
8.001	S10	30 Winter	30	+10%	100/15 Summer			
9.000	BLOCK C	30 Winter	30	+10%				
8.002	S10A	30 Winter	30	+10%				
10.000	S100	15 Winter	30	+10%	100/15 Summer			
11.000	TANK 3	120 Winter	30	+10%	30/15 Winter			
10.001	S101	15 Winter	30	+10%	2/15 Summer			
1.011	S5	15 Winter	30	+10%				
12.000	S309	15 Winter	30	+10%	100/15 Summer			
12.001	S310	15 Winter	30	+10%	100/15 Summer			
12.002	S311	15 Winter	30	+10%	30/15 Winter			
12.003	S312	15 Winter	30	+10%	30/15 Summer			
12.004	S313	15 Winter	30	+10%	30/15 Summer			
12.005	S314	15 Winter	30	+10%	30/15 Summer			
12.006	S315	15 Winter	30	+10%	30/15 Summer			
13.000	S300	15 Winter	30	+10%	100/15 Summer			
13.001	S301	15 Winter	30	+10%	100/15 Summer			
13.002	S302	15 Winter	30	+10%	30/15 Winter			
14.000	S307	15 Winter	30	+10%				
14.001	S308	15 Winter	30	+10%	100/15 Winter			
13.003	S303	15 Winter	30	+10%	30/15 Summer			
13.004	S304	15 Winter	30	+10%	30/15 Summer			
12.007	S305	180 Winter	30	+10%	100/15 Summer			
15.000	TANK 5	240 Winter	30	+10%	30/15 Winter			
12.008	S306	240 Winter	30	+10%	2/15 Summer			
1.012	S6	15 Winter	30	+10%	100/15 Summer			
1.013	S7	15 Winter	30	+10%				
1.014	S8	15 Winter	30	+10%				
1.015	S9	15 Winter	30	+10%				
1.016	HW1	180 Winter	30	+10%				
16.000	S210	15 Winter	30	+10%				
16.001	S211	15 Winter	30	+10%				
16.002	S212	15 Winter	30	+10%	100/15 Summer			
16.003	S213	15 Winter	30	+10%	30/15 Summer	100/15 Summer		
17.000	S200	15 Winter	30	+10%	100/15 Summer			
18.000	S209	15 Winter	30	+10%	100/15 Summer			
17.001	S201	15 Winter	30	+10%	100/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.003	S53	67.984	0.195	0.000	1.26			128.5	SURCHARGED
5.000	S57	70.513	-0.101	0.000	0.57			45.1	OK
6.000	S60	69.813	-0.250	0.000	0.06			10.2	OK
5.001	S58	69.249	-0.142	0.000	0.53			85.5	OK
5.002	S59	68.543	-0.070	0.000	0.92			152.3	OK
4.004	S54	67.393	-0.072	0.000	1.00			291.0	OK
4.005	S55	66.090	-0.220	0.000	0.50			389.9	OK
7.000	TANK 2	63.197	0.697	0.000	0.04			9.7	SURCHARGED
4.006	S56	63.330	1.105	0.000	0.09			9.7	SURCHARGED
1.009	S3	60.831	-0.184	0.000	0.31			82.3	OK
1.010	S4	58.663	-0.163	0.000	0.42			112.0	OK
8.000	BLOCK D	58.143	-0.126	0.000	0.39			41.0	OK
8.001	S10	57.183	-0.074	0.000	0.76			52.3	OK
9.000	BLOCK C	57.081	-0.144	0.000	0.28			30.9	OK
8.002	S10A	56.464	-0.133	0.000	0.59			83.4	OK
10.000	S100	56.533	-0.107	0.000	0.52			59.0	OK
11.000	TANK 3	56.376	0.122	0.000	0.08		119	4.7	SURCHARGED
10.001	S101	56.416	0.213	0.000	0.05			4.9	SURCHARGED
1.011	S5	55.752	-0.222	0.000	0.49			210.9	OK
12.000	S309	55.835	-0.145	0.000	0.51			35.7	OK
12.001	S310	55.724	-0.130	0.000	0.33			69.1	OK
12.002	S311	55.669	0.053	0.000	0.42			82.3	SURCHARGED
12.003	S312	55.622	0.149	0.000	0.51			80.8	SURCHARGED
12.004	S313	55.563	0.256	0.000	0.71			108.2	SURCHARGED
12.005	S314	55.487	0.283	0.000	0.80			120.0	SURCHARGED
12.006	S315	55.396	0.289	0.000	0.94			141.1	SURCHARGED
13.000	S300	55.765	-0.162	0.000	0.42			29.2	OK
13.001	S301	55.688	-0.121	0.000	0.42			49.0	OK
13.002	S302	55.644	0.011	0.000	0.92			107.7	SURCHARGED
14.000	S307	59.216	-0.261	0.000	0.21			190.0	OK
14.001	S308	57.543	-0.184	0.000	0.51			236.1	OK
13.003	S303	55.540	0.114	0.000	0.86			315.3	SURCHARGED
13.004	S304	55.420	0.143	0.000	1.09			382.5	SURCHARGED
12.007	S305	55.305	0.000	0.000	0.27			132.6	OK
15.000	TANK 5	55.273	0.331	0.000	0.08			18.2	SURCHARGED
12.008	S306	55.289	0.511	0.000	0.41			26.9	SURCHARGED
1.012	S6	54.439	-0.173	0.000	0.68			277.7	OK
1.013	S7	53.438	-0.239	0.000	0.44			279.8	OK
1.014	S8	51.847	-0.210	0.000	0.54			333.2	OK
1.015	S9	50.507	-0.210	0.000	0.55			334.4	OK
1.016	HW1	49.589	-0.411	0.000	0.07			148.2	OK
16.000	S210	60.411	-0.165	0.000	0.16			15.5	OK
16.001	S211	58.988	-0.134	0.000	0.34			33.7	OK
16.002	S212	57.556	-0.105	0.000	0.55			55.1	OK
16.003	S213	56.169	0.388	0.000	1.12			110.4	SURCHARGED
17.000	S200	55.863	-0.057	0.000	0.87			35.6	OK
18.000	S209	56.377	-0.139	0.000	0.31			32.2	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
17.001	S201	55.531	-0.048	0.000	0.95			81.5	OK

PN	US/MH Name	Level Exceeded
4.003	S53	
5.000	S57	
6.000	S60	
5.001	S58	
5.002	S59	
4.004	S54	
4.005	S55	
7.000	TANK 2	
4.006	S56	
1.009	S3	
1.010	S4	
8.000	BLOCK D	
8.001	S10	
9.000	BLOCK C	
8.002	S10A	
10.000	S100	
11.000	TANK 3	
10.001	S101	
1.011	S5	
12.000	S309	
12.001	S310	
12.002	S311	
12.003	S312	
12.004	S313	
12.005	S314	
12.006	S315	
13.000	S300	
13.001	S301	
13.002	S302	
14.000	S307	
14.001	S308	
13.003	S303	
13.004	S304	
12.007	S305	
15.000	TANK 5	
12.008	S306	
1.012	S6	
1.013	S7	
1.014	S8	
1.015	S9	
1.016	HW1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Level Exceeded
16.000	S210	
16.001	S211	
16.002	S212	
16.003	S213	2
17.000	S200	
18.000	S209	
17.001	S201	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
17.002	S202	15 Winter	30	+10%	100/15 Summer			
19.000	S207	15 Winter	30	+10%	100/15 Summer			
19.001	S208	15 Winter	30	+10%	100/15 Summer			
17.003	S203	15 Winter	30	+10%	30/15 Winter			
16.004	S204	15 Winter	30	+10%	100/15 Summer			
16.005	S205	15 Winter	30	+10%	30/15 Summer			
20.000	TANK 4	120 Winter	30	+10%	2/30 Summer			
16.006	S206	15 Winter	30	+10%	2/15 Summer	100/15 Summer		
16.007	S13	15 Winter	30	+10%	30/15 Summer			
16.008	S14	15 Winter	30	+10%	30/15 Summer			
21.000	S11	15 Winter	30	+10%				
21.001	S12	15 Winter	30	+10%				
16.009	S15	15 Winter	30	+10%	100/15 Summer			
16.010	S16	15 Winter	30	+10%	100/15 Summer			
22.000	S18	15 Winter	30	+10%	100/15 Summer			
22.001	S19	15 Winter	30	+10%	100/15 Summer			
23.000	BLOCK B	30 Winter	30	+10%	100/15 Summer			
22.002	S20	30 Winter	30	+10%	30/15 Winter			
16.011	S17	15 Winter	30	+10%	30/15 Summer			
16.012	HW2	180 Winter	30	+10%				
24.000	BLOCK A	30 Winter	30	+10%				
24.001	HW4	180 Winter	30	+10%				
1.017	HW3	180 Winter	30	+10%	2/60 Winter			
1.018	S21	180 Winter	30	+10%	2/30 Summer			
25.000	SD11	15 Summer	30	+10%				
25.001	SD12	15 Summer	30	+10%				
25.002	SD13	15 Summer	30	+10%				
26.000	SD1	15 Summer	30	+10%				
26.001	SD2	15 Summer	30	+10%				
26.002	SD3	15 Summer	30	+10%				
26.003	SD4	15 Summer	30	+10%				
25.003	SD5	15 Summer	30	+10%				
25.004	SD6	15 Summer	30	+10%				
25.005	SD7	15 Summer	30	+10%				
1.019	SD8	180 Winter	30	+10%				
1.020	SD9	180 Winter	30	+10%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
17.002	S202	55.177	-0.017	0.000	0.98			140.3	OK
19.000	S207	56.283	-0.145	0.000	0.51			75.6	OK
19.001	S208	55.443	-0.094	0.000	0.79			148.4	OK
17.003	S203	54.492	0.012	0.000	1.03			284.7	SURCHARGED
16.004	S204	54.027	-0.215	0.000	0.53			415.7	OK
16.005	S205	52.545	0.741	0.000	0.75			425.2	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
20.000	TANK 4	51.596	0.684	0.000	0.11			17.8	SURCHARGED
16.006	S206	51.980	1.486	0.000	1.88			28.7	SURCHARGED
16.007	S13	50.465	0.065	0.000	0.80			58.5	SURCHARGED
16.008	S14	50.331	0.133	0.000	1.31			94.4	SURCHARGED
21.000	S11	53.302	-0.251	0.000	0.06			16.7	OK
21.001	S12	51.540	-0.201	0.000	0.24			63.3	OK
16.009	S15	49.896	-0.120	0.000	0.88			147.5	OK
16.010	S16	49.780	-0.172	0.000	0.68			144.6	OK
22.000	S18	49.948	-0.167	0.000	0.39			26.1	OK
22.001	S19	49.817	-0.101	0.000	0.72			47.6	OK
23.000	BLOCK B	50.132	-0.093	0.000	0.63			47.2	OK
22.002	S20	49.741	0.050	0.000	1.14			71.2	SURCHARGED
16.011	S17	49.615	0.022	0.000	1.24			173.3	SURCHARGED
16.012	HW2	49.577	-0.523	0.000	0.03			76.7	OK
24.000	BLOCK A	52.092	-0.133	0.000	0.35			58.9	OK
24.001	HW4	49.549	-0.513	0.000	0.01			35.0	OK
1.017	HW3	49.548	0.448	0.000	1.49			116.6	SURCHARGED
1.018	S21	49.331	0.956	0.000	0.23			116.6	SURCHARGED
25.000	SD11	53.629	-0.525	0.000	0.00			0.0	OK
25.001	SD12	53.176	-0.525	0.000	0.00			0.0	OK
25.002	SD13	52.840	-0.525	0.000	0.00			0.0	OK
26.000	SD1	47.518	-0.525	0.000	0.00			0.0	OK
26.001	SD2	47.278	-0.525	0.000	0.00			0.0	OK
26.002	SD3	47.000	-0.525	0.000	0.00			0.0	OK
26.003	SD4	46.995	-0.525	0.000	0.00			0.0	OK
25.003	SD5	46.791	-0.600	0.000	0.00			0.0	OK
25.004	SD6	46.641	-0.600	0.000	0.00			0.0	OK
25.005	SD7	46.575	-0.600	0.000	0.00			0.0	OK
1.019	SD8	45.026	-0.455	0.000	0.13			116.6	OK
1.020	SD9	43.730	-0.464	0.000	0.12			116.6	OK

PN	US/MH Name	Level Exceeded
17.002	S202	
19.000	S207	
19.001	S208	
17.003	S203	
16.004	S204	
16.005	S205	
20.000	TANK 4	
16.006	S206	4
16.007	S13	
16.008	S14	
21.000	S11	
21.001	S12	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Level Exceeded
16.009	S15	
16.010	S16	
22.000	S18	
22.001	S19	
23.000	BLOCK B	
22.002	S20	
16.011	S17	
16.012	HW2	
24.000	BLOCK A	
24.001	HW4	
1.017	HW3	
1.018	S21	
25.000	SD11	
25.001	SD12	
25.002	SD13	
26.000	SD1	
26.001	SD2	
26.002	SD3	
26.003	SD4	
25.003	SD5	
25.004	SD6	
25.005	SD7	
1.019	SD8	
1.020	SD9	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	4.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	4
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.438
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 10, 40

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S61	15 Winter	100	+40%	100/15 Summer				68.607
1.001	S62	15 Winter	100	+40%	100/15 Summer				68.441
1.002	S63	15 Winter	100	+40%	30/15 Summer				68.134
2.000	S68	15 Winter	100	+40%	100/15 Summer				67.934
1.003	S64	15 Winter	100	+40%	100/15 Summer				67.907
1.004	S65	15 Winter	100	+40%	30/15 Winter				67.404
3.000	S69	15 Winter	100	+40%					66.814
3.001	S70	15 Winter	100	+40%	100/15 Summer				66.728
1.005	S66	15 Winter	100	+40%	100/15 Summer				66.678
1.006	S67	15 Winter	100	+40%	30/15 Summer				64.748
1.007	S1	180 Winter	100	+40%	2/30 Winter				64.259
1.008	S2	15 Winter	100	+40%					62.564
4.000	S50	15 Winter	100	+40%	100/15 Summer				69.932
4.001	S51	15 Winter	100	+40%	100/15 Summer				69.908
4.002	S52	15 Winter	100	+40%	100/15 Summer				69.294

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S61	0.364	0.000	0.46			94.4	SURCHARGED	
1.001	S62	0.753	0.000	0.76			155.8	SURCHARGED	
1.002	S63	0.994	0.000	1.42			190.6	SURCHARGED	
2.000	S68	0.748	0.000	0.31			16.0	SURCHARGED	
1.003	S64	0.885	0.000	1.14			226.7	SURCHARGED	
1.004	S65	0.766	0.000	1.26			255.2	SURCHARGED	
3.000	S69	-0.063	0.000	0.45			30.8	OK	
3.001	S70	0.475	0.000	0.57			32.6	SURCHARGED	
1.005	S66	0.512	0.000	0.94			350.2	SURCHARGED	
1.006	S67	0.769	0.000	1.34			456.7	SURCHARGED	
1.007	S1	1.231	0.000	0.16			20.0	SURCHARGED	
1.008	S2	-0.202	0.000	0.23			48.3	OK	
4.000	S50	0.175	0.000	0.24			16.2	SURCHARGED	
4.001	S51	0.633	0.000	0.91			64.2	SURCHARGED	
4.002	S52	1.047	0.000	0.81			84.4	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.003	S53	15 Winter	100	+40%	30/15 Summer			
5.000	S57	15 Winter	100	+40%	100/15 Summer			
6.000	S60	15 Winter	100	+40%	100/15 Winter			
5.001	S58	15 Winter	100	+40%	100/15 Summer			
5.002	S59	15 Winter	100	+40%	100/15 Summer			
4.004	S54	15 Winter	100	+40%	100/15 Summer			
4.005	S55	15 Winter	100	+40%				
7.000	TANK 2	360 Winter	100	+40%	2/30 Winter			
4.006	S56	15 Winter	100	+40%	2/15 Summer			
1.009	S3	15 Winter	100	+40%				
1.010	S4	15 Winter	100	+40%				
8.000	BLOCK D	30 Winter	100	+40%				
8.001	S10	30 Winter	100	+40%	100/15 Summer			
9.000	BLOCK C	15 Winter	100	+40%				
8.002	S10A	30 Winter	100	+40%				
10.000	S100	15 Winter	100	+40%	100/15 Summer			
11.000	TANK 3	180 Winter	100	+40%	30/15 Winter			
10.001	S101	180 Winter	100	+40%	2/15 Summer			
1.011	S5	30 Summer	100	+40%				
12.000	S309	15 Winter	100	+40%	100/15 Summer			
12.001	S310	15 Winter	100	+40%	100/15 Summer			
12.002	S311	15 Winter	100	+40%	30/15 Winter			
12.003	S312	15 Winter	100	+40%	30/15 Summer			
12.004	S313	15 Winter	100	+40%	30/15 Summer			
12.005	S314	15 Winter	100	+40%	30/15 Summer			
12.006	S315	120 Winter	100	+40%	30/15 Summer			
13.000	S300	15 Winter	100	+40%	100/15 Summer			
13.001	S301	15 Winter	100	+40%	100/15 Summer			
13.002	S302	15 Winter	100	+40%	30/15 Winter			
14.000	S307	15 Winter	100	+40%				
14.001	S308	15 Winter	100	+40%	100/15 Winter			
13.003	S303	15 Winter	100	+40%	30/15 Summer			
13.004	S304	15 Winter	100	+40%	30/15 Summer			
12.007	S305	120 Winter	100	+40%	100/15 Summer			
15.000	TANK 5	240 Winter	100	+40%	30/15 Winter			
12.008	S306	180 Winter	100	+40%	2/15 Summer			
1.012	S6	15 Winter	100	+40%	100/15 Summer			
1.013	S7	15 Winter	100	+40%				
1.014	S8	15 Winter	100	+40%				
1.015	S9	15 Winter	100	+40%				
1.016	HW1	360 Winter	100	+40%				
16.000	S210	15 Winter	100	+40%				
16.001	S211	15 Winter	100	+40%				
16.002	S212	15 Winter	100	+40%	100/15 Summer			
16.003	S213	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
17.000	S200	15 Winter	100	+40%	100/15 Summer			
18.000	S209	15 Winter	100	+40%	100/15 Summer			
17.001	S201	15 Winter	100	+40%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.003	S53	69.047	1.258	0.000	1.62			164.2	FLOOD RISK
5.000	S57	70.837	0.223	0.000	0.89			70.5	SURCHARGED
6.000	S60	70.092	0.029	0.000	0.10			16.5	SURCHARGED
5.001	S58	70.078	0.687	0.000	0.74			118.3	SURCHARGED
5.002	S59	69.728	1.115	0.000	1.15			190.4	SURCHARGED
4.004	S54	68.170	0.705	0.000	1.27			371.4	SURCHARGED
4.005	S55	66.137	-0.173	0.000	0.67			523.9	OK
7.000	TANK 2	64.044	1.544	0.000	0.04			9.8	SURCHARGED
4.006	S56	64.202	1.977	0.000	0.10			10.4	SURCHARGED
1.009	S3	60.862	-0.153	0.000	0.48			126.0	OK
1.010	S4	58.704	-0.122	0.000	0.66			176.4	OK
8.000	BLOCK D	58.176	-0.094	0.000	0.64			67.8	OK
8.001	S10	57.755	0.498	0.000	1.32			91.7	SURCHARGED
9.000	BLOCK C	57.108	-0.117	0.000	0.43			47.5	OK
8.002	S10A	56.554	-0.043	0.000	1.00			142.2	OK
10.000	S100	57.046	0.406	0.000	0.84			95.7	SURCHARGED
11.000	TANK 3	56.805	0.550	0.000	0.07			4.1	SURCHARGED
10.001	S101	56.806	0.603	0.000	0.05			4.9	SURCHARGED
1.011	S5	55.845	-0.129	0.000	0.82			347.5	OK
12.000	S309	56.835	0.855	0.000	0.72			50.1	FLOOD RISK
12.001	S310	56.750	0.896	0.000	0.39			81.3	FLOOD RISK
12.002	S311	56.628	1.012	0.000	0.54			105.9	SURCHARGED
12.003	S312	56.509	1.036	0.000	0.80			126.3	SURCHARGED
12.004	S313	56.397	1.090	0.000	1.25			189.7	SURCHARGED
12.005	S314	56.224	1.020	0.000	1.40			210.9	SURCHARGED
12.006	S315	56.133	1.026	0.000	0.70			105.1	SURCHARGED
13.000	S300	56.961	1.034	0.000	0.59			40.7	FLOOD RISK
13.001	S301	56.892	1.083	0.000	0.61			70.0	FLOOD RISK
13.002	S302	56.798	1.165	0.000	1.28			149.9	SURCHARGED
14.000	S307	59.254	-0.223	0.000	0.35			314.8	OK
14.001	S308	57.828	0.101	0.000	0.81			377.7	SURCHARGED
13.003	S303	56.435	1.009	0.000	1.37			501.9	SURCHARGED
13.004	S304	56.159	0.882	0.000	1.79			625.7	SURCHARGED
12.007	S305	56.129	0.824	0.000	0.63			316.3	SURCHARGED
15.000	TANK 5	55.923	0.981	0.000	0.11			25.4	SURCHARGED
12.008	S306	55.979	1.202	0.000	0.41			27.2	SURCHARGED
1.012	S6	54.672	0.060	0.000	1.04			426.1	SURCHARGED
1.013	S7	53.501	-0.176	0.000	0.68			426.4	OK
1.014	S8	51.923	-0.134	0.000	0.83			506.8	OK
1.015	S9	50.584	-0.132	0.000	0.83			506.4	OK
1.016	HW1	50.000	0.000	0.000	0.08			164.3	FLOOD RISK
16.000	S210	60.429	-0.147	0.000	0.26			25.7	OK
16.001	S211	59.019	-0.103	0.000	0.57			55.8	OK
16.002	S212	58.559	0.898	0.000	0.75			75.3	SURCHARGED
16.003	S213	57.448	1.667	3.849	1.38			136.7	FLOOD
17.000	S200	57.109	1.189	0.000	1.14			46.2	FLOOD RISK
18.000	S209	56.844	0.328	0.000	0.47			48.9	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
17.001	S201	56.700	1.121	0.000	1.25			107.5	SURCHARGED

PN	US/MH Name	Level Exceeded
4.003	S53	
5.000	S57	
6.000	S60	
5.001	S58	
5.002	S59	
4.004	S54	
4.005	S55	
7.000	TANK 2	
4.006	S56	
1.009	S3	
1.010	S4	
8.000	BLOCK D	
8.001	S10	
9.000	BLOCK C	
8.002	S10A	
10.000	S100	
11.000	TANK 3	
10.001	S101	
1.011	S5	
12.000	S309	
12.001	S310	
12.002	S311	
12.003	S312	
12.004	S313	
12.005	S314	
12.006	S315	
13.000	S300	
13.001	S301	
13.002	S302	
14.000	S307	
14.001	S308	
13.003	S303	
13.004	S304	
12.007	S305	
15.000	TANK 5	
12.008	S306	
1.012	S6	
1.013	S7	
1.014	S8	
1.015	S9	
1.016	HW1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Level Exceeded	
16.000	S210		
16.001	S211		
16.002	S212		
16.003	S213	2	
17.000	S200		
18.000	S209		
17.001	S201		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
17.002	S202	15 Winter	100	+40%	100/15 Summer			
19.000	S207	15 Winter	100	+40%	100/15 Summer			
19.001	S208	15 Winter	100	+40%	100/15 Summer			
17.003	S203	15 Winter	100	+40%	30/15 Winter			
16.004	S204	15 Winter	100	+40%	100/15 Summer			
16.005	S205	15 Winter	100	+40%	30/15 Summer			
20.000	TANK 4	120 Winter	100	+40%	2/30 Summer			
16.006	S206	15 Winter	100	+40%	2/15 Summer	100/15 Summer		
16.007	S13	15 Winter	100	+40%	30/15 Summer			
16.008	S14	15 Winter	100	+40%	30/15 Summer			
21.000	S11	15 Winter	100	+40%				
21.001	S12	15 Winter	100	+40%				
16.009	S15	15 Winter	100	+40%	100/15 Summer			
16.010	S16	15 Winter	100	+40%	100/15 Summer			
22.000	S18	30 Winter	100	+40%	100/15 Summer			
22.001	S19	30 Winter	100	+40%	100/15 Summer			
23.000	BLOCK B	30 Winter	100	+40%	100/15 Summer			
22.002	S20	30 Winter	100	+40%	30/15 Winter			
16.011	S17	180 Winter	100	+40%	30/15 Summer			
16.012	HW2	180 Winter	100	+40%				
24.000	BLOCK A	15 Winter	100	+40%				
24.001	HW4	180 Winter	100	+40%				
1.017	HW3	180 Winter	100	+40%	2/60 Winter			
1.018	S21	180 Winter	100	+40%	2/30 Summer			
25.000	SD11	15 Summer	100	+40%				
25.001	SD12	15 Summer	100	+40%				
25.002	SD13	15 Summer	100	+40%				
26.000	SD1	15 Summer	100	+40%				
26.001	SD2	15 Summer	100	+40%				
26.002	SD3	15 Summer	100	+40%				
26.003	SD4	15 Summer	100	+40%				
25.003	SD5	15 Summer	100	+40%				
25.004	SD6	15 Summer	100	+40%				
25.005	SD7	15 Summer	100	+40%				
1.019	SD8	180 Winter	100	+40%				
1.020	SD9	180 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
17.002	S202	56.251	1.057	0.000	1.28			182.3	SURCHARGED
19.000	S207	56.670	0.242	0.000	0.75			109.9	SURCHARGED
19.001	S208	56.211	0.674	0.000	1.09			204.6	SURCHARGED
17.003	S203	55.088	0.608	0.000	1.35			371.8	SURCHARGED
16.004	S204	54.656	0.414	0.000	0.68			530.5	SURCHARGED
16.005	S205	53.517	1.713	0.000	0.97			550.1	FLOOD RISK

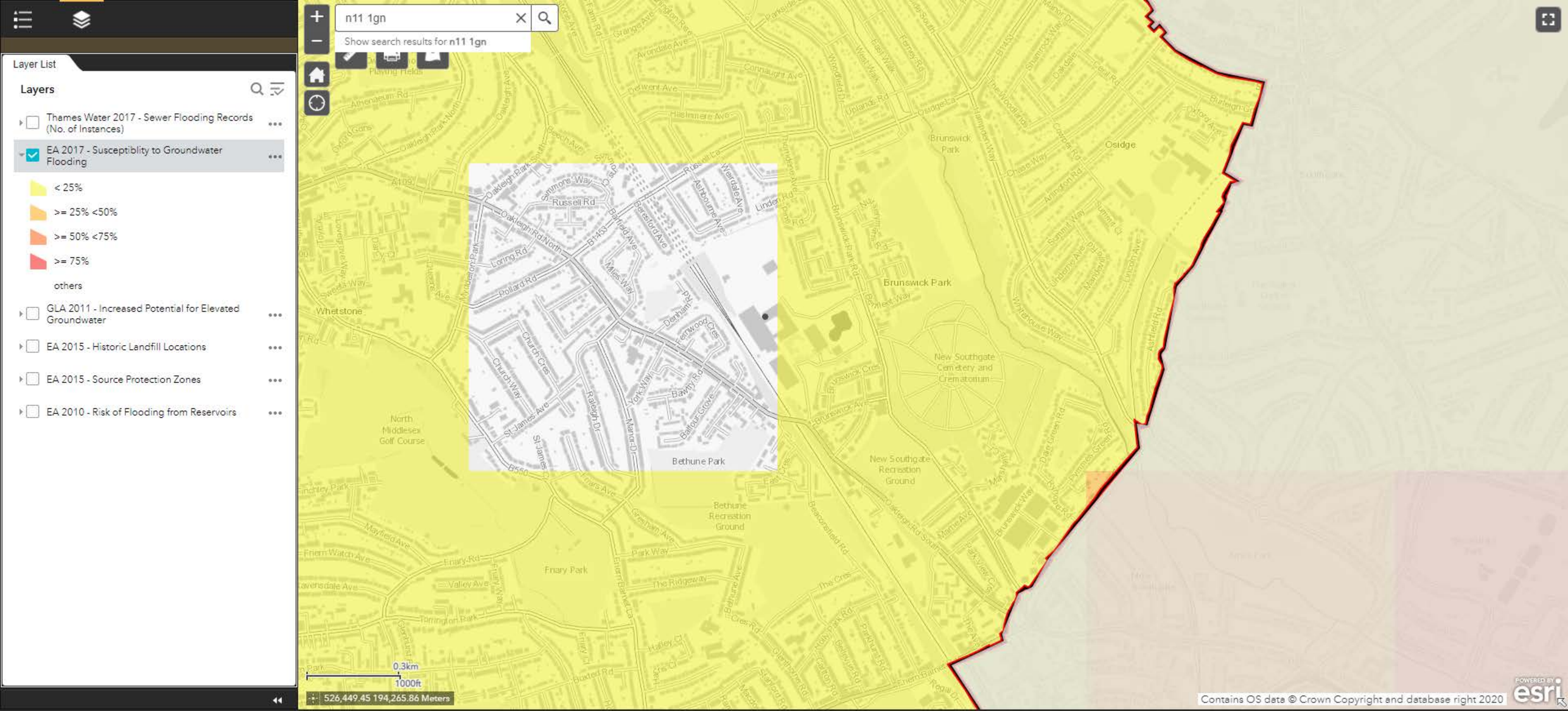
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
20.000	TANK 4	52.066	1.154	0.000	0.20			30.6	SURCHARGED
16.006	S206	52.558	2.064	8.630	6.22			94.7	FLOOD
16.007	S13	51.251	0.851	0.000	1.45			105.7	SURCHARGED
16.008	S14	51.010	0.812	0.000	1.94			140.1	SURCHARGED
21.000	S11	53.318	-0.235	0.000	0.10			27.8	OK
21.001	S12	51.572	-0.169	0.000	0.40			104.9	OK
16.009	S15	50.310	0.295	0.000	1.39			233.5	SURCHARGED
16.010	S16	50.143	0.190	0.000	1.05			222.6	SURCHARGED
22.000	S18	50.313	0.198	0.000	0.48			32.2	SURCHARGED
22.001	S19	50.236	0.318	0.000	0.83			55.0	SURCHARGED
23.000	BLOCK B	50.599	0.374	0.000	1.05			78.7	SURCHARGED
22.002	S20	50.130	0.439	0.000	1.85			115.2	SURCHARGED
16.011	S17	49.988	0.396	0.000	1.08			150.9	SURCHARGED
16.012	HW2	49.961	-0.139	0.000	0.06			150.7	FLOOD RISK
24.000	BLOCK A	52.126	-0.099	0.000	0.54			90.7	OK
24.001	HW4	49.893	-0.169	0.000	0.02			58.4	FLOOD RISK
1.017	HW3	49.877	0.777	0.000	2.27			176.9	FLOOD RISK
1.018	S21	49.379	1.004	0.000	0.35			176.9	SURCHARGED
25.000	SD11	53.629	-0.525	0.000	0.00			0.0	OK
25.001	SD12	53.176	-0.525	0.000	0.00			0.0	OK
25.002	SD13	52.840	-0.525	0.000	0.00			0.0	OK
26.000	SD1	47.518	-0.525	0.000	0.00			0.0	OK
26.001	SD2	47.278	-0.525	0.000	0.00			0.0	OK
26.002	SD3	47.000	-0.525	0.000	0.00			0.0	OK
26.003	SD4	46.995	-0.525	0.000	0.00			0.0	OK
25.003	SD5	46.791	-0.600	0.000	0.00			0.0	OK
25.004	SD6	46.641	-0.600	0.000	0.00			0.0	OK
25.005	SD7	46.575	-0.600	0.000	0.00			0.0	OK
1.019	SD8	45.063	-0.418	0.000	0.20			176.9	OK
1.020	SD9	43.763	-0.431	0.000	0.18			176.9	OK

PN	US/MH Name	Level Exceeded
17.002	S202	
19.000	S207	
19.001	S208	
17.003	S203	
16.004	S204	
16.005	S205	
20.000	TANK 4	
16.006	S206	4
16.007	S13	
16.008	S14	
21.000	S11	
21.001	S12	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Level Exceeded
16.009	S15	
16.010	S16	
22.000	S18	
22.001	S19	
23.000	BLOCK B	
22.002	S20	
16.011	S17	
16.012	HW2	
24.000	BLOCK A	
24.001	HW4	
1.017	HW3	
1.018	S21	
25.000	SD11	
25.001	SD12	
25.002	SD13	
26.000	SD1	
26.001	SD2	
26.002	SD3	
26.003	SD4	
25.003	SD5	
25.004	SD6	
25.005	SD7	
1.019	SD8	
1.020	SD9	


n11 1gn
Show search results for n11 1gn
Layer List
Layers
Thames Water 2017 - Sewer Flooding Records (No. of Instances)
EA 2017 - Susceptiblity to Groundwater Flooding
< 25%
>= 25% <50%
>= 50% <75%
>= 75%
others
GLA 2011 - Increased Potential for Elevated Groundwater
EA 2015 - Historic Landfill Locations
EA 2015 - Source Protection Zones
EA 2010 - Risk of Flooding from Reservoirs
Russell Rd
Oakleigh Rd North
Pollard Rd
Loring Rd
Church Cres
Church Way
St James Ave
Raleigh Dr
York Way
Barnet By
Balfour Grove
Denham Rd
Fernwood Cres
Bethune Park
Whetstone
North Middlesex Golf Course
Brunswick Park
New Southgate Cemetery and Crematorium
New Southgate Recreation Ground
Bethune Recreation Ground
Friary Park
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1000ft
526,449.45 194,265.86 Meters
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Sewer Flooding
History Enquiry

Property Searches

Stomor Ltd

Search address supplied	Building 1 Oakleigh Road South North London Business Park London N11 1GN
Your reference	ST-3013
Our reference	SFH/SFH Standard/2021_4405606
Received date	**19 April 2021**
Search date	**19 April 2021**

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

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Sewer Flooding
History Enquiry

Property Searches

Search address supplied: Building 1,Oakleigh Road South,North London Business Park,London,N11 1GN

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

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

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Sewer Flooding
History Enquiry

Thames Water Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

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