



## **DRAINAGE STRATEGY**

FOR  
**LAND OFF FORGE LANE,  
DEWSBURY**

ON BEHALF OF  
**HEBBLE HOMES LTD**



**ARP ASSOCIATES**

**CHARTERED CONSULTING ENGINEERS**

Northwest House 5/6 Northwest Business Park Servia Hill Leeds LS6 2QH

c 0113 245 8498 m leeds@arpassociates.co.uk w www.arpconsultingengineers.co.uk

**Drainage Strategy for land off Forge Lane, Dewsbury**

**2465/01r1**

	<b>Initial Issue</b> <b>25th November 2024</b>	<b>Revision A</b>	<b>Revision B</b>
<b>Prepared By:</b>	I Casling MEng (Hons)		

<b>Signature</b>	M Darby MEng (Hons) GradCIWEM GMICE		
<b>Authorised By:</b>	M Ingram MCIHT		

## CONTENTS

		Page
1.0	Introduction	4
2.0	Site Description	5 – 9
3.0	Consultation and Data Review	10 – 12
4.0	Surface Water Drainage Strategy	13 – 18
5.0	Foul Water Drainage Strategy	19 - 20
6.0	Summary	21 - 22

## APPENDICES

Appendix A	Site Location Plan
Appendix B	Topographical Survey
Appendix C	Proposed Site Layout
Appendix D	Water Authority Sewer Map
Appendix E	Preliminary Drainage Layout
Appendix F	Greenfield Runoff Calculations
Appendix G	Preliminary Attenuation Storage Calculations

## **1.0 INTRODUCTION**

- 1.1 Hebble Homes Ltd are proposing the development of 2 commercial units at land to the east of Forge Lane, Dewsbury, which is referred henceforth as “the site”. The site classifies as major development and therefore a surface water drainage strategy is required.
- 1.2 ARP Associates have been appointed to prepare a Drainage Strategy for the development, undertaking appropriate assessments, and preparing a report to satisfy the requirements of the Planning Authority.
- 1.3 The site appraisal for this assessment was carried out between September and November 2024. A review of these assessments has been undertaken in November 2024.
- 1.4 The report has been initially prepared for the use and reliance of the Client only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP Associates. For the avoidance of any doubt, where ARP Associates enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP Associates consent.
- 1.5 Attention is drawn to the requirements of the Construction Design and Management Regulations 2015, and in particular, the duties and obligations of the Client.

## 2.0 SITE DESCRIPTION

### General

- 2.1 The site, which is centred on Ordnance Survey Grid Reference 423724, 419734 and is located to the south of Dewsbury, off Forge Lane nearest postcode WF12 9HF. The site is to be accessed off Forge Lane and is to the north of the junction with Lees Road.
- 2.2 The site is a rectangular shaped piece of land extending to an area of approximately 4.43 hectares (ha), with overall dimensions of approximately 140m (north - south) by 350m (east - west).
- 2.3 A site location plan is presented in **Appendix A**, which shows the application site to which this report refers and the surrounding development for reference.

### Current Use

- 2.4 The existing site comprises of heavily vegetated scrubland. The site contains an extensive area of existing hardstanding which has remained following the previous steelworks superstructure being demolished. The site is covered by a number of mature bushes, shrubs and trees across the site.

### Topography

- 2.5 A topographical survey of the site was undertaken by Aecom in November 2009. A copy of the survey plan is included in **Appendix B** for reference. The site generally falls steeply from the western and southern boundaries where levels are of the order of 43.50 metres Above Ordnance Datum (m AOD) towards the canal along the northern boundary of the site. The levels are generally around 38.50mAOD along the northern boundary. There are various embankments and low spots across the site formed from the previous development and demolition. Levels along Forge Lane immediately adjacent to site entrance range from 43.57 – 43.65mAOD.

### Development Proposals

- 2.6 The development proposals are for the construction of two commercial units within the western and central area of the site. Vehicular access will be provided from a new access point off Forge Lane. The proposed development proposals are shown in the Site Layout plan within **Appendix C.**

### Boundaries

- 2.7 The western and northern boundaries of the site are formed by Forge Lane and the Calder and Hebble Navigation Canal respectively. The eastern and southern boundaries are defined by residential development, with allotments towards the south-west corner and a public open space/play area against the eastern boundary which was part of more recent housing development.

### Hydrology

- 2.8 The nearest major watercourse to the site is the River Calder, which is approximately 400 metres to the north of the site. The River Calder is classified as an Environment Agency (EA) Main River. This main river flows in a meandering easterly direction past the north of the site. Land between the River Calder and the railway line to the north of the site is designated as flood storage area, which extends up to approximately 250m north of the site. The EA are responsible for any maintenance and construction work on main rivers and flood storage areas.
- 2.9 The nearest watercourse to the site is an unnamed ordinary watercourse/ditch which flows through the eastern extent of the site before turning in a westerly direction along the northern boundary. It is culverted but for two open sections on the development site. The watercourse is believed to serve a culvert draining land to the south and a number of roads and properties along Sovereign Way, Mortons Grove and Fiddler Hill. From existing surveys this culverted watercourse enters the site directly north of the road Fiddlers Hill and enters a small pond with an outlet to an open channel just before the site boundary, in the rear landscaped area to the property on the corner of Fiddlers Hill and Kimberley Street. The channel travels towards the

northern boundary and then along it west. Existing survey information has proved inconclusive as it only defines approximately 60m of open channel in the site from the southern boundary, but it is believed to travel north another 55m in a culvert, then west approximately 90m as open channel and then enters a 1200mm diameter culvert that travels another 130m to a manhole where it runs north-east under the canal as a siphon drain.

- 2.10 There is a low point that exists along the site boundary in a similar position to where the last section of open watercourse on site enters the 1200mm diameter pipe, which would allow overtopping into the canal. There is also another culverted watercourse/drain that connects on to this culverted section of watercourse approximately 36m downstream of the beginning of the 1200mm diameter pipe. The connection is a drain that terminates around the marshy area, likely serving the old steelworks and pond.
- 2.11 The low-lying marshy area recorded within the topographic surveys historically appears to have originally been a gravel pit and later a pond potentially serving the former iron and steel forge and glassworks. According to survey information there was an assumed culverted watercourse draining land above coming from the south across Lees Hall Road under the footprint of plot 324a discharging to a headwall at the site boundary. However, no outfall has been found and assumed this has been blocked up. The water levels in this area are assumed to drain via a surface water drain/culvert (as described above) which discharges to the downstream culverted watercourse which outfalls from the site to the siphon drain under the canal towards the north-west corner of the site.

#### Ground Conditions

- 2.12 In previous correspondence with the LLFA, it has been acknowledged the site is unsuitable for soakaways due to the ground conditions being poor for infiltration (British Geological Survey rates the potential at level 4 – which is severe constraints).
- 2.13 According to the BGS Geology Viewer online, the bedrock geology is Pennine Lower Coal Measures Formation – Mudstone, siltstone and sandstone. The superficial deposits are

Alluvium – Clay, silt, sand and gravel. Further information was obtained from the LandIS Soils Vues Viewer online and describes the soils as loamy and clayey floodplain soils for a majority of the site, and slowly permeable seasonally wet acid loamy and clayey soils surrounding the site to the south, which are known to impede infiltration. The site is not situated within a Source Protection Zone (SPZ).

- 2.14 The Environment Agency check long term flood risk service website states that groundwater is unlikely in this area. Therefore, the risk of groundwater flooding is considered to be low.

#### Existing Drainage

- 2.15 A topographical survey was produced by Bullen Consultants dated 7.10.1997 and shows the position of manholes as indicated on the site survey ref 97291/01 dated 07.10.1997. The onsite drainage routes were interpolated from Yorkshire Water records (a more current record is within **Appendix D**). The survey indicates a 500mm water main down the western side of the site, a 375mm foul water sewer crossing part of the site from the south-west corner and running along the southern boundary.
- 2.16 A 375mm diameter surface water sewer comes into the site from the south-west corner east along the southern boundary, then centrally turns directly north to where it increases in diameter to 450mm then connects into an assumed 1200mm diameter culverted watercourse which heads back west along the northern site boundary.
- 2.17 A culverted watercourse/sewer line appears from the central marshy area passing to the north which appeared to pick up a land drainage connection from the south and then runs along the western extent north towards the canal as described in the hydrology section of this report.
- 2.18 A headwall outfall is shown to the culverted watercourse that passes under 324a Lees Hall Road and discharges at the southern site boundary. A 450mm culvert marked as private passes through a manhole then discharges to a headwall/piped outlet to a pond with outlet to the open ditch/ordinary watercourse to the rear of the property on the junction with Fiddler Hill and Kimberley Street.

- 2.19 Aecom carried out a CCTV drainage plan on behalf of Kirklees Council dated 17.02.2022 and it shows a similar record of drainage as described above, but for the sewer crossing the north-west corner as a 600mm diameter pipe and as abandoned, connecting to the manhole downstream where it meets the culverted watercourse (assumed 1200mm diameter) with an outfall to the siphon drain crossing under the canal.
- 2.20 The surface water generated on site appears to flow from the western and southern boundaries to the north. With flows coming on to site via the headwall as described above into the open ditch passing along the eastern extent of the site, with some flows passing into the marsh area before either discharging to the surface water sewer/culvert running centrally through the site or being carried overland towards the open ditch and then the downstream culverted watercourse. It is believed that in times of exceedance the last section of open watercourse on site can pond at the downstream end and then overtop into the canal, as there is a low spot of approximately 38.259m AOD approximately 90m from the eastern edge along the northern site boundary nearby.
- 2.21 No further land drainage has been picked up in the surveys available.

### 3.0 CONSULTATION AND DATA REVIEW

#### Water Authority

- 3.1 Yorkshire Water have not been formally consulted regarding drainage matters on this site. The sewer records (refer to **Appendix D**) show a number of public sewers crossing the site as described in **Section 2**. The proposed architect layout has positioned the buildings away from these sewers with the relevant easements. In the event of the routes of the sewers are found to be in different locations, S185 diversionary works, reduced or offset easements or build-over agreements may be necessary.
- 3.2 Yorkshire Water will highlight the Building Regulations Part H – Requirements for rainwater drainage in Section H3 are followed in order of priority, which is soakaway or infiltration, watercourse or where not reasonably practicable a sewer for means of disposal of surface water.
- 3.3 Further discussions should be undertaken with Yorkshire Water at the detailed design stage and following planning permission approval to determine the requirements for the proposed point of connection to the public combined sewer for the foul drainage. A S106 agreement will be required for the foul connection on to the combined public sewer.

#### Lead Local Flood Authority

- 3.4 A pre-application response was made by Kirklees Council, letter reference 2023/21634, which confirms an online meeting was held on 08.02.2024 with Paul Farndale (LLFA) and David Wordsworth (Development Management Group Leader) of Kirklees Council. It also outlined further correspondence between Paul Farndale and the applicant in regard to flood risk/drainage.
- 3.5 In summary of the correspondence and pre-application response, it confirmed the site is located in Flood Zone 2 (EA and SFRA). Also, there are number of points were raised about the

existing and proposed drainage and surface water drainage site which will be further addressed by subsequent sections of this report.

- 3.6 The Flood Risk Assessment report (ref: 2465-01r1) sets out measures to implement surface water volume compensation on the eastern side of the site to offset the loss of surface water flood volumes from the development footprint. The proposals around the existing watercourse and also the surface water connection to the culverted watercourse further downstream will require approval from the LLFA and a land drainage consent.

### Climate Change

- 3.7 NPPF requires that the projected impacts of climate change are taken into account over the lifetime of a development. Studies have projected that the Global Sea level will continue to rise and there will be an increase in river flows and rainfall intensity across the country, with the degree of change depending on greenhouse gas emissions and the sensitivity of the climate system.
- 3.8 Recommended allowances for assessment are set out in Environment Agency publication 'Flood risk assessments: climate change allowances' (published February 2016; last updated May 2022). Within this guidance, a regionalised approach is adopted to climate change impacts based upon the river Management Catchment within which the proposed development site falls, and the intended design life of the development.
- 3.9 The site is situated within the 'Aire and Calder' Management Catchment. For commercial development, climate change impacts over a design life of at least 50 years should be considered.
- 3.10 Impact on River Flooding - With respect to river flows, the applicable allowances are also influenced by the flood risk vulnerability of the proposed development and the present-day Flood Zone classification of the site. As the proposed development comes under general industry, storage and distribution this would be less vulnerable according to the NPPF Annex 3: Flood risk vulnerability classification. An applicable allowance for sites in Flood Zone 2 is

specifically given by the current guidance, that the impacts of the central climate change allowance should be considered. Within this Management Catchment, the central climate change scenario is predicted to lead to an increase in peak river flows of up to 23% for the 2080's epoch (2070-2125).

- 3.11 Impact on Rainfall Intensity - In accordance with the current guidance, for a design life of at least 50 years the impacts of the 'central' climate change allowance with a lifetime of between 2061 and 2100 should use the 2070's epoch (2061 to 2125). Within this Management Catchment, this is predicted to lead to an increase in rainfall intensity of up to 25% in the 1 in 30 year (3.33% annual exceedance probability) rainfall event, and up to 30% in the 1 in 100 year (1% annual exceedance probability) rainfall event.

#### 4.0 SURFACE WATER DRAINAGE STRATEGY

- 4.1 This section sets out the proposed means of managing surface water discharge from the proposed development of the site. This section should be read in conjunction with the ARP Drainage Strategy plan (drawing 2465/01/SK01.01) which has been prepared to illustrate the proposals and is shown within **Appendix E**.

##### Existing Surface Water Runoff

- 4.2 As set out in **Section 2**, it is assumed that surface water runoff generated within the site flows from the higher western side of the site (along Forge Lane) towards the marsh area located in the central area approximately 190m from Forge Lane just off the southern site boundary. Flows appear to pass through this area towards the open watercourse approximately 90m to the east of the marsh area.

During times of flood the site acts like a flood basin and it is thought that water overflows into the canal to the north.

The site is relatively level in places with some depressions particularly in the central northern areas and to the east, although the general falls are described as above there is opportunity for some flows to pond on site.

- 4.3 The greenfield runoff rate for the site has been calculated using the Source Control module of Micro Drainage. The site's development impermeable area is approximately 2.363 ha in area and the greenfield runoff rates are outlined below in **Table 1** and within **Appendix F**.

**Table 1: Existing Runoff Rates**

Return Period	Runoff Rates	
	Greenfield (l/s/ha)	Development Platform (2.363 ha)
1 in 1	1.7	4.1
QBAR	2.0	4.8
1 in 30	3.6	8.5
1 in 100	4.2	10.0

Proposed Surface Water Runoff Destination

- 4.4 The proposed means of managing surface water runoff from the proposed development has been considered with respect to the hierarchy set out in Building Regulations Part H (2015) as follows.
- 4.5 Consideration of the proposed means of surface water drainage should firstly be given to infiltration techniques (to ground). The potential for use of infiltration has been discounted due to the pre-planning application to Kirklees Council (not dated, reference 2023/21634) stating that the British Geological Survey rates the potential at level 4 (severe constraints). The site is located in Flood Zone 2 and a number of watercourses are present with some retaining water showing that infiltration is not feasible.
- 4.6 As infiltration is unfeasible, discharge to a watercourse is the next option in the hierarchy. As detailed in **Section 2**, there is a watercourse available on site. Therefore, surface water is to be directed to the existing manhole on the culverted watercourse where the public surface water sewer spanning the central area of the site also discharges into.

#### Proposed Surface Water Discharge Limit

- 4.7 In order to minimise the increase in flood volumes and flood risk elsewhere, it is proposed that the maximum post development surface water discharge rate will be based on the equivalent QBAR greenfield runoff rate for the proposed development area.
- 4.8 The development sites proposed impermeable area is approximately 2.363 ha and generates a greenfield runoff rate (QBAR) of approximately 4.8 l/s based on existing greenfield runoff rates.

#### Proposed Surface Water Attenuation Storage

- 4.9 All new proposed surface water drainage systems shall be designed to accommodate a 1 in 30 year storm event without flooding and, to accord with the requirements of the Lead Local Flood Authority, will need to accommodate the 1 in 100 year plus 30% climate change allowance event without causing flooding of property or third-party land.
- 4.10 The proposed development is indicated to be approximately 2.363ha of impermeable area. A 10% allowance for urban creep has not been applied to the calculations.
- 4.11 In order to accommodate the 1 in 100 year plus 30% climate change event, approximately 1,979m<sup>3</sup> of storage would be required for the whole development site. It is proposed that most of the attenuation storage will be provided within attenuation tanks in the form of cellular/modular surface water attenuation crates. It is proposed to have two attenuation tanks, with each tank sized for their respective catchment and a proportion of the maximum discharge rate. As such each will have their own flow control device. The attenuation tanks will be located within the service yards in front of each unit. The preliminary attenuation storage calculations are provided within **Appendix G**. Due to the existing levels of the culverted watercourse and depth of the proposed drainage, both surface water outfalls will need separate pump stations to pump the flow up to a gravity connection/break chamber.

- 4.12 The attenuation storage calculations do take into account the storage capacity within the pipe/manhole network and within the private drainage network. Details of SuDS features will be confirmed at detailed design.
- 4.13 The surface water drainage strategy is illustrated in the ARP Drainage Feasibility drawings 2465/01/SK01.01 which are included in **Appendix E** for reference. The strategy is subject to agreement with the LLFA and Yorkshire Water, and subject to detailed design.

#### Surface Water Quality

- 4.14 Appropriate measures will need be incorporated in the surface water drainage system to mitigate the risk of contaminated runoff from the site causing adverse impacts on surface water bodies downstream in accordance with local SuDS guidance.
- 4.15 As assessment of the pollution hazards posed by the site has been assessed using the CIRIA SuDS Manual C753 –Table 26.2 pollution hazard indices table. The site is to consist of industrial units with associated facilities, service yards and car parking. The pollution hazard level will likely be high according to SuDS manual, with a total suspended solids index of 0.8 a metal index of 0.8 and a hydrocarbon index of 0.9.
- 4.16 For the industrial roofs, these are generally considered to be relatively ‘clean’ surface water run-off and would be expected to have a very low level of potential contamination. On this basis no specific treatment for this run-off is proposed, except for suitable leaf debris traps and silt traps. Due to the scale of the units, a syphonic drainage system is likely to drain down the roof areas instead of traditional rainwater systems.
- 4.17 Areas subject to vehicular traffic will have the propensity to contain suspended solids, metals and hydrocarbons, and will require more treatment to reduce the risk to receiving waters, and therefore warrant further consideration at the detailed design stage.
- 4.18 The use of SuDS in surface water management is an effective means of managing surface water quality whilst providing other benefits (as discussed above), and it is recommended that

surface water drainage systems for parking areas should therefore be designed in accordance with the risk-based approach outlined in CIRIA C753 The SuDS Manual. The ‘simple index approach’, as discussed below, can be used to make a preliminary assessment of the likely pollution hazard and the likely requirements for mitigation.

- 4.19 The SuDS Manual sets out the ‘Pollution Hazard Indices’ for different proposed land uses. **Table 2** summarises the likely applicable indices for the areas of development subject to vehicular traffic.

**Table 2: Pollution Hazard Indices for Proposed Development**

Proposed Land Use	Pollution Hazard Level	Pollution Hazard Index		
		Total Suspended Solids	Metals	Hydro-carbons
Industrial Roofs	Low	0.30	0.20	0.05
Industrial Roads	High	0.80	0.80	0.90

Based on Table 26.2 of The SuDS Manual.

- 4.20 The SuDS Manual sets out a ‘Mitigation Index’ for different SuDS components. **Table 3** shows typical mitigation indices for the SuDS components proposed as part of the drainage strategy for the development.

**Table 3: Indicative SuDS Mitigation Indices for Proposed SuDS Components**

Proposed SuDS Component	Mitigation Index		
	Total Suspended Solids	Metals	Hydro-carbons
Permeable Pavement	0.70	0.60	0.70
Swale	0.50	0.60	0.60

Based on Table 26.3 of The SuDS Manual.

- 4.21 On this basis an appropriate SuDS strategy can provide the required mitigation for water quality impacts from the commercial roads, service yards and car parking and will also require the use

of oil separators. The water quality treatment should be reviewed at the detailed design stage and any required SuDS agreed with statutory consultees.

#### Exceedance Flow Routes

- 4.22 For rainfall events in excess of the design standard (i.e. greater than 1 in 100 year plus climate change event) the capacity of the drainage system is likely to be exceeded. There also remains a residual risk of flows leaving the surface water drainage system in the event of a blockage.
- 4.23 So that exceedance flows do not adversely affect properties on or off site, site levels should be designed to direct flows from hard-paved areas away from building entrances where possible, so that any flooding remains in areas such as landscaped areas, car parks, or roads, where the consequences of surface water flooding would be less significant.
- 4.24 Exceedance flow routes will be reviewed as part of the detailed drainage and levels design, however it is envisaged that any exceedance flows will likely be limited to shallow flow along roads and car parking/service yards.

#### Construction Stage Surface Water Management

- 4.25 During the construction stage, before the permanent drainage systems are installed, measures will need to be taken to mitigate the potential environmental risks posed by runoff from the development site. A detailed Temporary Surface Water Management Plan will be required to address these risks. Key issues which require consideration will include the potential for silt-laden or contaminated runoff to adversely affect flood risk and water quality, and the potential for uncontrolled runoff to cause flooding on or off site.
- 4.26 A more detailed assessment of the potential construction stage risks will be undertaken before formulating a site-specific Temporary Surface Water Management Plan to manage the risk. The plan will need to be approved by the LLFA prior to implementation.

## 5.0 FOUL WATER DRAINAGE STRATEGY

5.1 This section sets out the proposed means of managing foul water discharge from the proposed development of the site. This section should be read in conjunction with the ARP Drainage Strategy plan (drawing 2465/01/SK01.01) which has been prepared to illustrate the proposals and is shown within **Appendix E**.

### Existing Foul Drainage

5.2 A review of the Yorkshire Water sewer records (**Appendix D**) indicates that the nearest accessible point of discharge for foul is the 375mm diameter public combined water sewer which spans across the south-western section of the site. The sewer flows from west to east. The point of connection is approximately 100 metres from the proposed site entrance on the southern boundary.

### Proposed Foul Drainage

5.3 In accordance with the hierarchy of foul drainage options set out in Building Regulations (2015) Part H, foul drainage should be disposed to a public sewer if available. It is proposed that foul water from the proposed two commercial units be directed to the public combined water sewer via a new manhole.

5.4 The occupancy and peak foul loading for the development is not known at the time of writing. There is approximately 6 toilets and 4 sinks shown in the entrance area to Building 1 and 4 toilets and 2 sinks to the entrance area to Building 2. Foul generated from within the units is to be confirmed.

5.5 It is anticipated that due to the site levels and the location of the proposed outfall, foul water within the site will be able to drain via gravity to the existing sewer. Should the inverts of the receiving sewer be higher than expected, package pumping station(s) will be required to pump the foul flows generated within the development.

5.6 Due to site levels and the location of the eastern refuse storage area for Building 2 at the far corner of the service yard, a small package pump station will be required to drain the area when

being washed down in accordance with building regulations. Building 1 refuse storage area/wash down may also require a similar form of pumping if levels are higher and subject to detailed design.

- 5.7 The proposals for foul drainage are subject to detailed design and subject to the approval of the Regulatory Authorities.

## 6.0 SUMMARY

- 6.1 This report details the drainage strategy for the development of two large commercial units with associated reception/office areas to the side. The proposed development will be served by separate surface and foul water drainage systems.
- 6.2 Sustainable surface water drainage systems shall be provided to manage surface water run-off from the site itself up to the 1 in 100 year plus 30% climate change event.
- 6.3 It is proposed in accordance with the drainage hierarchy that surface water runoff will be directed to the nearest watercourse, which is the unnamed ordinary watercourse at a point which is culverted running along the northern boundary. The existing manhole will be utilised for the connection if possible. The culverted watercourse carries discharges into an existing manhole in the north-west corner of the site under the canal to the north.
- 6.4 Surface water runoff generated from the site will be restricted to a greenfield runoff rate of 4.8 l/s for the proposed development impermeable area. Surface water runoff will be controlled by the use of underground attenuation tanks and vortex flow controls. The restricted flows will be pumped up to the culverted watercourse outfall via a small gravity connection and break chamber.
- 6.5 It is proposed that surface water drainage will be put under the maintenance of a management company on completion. The attenuation storage will be provided within attenuation tanks, pipes and manhole networks.
- 6.6 It is proposed that foul water drainage will also be put under the maintenance of a management company. It is proposed that foul water will be discharge via gravity to the existing combined sewer via a new manhole at the south-western part of the site. A small package pumping station will be needed for pumping the refuse storage/wash down area back up to the main foul drainage.

- 6.7 A detailed temporary surface water management plan will need to be prepared and submitted to the LLFA for approval to demonstrate how surface water will be managed during construction and the intervening period prior to the surface water drainage being maintained by the management company.
- 6.8 The findings of this report are subject to the approval of the Regulatory Authorities. The detailed drainage design and calculations shall be submitted to the Planning Authority for approval prior to construction on the development site.
- 6.9 Subject to compliance with the above, and subject to the further approvals of Regulatory Authorities, it is anticipated that the proposed development can satisfy the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation to flood risk and drainage.

**APPENDIX A**

**SITE LOCATION PLAN**

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 M

Forge Lane Bridge

41.9m

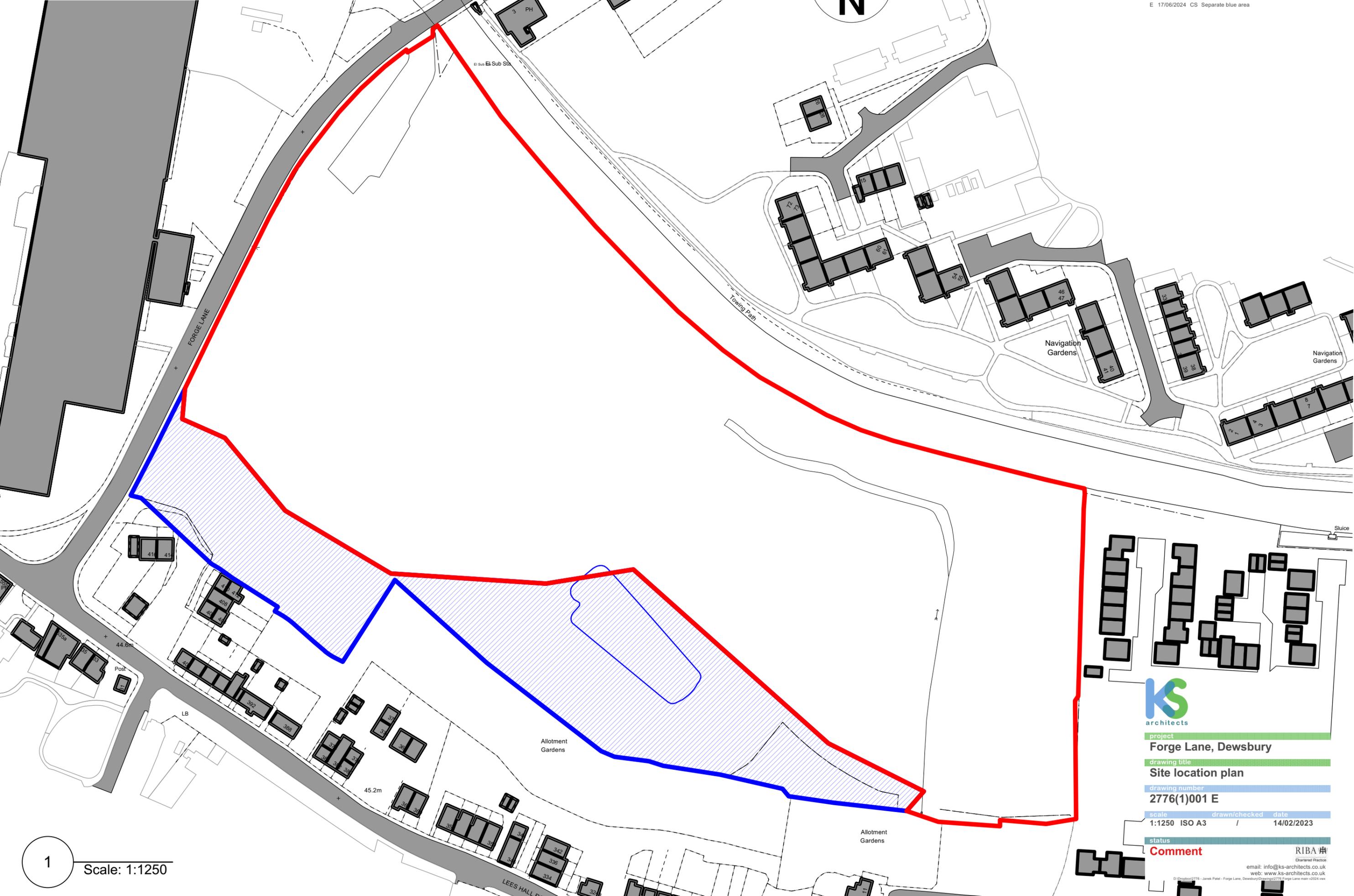
PH

El Sub El Sub Stn



Do not scale from this drawing. If in doubt please contact the architect.

- Revisions**
- C 03/05/2023 CS Boundary adjusted
  - D 29/11/2023 CS Scale bar added
  - E 17/06/2024 CS Separate blue area



FORGE LANE

Towing Path

Navigation Gardens

Navigation Gardens

Sluice

Allotment Gardens

Allotment Gardens

45.2m

44.6m

LEES HALL



project  
**Forge Lane, Dewsbury**

drawing title  
**Site location plan**

drawing number  
**2776(1)001 E**

scale	drawn/checked	date
1:1250 ISO A3	/	14/02/2023

status  
**Comment**

RIBA #

email: info@ks-architects.co.uk  
web: www.ks-architects.co.uk

D:\Dropbox\2776 - Janek Patel - Forge Lane, Dewsbury\Drawings\2776 Forge Lane main v2024.ves

1

Scale: 1:1250

**APPENDIX B**

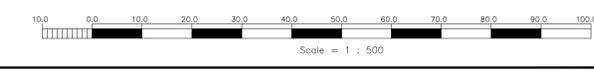
**TOPOGRAPHIC SURVEY**



STATION	EASTING	NORTHING	HEIGHT
STNB	423695.418	419949.970	42.052
STNA	423672.919	419935.889	43.020
STNC	423681.239	419931.801	43.000
STNK	423632.092	419908.475	43.610
STNH	423659.572	419899.919	41.155
STND	423563.799	419788.977	43.630
STNP	423536.900	419718.318	43.928
STNF	423686.639	419783.245	38.305
STNE	423689.873	419827.153	38.578
STND	423707.853	419840.384	38.564
STNJ	423651.061	419875.776	39.930
STAF	423755.219	419808.431	38.580
STAH	423741.390	419773.475	38.399
STAG	423776.065	419734.957	38.152
STAJ	423825.148	419701.107	39.044
STAK	423843.455	419669.963	39.069
STAL	423836.610	419653.424	37.714
STNF	423686.680	419793.228	38.278
STNN	423548.910	419738.826	43.618
STNQ	423604.329	419868.282	44.298
STNL	423588.622	419839.488	43.832
STNS	423682.683	419897.733	39.154
STNR	423708.239	419869.353	38.658
STNX	423602.897	419760.817	38.752
STAO	423770.985	419700.300	40.631
STAN	423755.571	419899.076	38.184
STAM	423795.298	419664.271	37.899
STNG	423639.561	419757.063	38.188
STNV	423597.332	419730.274	39.452
STNY	423584.906	419748.900	41.031
STAA	423605.844	419833.892	39.747
STAC	423625.045	419860.029	39.769
STAB	423640.188	419836.455	38.541
STAU	423635.191	419791.856	38.303
STAV	423601.860	419789.735	40.281
STAZ	423588.584	419790.849	40.271
STAT	423662.538	419734.305	38.148
STAE	423728.426	419666.026	39.823
STAD	423694.407	419691.469	38.747

- NOTES**
- ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM NEWLYN BY MEANS OF ORDNANCE SURVEY LEICA SMARTNET.
  - DO NOT SCALE FROM THIS DRAWING.
- KEY**
- ±0.000 GROUND LEVEL (m.A.O.D)
  - 0.000 LEVEL TOP OF WALL (m.A.O.D)
  - BO BOLLARD
  - GU GULLY
  - GV GAS VALVE
  - LP LAMP POST
  - MH MANHOLE
  - WH WATER HYDRANT
- LINE KEY**
- BUILDING
  - HEDGE LINE
  - FENCE
  - ROAD CHANNEL WITH KERB
  - ROAD CHANNEL WITH DROP KERB
  - TOP OF BANK
  - BOTTOM OF BANK
  - WALL
  - DENSE CLUSTER OF TREES & BRAMBLES

SECTION AA ADDED		K	K
Rev	Date	Drawn	Checked
<b>DRAFT COPY</b>			
Client:			
Project:			
<b>FORGE LANE DEWSBURY</b>			
Title:			
<b>TOPOGRAPHICAL SURVEY PLAN</b>			
Eng: IK	CAD: IK		
Chkd:	App'd:		
Date: 25/11/2009	Scale: AS SHOWN @ A0		
<b>AECOM</b>			
5th Floor 2 City Walk LEEDS, LS11 5AB		Tel: +44 (0) 113 391 8900 Fax: +44 (0) 113 391 8999 www.aecom.co.uk	
No. 60140787_LS01 3D			



**APPENDIX C**

**PROPOSED SITE LAYOUT**

Do not scale from this drawing. If in doubt please contact the architect.  
 Revisions  
 D 08/05/2024 CS Access position adjusted.  
 E 13/08/2024 CS Boundary revised to accommodate road  
 F 16/09/2024 CS Boundary adjacent to canal relocated  
 from canal



**KS**  
architects

project  
**Forge Lane, Dewsbury**

drawing title  
**Site layout industrial**

drawing number  
**2776(1)003 F**

scale  
1:500

drawn/checked  
ISO A0

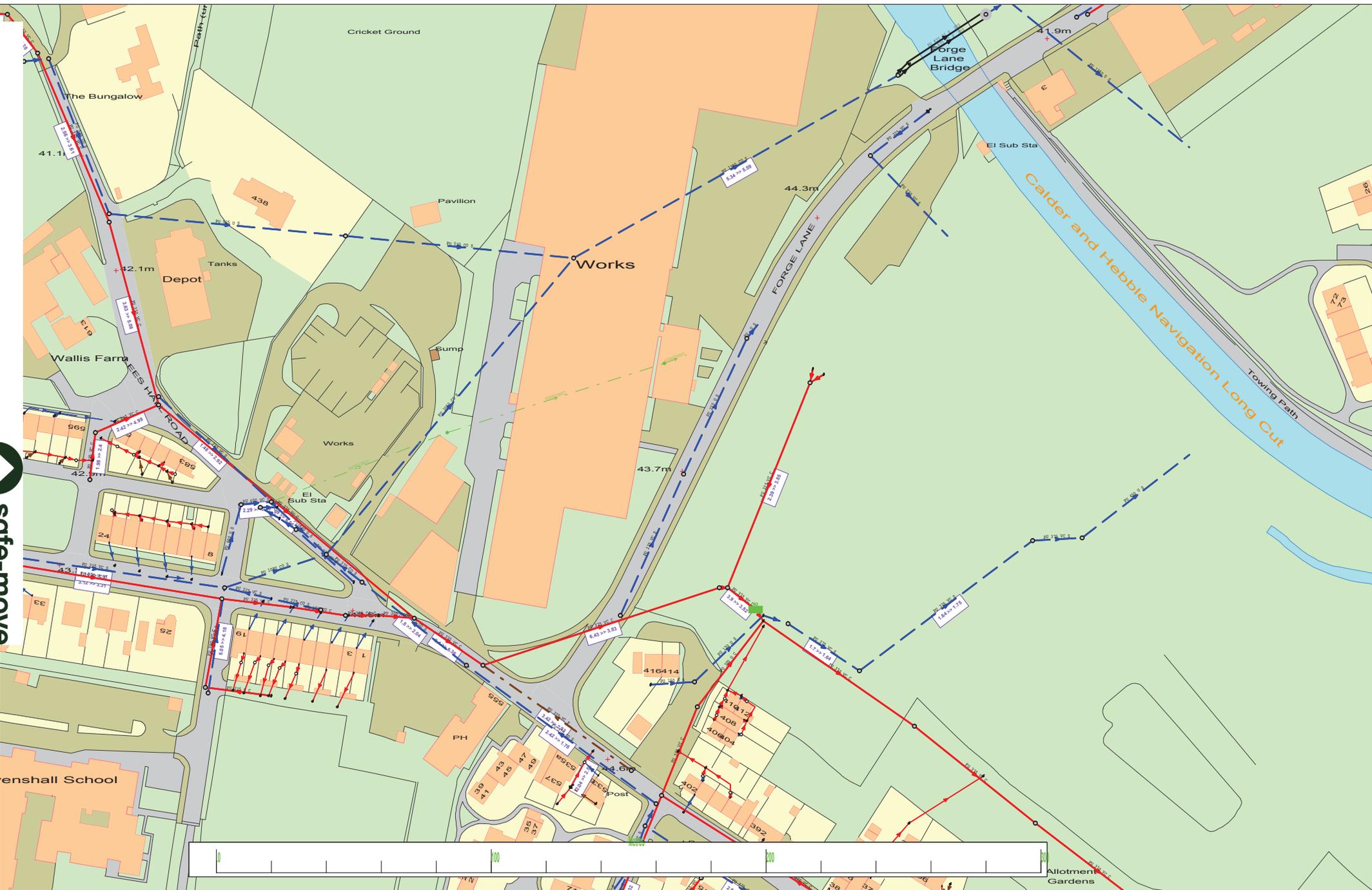
date  
14/02/2023

status  
**Comment**

RIBA #  
Chartered Practice  
email: info@ks-architects.co.uk  
web: www.ks-architects.co.uk  
© Copyright 2023 - James Pater - Forge Lane, Dewsbury Drawing 2776 Forge Lane mark v023 vna

**APPENDIX D**

**YORKSHIRE WATER SEWER RECORDS**



Date Requested : 30/08/2013, 12:36:05  
Date Generated : 30/08/2013, 12:36:07

(Only) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2004. All rights reserved Ordnance Survey Licence number 100019559  
Copyright for additional data shown on this map may rest with: British Geological Survey, Natural England, Environment Agency, Natural Environment Research Council, The MET Office, DEFRA, George Philip Ltd., Royal Mail, Cranfield University and Yorkshire Water.

Scale : 1:1250  
The position and depth of any YW apparatus shown on this map are approximate only.

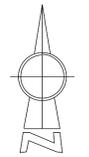
UPN: Undefined Originator: Cropper, ,

**APPENDIX E**

**PRELIMINARY DRAINAGE LAYOUT**

KEY

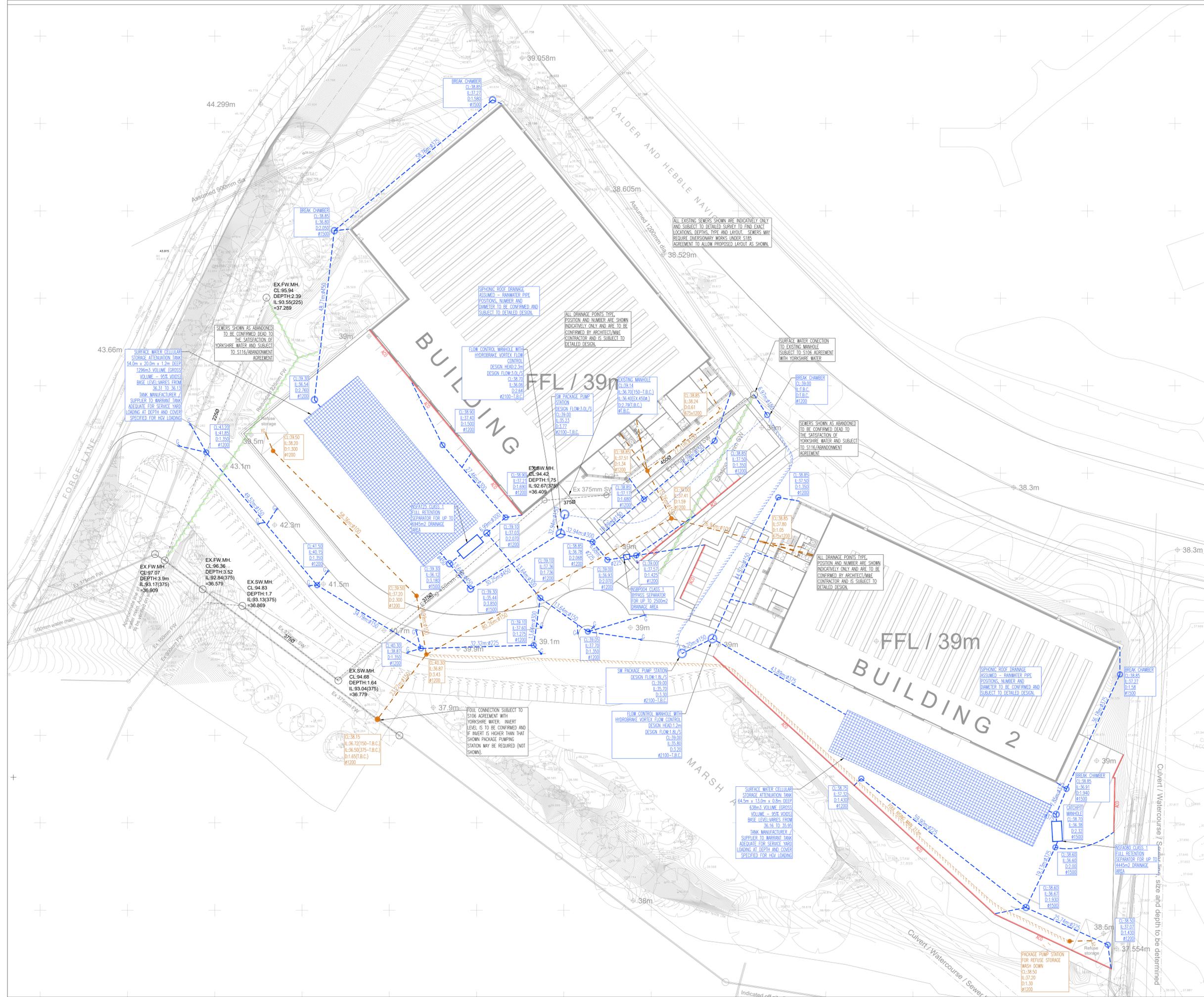
- Proposed Storm Water Manhole
- Proposed Storm Water Sewer
- Foul Water Manhole
- Proposed Foul Water Sewer



Notes

- Drainage runs shown are approximate and are subject to change at detailed design stage.
- No trees to be planted within 5m of drainage.
- All levels and pipe sizes are approximate and may vary at detailed design stage.

Drainage Design Criteria	
Design parameters are based on the latest information available and may be subject to change at detailed design and planning approval stage.	
Climate Change Allowance (%)	30%
Urban Creep (%)	0%
CV Values (Summer/Winter)	0.75/0.84



Rev	By	Date	Revision	MI	Apvd
/	IC	15.11.24	Issued for approval		

**ARP** ARP ASSOCIATES  
Chartered Consulting Engineers

Northwest House • 5 & 6 Northwest Business Park • Servia Hill, Leeds, LS6 2QH  
0113 245 6498 • 0113 244 3864 • leeds@arpassociates.co.uk • www.arpassociates.co.uk

ARP Associates is a trading division of ARP Geotechnical Ltd, a company registered in England and Wales with company number 3773313, whose registered office is at 5/6 Northwest Business Park, Servia Hill, Leeds LS6 2QH

TITLE	DRAINAGE FEASIBILITY		
PROJECT	FORGE LANE, DEWSBURY		
CLIENT	HEBBLE HOMES		
DRAWING STATUS	PRELIMINARY		
Scale	1:500 @ A1	Date	NOV 24
		Drawn	IC
		Chk.	MI
Dwg. No.	2465/01/SK01		Rev /

## **APPENDIX F**

### **GREENFIELD RUNOFF CALCULATIONS**

ARP Associates		Page 1
Northwest House	2465/01 Forge Lane	
Servia Hill	Dewsbury	
Leeds LS6 2QH	Existing greenfield runoff	
Date 22/10/2024 4:09pm	Designed by IC	
File	Checked by	
Innovyze	Source Control 2020.1.3	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	2.363	Urban	0.000
SAAR (mm)	771	Region Number	Region 3

**Results 1/s**

QBAR Rural	4.8
QBAR Urban	4.8
Q100 years	10.0
Q1 year	4.1
Q30 years	8.5
Q100 years	10.0

## **APPENDIX G**

### **PRELIMINARY ATTENUATION STORAGE CALCULATIONS**

Manhole Schedules for 2465 01 SW NETWORK BUILDING 1.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	38.850	1.575	Open Manhole	1200	1.000	37.275	375				
2	38.850	2.042	Open Manhole	1200	1.001	36.808	450	1.000	36.883	375	
3	39.300	2.755	Open Manhole	1200	1.002	36.545	450	1.001	36.545	450	
TANK IN	39.300	2.984	Open Manhole	3000	1.003	36.316	-1	1.002	36.316	450	
TANK OUT	39.300	3.164	Open Manhole	3000	1.004	36.136	450	1.003	36.136	-1	
4	43.200	1.350	Open Manhole	1200	2.000	41.850	150				
5	41.500	1.350	Open Manhole	1200	2.001	40.150	150	2.000	40.150	150	
6	40.300	1.425	Open Manhole	1200	2.002	38.875	225	2.001	38.950	150	
7	39.100	1.500	Open Manhole	1200	2.003	37.600	300	2.002	37.675	225	
8	39.050	1.350	Open Manhole	1200	3.000	37.700	150				
9	39.100	1.736	Open Manhole	1200	2.004	37.364	300	2.003	37.364	300	
								3.000	37.514	150	
10	38.900	1.500	Open Manhole	1200	4.000	37.400	300				
11	38.900	1.683	Open Manhole	1200	4.001	37.217	300	4.000	37.217	300	
12	39.100	2.062	Open Manhole	1200	2.005	37.038	450	2.004	37.188	300	150
								4.001	37.188	300	150
13	39.300	3.178	Open Manhole	1500	1.005	36.122	450	1.004	36.122	450	
								2.005	36.290	450	180
14	39.300	3.852	Open Manhole	1350	1.006	35.448	450	1.005	35.448	450	
15	38.850	1.350	Open Manhole	1200	5.000	37.500	150				
16	38.850	1.679	Open Manhole	1200	5.001	37.171	150	5.000	37.171	150	
17	39.000	1.425	Open Manhole	1200	6.000	37.575	225				
18	39.000	2.070	Open Manhole	1200	6.001	36.930	225	6.000	36.930	225	
19	38.850	2.068	Open Manhole	1200	5.002	36.782	300	5.001	36.932	150	75
								6.001	36.857	225	75
20 (FC)	38.850	3.503	Open Manhole	1350	1.007	35.347	150	1.006	35.347	450	
EX.SW.MH.	38.850	3.615	Open Manhole	1500		OUTFALL		5.002	36.750	300	1478
								1.007	35.235	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
---------	---------------------	----------------------	--------------------------	---------------------------	----------------	----------------

1	423679.565	419881.760	423679.565	419881.760	Required	
---	------------	------------	------------	------------	----------	--

2	423634.251	419844.352	423634.251	419844.352	Required	
---	------------	------------	------------	------------	----------	--



Northwest House  
 Servia Hill  
 Leeds LS6 2QH

2465/01 Forge Lane  
 Dewsbury - Building 1  
 SW calculations



Date 15/11/2024 3:06pm  
 File 2465 01 SW Network Buil...

Designed by IC  
 Checked by

Innovyze

Network 2020.1.3

Manhole Schedules for 2465 01 SW NETWORK BUILDING 1.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
3	423628.555	419795.977	423628.555	419795.977	Required	
TANK IN	423630.251	419793.923	423630.251	419793.923	Required	
TANK OUT	423664.628	419752.280	423664.628	419752.280	Required	
4	423597.570	419780.944	423597.570	419780.944	Required	
5	423629.334	419742.949	423629.334	419742.949	Required	
6	423659.037	419724.845	423659.037	419724.845	Required	
7	423691.345	419725.783	423691.345	419725.783	Required	
8	423706.888	419729.653	423706.888	419729.653	Required	
9	423693.246	419739.287	423693.246	419739.287	Required	
10	423665.250	419783.017	423665.250	419783.017	Required	
11	423683.297	419762.325	423683.297	419762.325	Required	
12	423677.903	419757.872	423677.903	419757.872	Required	
13	423667.263	419749.089	423667.263	419749.089	Required	
14	423673.246	419741.842	423673.246	419741.842	Required	
15	423743.193	419784.213	423743.193	419784.213	Required	

Northwest House  
 Servia Hill  
 Leeds LS6 2QH

2465/01 Forge Lane  
 Dewsbury - Building 1  
 SW calculations



Date 15/11/2024 3:06pm  
 File 2465 01 SW Network Buil...

Designed by IC  
 Checked by

Innovyze

Network 2020.1.3

Manhole Schedules for 2465 01 SW NETWORK BUILDING 1.SWS

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
16	423722.923	419767.480	423722.923	419767.480	Required	
17	423720.703	419751.450	423720.703	419751.450	Required	
18	423712.454	419750.178	423712.454	419750.178	Required	
19	423708.202	419755.328	423708.202	419755.328	Required	
20 (FC)	423698.999	419757.790	423698.999	419757.790	Required	
EX.SW.MH.	423700.238	419763.211			No Entry	

ARP Associates		Page 3
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

PIPELINE SCHEDULES for 2465 01 SW NETWORK BUILDING 1.SWS

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	1	38.850	37.275	1.200	Open Manhole	1200
1.001	o	450	2	38.850	36.808	1.592	Open Manhole	1200
1.002	o	450	3	39.300	36.545	1.555	Open Manhole	1200
1.003	[ ]	-1	TANK IN	39.300	36.316	2.834	Open Manhole	3000
1.004	o	450	TANK OUT	39.300	36.136	2.714	Open Manhole	3000
2.000	o	150	4	43.200	41.850	1.200	Open Manhole	1200
2.001	o	150	5	41.500	40.150	1.200	Open Manhole	1200
2.002	o	225	6	40.300	38.875	1.200	Open Manhole	1200
2.003	o	300	7	39.100	37.600	1.200	Open Manhole	1200
3.000	o	150	8	39.050	37.700	1.200	Open Manhole	1200
2.004	o	300	9	39.100	37.364	1.436	Open Manhole	1200
4.000	o	300	10	38.900	37.400	1.275	Open Manhole	1200
4.001	o	300	11	38.900	37.217	1.383	Open Manhole	1200
2.005	o	450	12	39.100	37.038	1.762	Open Manhole	1200
1.005	o	450	13	39.300	36.122	2.728	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)
1.000	58.760	149.9	2	38.850	36.883	1.592	Open Manhole	1200
1.001	48.709	185.5	3	39.300	36.545	2.305	Open Manhole	1200
1.002	2.664	11.6	TANK IN	39.300	36.316	1.784	Open Manhole	3000
1.003	53.999	300.0	TANK OUT	39.300	36.136	3.014	Open Manhole	3000
1.004	4.138	295.6	13	39.300	36.122	2.728	Open Manhole	1500
2.000	49.523	29.1	5	41.500	40.150	1.200	Open Manhole	1200
2.001	34.785	29.0	6	40.300	38.950	1.200	Open Manhole	1200
2.002	32.322	26.9	7	39.100	37.675	1.200	Open Manhole	1200
2.003	13.638	57.8	9	39.100	37.364	1.436	Open Manhole	1200
3.000	16.701	90.0	9	39.100	37.514	1.436	Open Manhole	1200
2.004	24.100	136.9	12	39.100	37.188	1.612	Open Manhole	1200
4.000	27.456	150.0	11	38.900	37.217	1.458	Open Manhole	1200
4.001	6.995	241.2	12	39.100	37.188	1.612	Open Manhole	1200
2.005	13.797	18.4	13	39.300	36.290	2.710	Open Manhole	1500
1.005	9.397	13.9	14	39.300	35.448	3.402	Open Manhole	1350

ARP Associates		Page 4
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

PIPELINE SCHEDULES for 2465 01 SW NETWORK BUILDING 1.SWS

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)
1.006	o	450	14	39.300	35.448	3.402	Open Manhole	1350
5.000	o	150	15	38.850	37.500	1.200	Open Manhole	1200
5.001	o	150	16	38.850	37.171	1.529	Open Manhole	1200
6.000	o	225	17	39.000	37.575	1.200	Open Manhole	1200
6.001	o	225	18	39.000	36.930	1.845	Open Manhole	1200
5.002	o	300	19	38.850	36.782	1.843	Open Manhole	1200
1.007	o	150	20 (FC)	38.850	35.347	3.353	Open Manhole	1350

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)
1.006	30.291	299.9	20 (FC)	38.850	35.347	3.053	Open Manhole	1350
5.000	26.284	79.9	16	38.850	37.171	1.529	Open Manhole	1200
5.001	19.089	79.9	19	38.850	36.932	1.768	Open Manhole	1200
6.000	8.346	12.9	18	39.000	36.930	1.845	Open Manhole	1200
6.001	6.678	91.5	19	38.850	36.857	1.768	Open Manhole	1200
5.002	9.527	300.0	20 (FC)	38.850	36.750	1.875	Open Manhole	1350
1.007	5.561	49.6	EX.SW.MH.	38.850	35.235	3.465	Open Manhole	1500

Surcharged Outfall Details for 2465 01 SW NETWORK BUILDING 1.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.007	EX.SW.MH.	38.850	35.235	0.000	1500	0
Datum (m) 35.534 Offset (mins) 0						

Time (mins)	Depth (m)								
1440	0.000	5760	0.000	10080	0.000	14400	0.000	18720	0.000
2880	0.000	7200	0.000	11520	0.000	15840	0.000	20160	0.000
4320	0.000	8640	0.000	12960	0.000	17280	0.000		

ARP Associates		Page 5
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

Simulation Criteria for 2465 01 SW NETWORK BUILDING 1.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
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)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

ARP Associates		Page 6
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

Online Controls for 2465 01 SW NETWORK BUILDING 1.SWS

Hydro-Brake® Optimum Manhole: 20(FC), DS/PN: 1.007, Volume (m³): 10.2

Unit Reference	MD-SHE-0068-3000-2300-3000
Design Head (m)	2.300
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	35.347
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	3.0
Flush-Flo™	0.299	2.0
Kick-Flo®	0.605	1.6
Mean Flow over Head Range	-	2.2

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)						
0.100	1.7	1.200	2.2	3.000	3.4	7.000	5.0
0.200	2.0	1.400	2.4	3.500	3.6	7.500	5.2
0.300	2.0	1.600	2.5	4.000	3.9	8.000	5.4
0.400	2.0	1.800	2.7	4.500	4.1	8.500	5.5
0.500	1.9	2.000	2.8	5.000	4.3	9.000	5.7
0.600	1.7	2.200	2.9	5.500	4.5	9.500	5.8
0.800	1.9	2.400	3.1	6.000	4.7		
1.000	2.0	2.600	3.2	6.500	4.9		

ARP Associates		Page 7
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 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 0  
Number of Online Controls 1      Number of Time/Area Diagrams 0  
Number of Offline Controls 0      Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model                      FSR                      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)                      19.000 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, 240, 360, 480, 960, 1440  
Return Period(s) (years)                      1, 2, 30, 100  
Climate Change (%)                      0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	1	+0%	100/15 Summer			
1.001	2	15 Winter	1	+0%	100/15 Summer			
1.002	3	15 Winter	1	+0%	100/15 Winter			
1.003	TANK IN	1440 Winter	1	+0%	100/1440 Winter			
1.004	TANK OUT	1440 Winter	1	+0%	2/960 Winter			
2.000	4	15 Winter	1	+0%				
2.001	5	15 Winter	1	+0%	100/15 Summer			
2.002	6	15 Winter	1	+0%				
2.003	7	15 Winter	1	+0%				
3.000	8	15 Winter	1	+0%	30/15 Summer			
2.004	9	15 Winter	1	+0%	100/15 Summer			
4.000	10	15 Winter	1	+0%	30/15 Summer			
4.001	11	15 Winter	1	+0%	2/15 Summer			
2.005	12	15 Winter	1	+0%	100/960 Winter			
1.005	13	15 Summer	1	+0%	1/15 Summer			
1.006	14	15 Summer	1	+0%	1/15 Summer			
5.000	15	15 Winter	1	+0%	100/15 Summer			
5.001	16	15 Winter	1	+0%	100/15 Summer			
6.000	17	15 Winter	1	+0%	100/15 Summer			

ARP Associates		Page 8
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		37.404	-0.246	0.000	0.25		39.4	OK
1.001		36.990	-0.268	0.000	0.33		71.9	OK
1.002		36.703	-0.292	0.000	0.27		71.9	OK
1.003	TANK IN	36.535	-0.981	0.000	0.00		5.4	OK
1.004	TANK OUT	36.535	-0.051	0.000	0.17		20.3	OK
2.000		41.891	-0.109	0.000	0.16		5.2	OK
2.001		40.207	-0.093	0.000	0.31		9.8	OK
2.002		38.934	-0.166	0.000	0.15		14.4	OK
2.003		37.669	-0.231	0.000	0.12		14.4	OK
3.000		37.773	-0.077	0.000	0.47		8.5	OK
2.004		37.470	-0.194	0.000	0.27		22.9	OK
4.000		37.516	-0.184	0.000	0.31		26.6	OK
4.001		37.449	-0.068	0.000	0.95		49.2	OK
2.005		37.153	-0.335	0.000	0.15		71.8	OK
1.005		36.674	0.102	0.000	0.06		28.3	SURCHARGED
1.006		36.720	0.822	0.000	0.11		16.9	SURCHARGED
5.000		37.541	-0.109	0.000	0.16		3.1	OK
5.001		37.228	-0.093	0.000	0.31		5.8	OK
6.000		37.648	-0.152	0.000	0.23		26.1	OK

PN	US/MH Name	Level Exceeded
1.000		1
1.001		2
1.002		3
1.003	TANK IN	
1.004	TANK OUT	
2.000		4
2.001		5
2.002		6
2.003		7
3.000		8
2.004		9
4.000		10
4.001		11
2.005		12
1.005		13
1.006		14
5.000		15
5.001		16
6.000		17

ARP Associates		Page 9
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.001	18	15	Winter	1	+0%	30/15	Summer		37.069
5.002	19	15	Winter	1	+0%	30/15	Summer		36.960
1.007	20 (FC)	15	Winter	1	+0%	1/15	Summer		36.761

PN	US/MH Name	Surcharged		Flooded		Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (1/s)	Status	Level Exceeded
		Depth (m)	Volume (m <sup>3</sup> )	Flow (1/s)	Volume (m <sup>3</sup> )						
6.001	18	-0.086	0.000	0.68					25.8	OK	
5.002	19	-0.122	0.000	0.65					31.9	OK	
1.007	20 (FC)	1.264	0.000	0.10					2.1	SURCHARGED	

ARP Associates		Page 10
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                    0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm)                0    Inlet Coefficient 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 0  
Number of Online Controls 1      Number of Time/Area Diagrams 0  
Number of Offline Controls 0      Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)    19.000 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, 240, 360, 480, 960, 1440  
Return Period(s) (years)    1, 2, 30, 100  
Climate Change (%)    0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	2	+0%	100/15 Summer			
1.001	2	15 Winter	2	+0%	100/15 Summer			
1.002	3	15 Winter	2	+0%	100/15 Winter			
1.003	TANK IN	1440 Winter	2	+0%	100/1440 Winter			
1.004	TANK OUT	1440 Winter	2	+0%	2/960 Winter			
2.000	4	15 Winter	2	+0%				
2.001	5	15 Winter	2	+0%	100/15 Summer			
2.002	6	15 Winter	2	+0%				
2.003	7	15 Winter	2	+0%				
3.000	8	15 Winter	2	+0%	30/15 Summer			
2.004	9	15 Winter	2	+0%	100/15 Summer			
4.000	10	15 Winter	2	+0%	30/15 Summer			
4.001	11	15 Winter	2	+0%	2/15 Summer			
2.005	12	15 Winter	2	+0%	100/960 Winter			
1.005	13	15 Winter	2	+0%	1/15 Summer			
1.006	14	15 Winter	2	+0%	1/15 Summer			
5.000	15	15 Winter	2	+0%	100/15 Summer			
5.001	16	15 Winter	2	+0%	100/15 Summer			
6.000	17	15 Winter	2	+0%	100/15 Summer			

ARP Associates		Page 11
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1 37.424	-0.226	0.000	0.32		51.0	OK
1.001		2 37.017	-0.241	0.000	0.43		93.0	OK
1.002		3 36.728	-0.267	0.000	0.34		93.0	OK
1.003	TANK IN	36.613	-0.903	0.000	0.00		6.3	OK
1.004	TANK OUT	36.613	0.027	0.000	0.17		19.9	SURCHARGED
2.000		4 41.897	-0.103	0.000	0.21		6.7	OK
2.001		5 40.216	-0.084	0.000	0.40		12.7	OK
2.002		6 38.943	-0.157	0.000	0.20		18.6	OK
2.003		7 37.679	-0.221	0.000	0.15		18.7	OK
3.000		8 37.786	-0.064	0.000	0.61		10.9	OK
2.004		9 37.487	-0.177	0.000	0.35		29.7	OK
4.000		10 37.581	-0.119	0.000	0.38		32.6	OK
4.001		11 37.535	0.018	0.000	1.19		61.4	SURCHARGED
2.005		12 37.169	-0.319	0.000	0.19		90.9	OK
1.005		13 36.702	0.130	0.000	0.07		31.4	SURCHARGED
1.006		14 36.775	0.877	0.000	0.12		19.2	SURCHARGED
5.000		15 37.547	-0.103	0.000	0.21		4.0	OK
5.001		16 37.237	-0.084	0.000	0.40		7.5	OK
6.000		17 37.659	-0.141	0.000	0.30		33.7	OK

PN	US/MH Name	Level Exceeded
1.000		1
1.001		2
1.002		3
1.003	TANK IN	
1.004	TANK OUT	
2.000		4
2.001		5
2.002		6
2.003		7
3.000		8
2.004		9
4.000		10
4.001		11
2.005		12
1.005		13
1.006		14
5.000		15
5.001		16
6.000		17

ARP Associates		Page 12
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.001	18	15	Winter	2	+0%	30/15	Summer		37.097
5.002	19	15	Winter	2	+0%	30/15	Summer		36.994
1.007	20 (FC)	15	Winter	2	+0%	1/15	Summer		36.844

PN	US/MH Name	Surcharged		Flooded		Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (1/s)	Status	Level Exceeded
		Depth (m)	Volume (m <sup>3</sup> )	Flow	Volume						
6.001	18	-0.058	0.000	0.88					33.3	OK	
5.002	19	-0.088	0.000	0.84					41.4	OK	
1.007	20 (FC)	1.347	0.000	0.11					2.2	SURCHARGED	

ARP Associates		Page 13
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 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 0  
Number of Online Controls 1      Number of Time/Area Diagrams 0  
Number of Offline Controls 0      Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model                      FSR                      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)                      19.000 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, 240, 360, 480, 960, 1440  
Return Period(s) (years)                      1, 2, 30, 100  
Climate Change (%)                      0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	30	+0%	100/15 Summer			
1.001	2	15 Winter	30	+0%	100/15 Summer			
1.002	3	1440 Winter	30	+0%	100/15 Winter			
1.003	TANK IN	1440 Winter	30	+0%	100/1440 Winter			
1.004	TANK OUT	1440 Winter	30	+0%	2/960 Winter			
2.000	4	15 Winter	30	+0%				
2.001	5	15 Winter	30	+0%	100/15 Summer			
2.002	6	15 Winter	30	+0%				
2.003	7	15 Winter	30	+0%				
3.000	8	15 Winter	30	+0%	30/15 Summer			
2.004	9	15 Winter	30	+0%	100/15 Summer			
4.000	10	15 Winter	30	+0%	30/15 Summer			
4.001	11	15 Winter	30	+0%	2/15 Summer			
2.005	12	15 Winter	30	+0%	100/960 Winter			
1.005	13	1440 Winter	30	+0%	1/15 Summer			
1.006	14	15 Summer	30	+0%	1/15 Summer			
5.000	15	15 Winter	30	+0%	100/15 Summer			
5.001	16	15 Winter	30	+0%	100/15 Summer			
6.000	17	15 Winter	30	+0%	100/15 Summer			

ARP Associates		Page 14
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1 37.492	-0.158	0.000	0.61		96.5	OK
1.001		2 37.150	-0.108	0.000	0.90		192.9	OK
1.002		3 36.957	-0.038	0.000	0.04		10.8	OK
1.003	TANK IN	36.957	-0.559	0.000	0.00		10.7	OK
1.004	TANK OUT	36.957	0.371	0.000	0.17		20.0	SURCHARGED
2.000		4 41.916	-0.084	0.000	0.39		12.7	OK
2.001		5 40.257	-0.043	0.000	0.83		26.5	OK
2.002		6 38.979	-0.121	0.000	0.43		40.4	OK
2.003		7 37.721	-0.179	0.000	0.33		40.1	OK
3.000		8 37.898	0.048	0.000	1.13		20.4	SURCHARGED
2.004		9 37.553	-0.111	0.000	0.72		60.3	OK
4.000		10 37.880	0.180	0.000	0.77		65.8	SURCHARGED
4.001		11 37.768	0.251	0.000	2.53		130.6	SURCHARGED
2.005		12 37.235	-0.253	0.000	0.39		191.7	OK
1.005		13 36.974	0.402	0.000	0.05		21.6	SURCHARGED
1.006		14 36.998	1.100	0.000	0.13		20.8	SURCHARGED
5.000		15 37.566	-0.084	0.000	0.39		7.6	OK
5.001		16 37.306	-0.015	0.000	0.82		15.4	OK
6.000		17 37.697	-0.103	0.000	0.56		63.9	OK

PN	US/MH Name	Level Exceeded
1.000		1
1.001		2
1.002		3
1.003	TANK IN	
1.004	TANK OUT	
2.000		4
2.001		5
2.002		6
2.003		7
3.000		8
2.004		9
4.000		10
4.001		11
2.005		12
1.005		13
1.006		14
5.000		15
5.001		16
6.000		17

ARP Associates		Page 15
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.001	18	15	Winter	30	+0%	30/15	Summer		37.365
5.002	19	15	Summer	30	+0%	30/15	Summer		37.175
1.007	20 (FC)	15	Summer	30	+0%	1/15	Summer		37.118

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
6.001	18	0.210	0.000	1.67		63.6	SURCHARGED	
5.002	19	0.093	0.000	1.57		77.4	SURCHARGED	
1.007	20 (FC)	1.621	0.000	0.12		2.4	SURCHARGED	

ARP Associates		Page 16
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2465 01 SW NETWORK BUILDING 1.SWS

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins) 0      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm) 0      Inlet Coefficient 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 0  
Number of Online Controls 1      Number of Time/Area Diagrams 0  
Number of Offline Controls 0      Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model      FSR      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)      19.000 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, 240, 360, 480, 960, 1440  
Return Period(s) (years)      1, 2, 30, 100  
Climate Change (%)      0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	100	+30%	100/15 Summer			
1.001	2	1440 Winter	100	+30%	100/15 Summer			
1.002	3	1440 Winter	100	+30%	100/15 Winter			
1.003	TANK IN	1440 Winter	100	+30%	100/1440 Winter			
1.004	TANK OUT	1440 Winter	100	+30%	2/960 Winter			
2.000	4	15 Winter	100	+30%				
2.001	5	15 Winter	100	+30%	100/15 Summer			
2.002	6	15 Winter	100	+30%				
2.003	7	1440 Winter	100	+30%				
3.000	8	15 Winter	100	+30%	30/15 Summer			
2.004	9	1440 Winter	100	+30%	100/15 Summer			
4.000	10	15 Winter	100	+30%	30/15 Summer			
4.001	11	15 Winter	100	+30%	2/15 Summer			
2.005	12	1440 Winter	100	+30%	100/960 Winter			
1.005	13	1440 Winter	100	+30%	1/15 Summer			
1.006	14	1440 Winter	100	+30%	1/15 Summer			
5.000	15	1440 Winter	100	+30%	100/15 Summer			
5.001	16	1440 Winter	100	+30%	100/15 Summer			
6.000	17	15 Winter	100	+30%	100/15 Summer			

ARP Associates		Page 17
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000		1 37.916	0.266	0.000	0.98		153.9	SURCHARGED
1.001		2 37.872	0.614	0.000	0.08		17.6	SURCHARGED
1.002		3 37.872	0.877	0.000	0.06		17.3	SURCHARGED
1.003	TANK IN	37.872	0.356	0.000	0.00		16.9	SURCHARGED
1.004	TANK OUT	37.872	1.286	0.000	0.18		21.4	SURCHARGED
2.000		4 41.941	-0.059	0.000	0.65		21.4	OK
2.001		5 40.863	0.563	0.000	1.20		38.5	SURCHARGED
2.002		6 39.007	-0.093	0.000	0.63		59.4	OK
2.003		7 37.867	-0.033	0.000	0.03		3.6	OK
2.000		8 38.299	0.449	0.000	1.80		32.5	SURCHARGED
2.004		9 37.866	0.202	0.000	0.06		5.4	SURCHARGED
2.000		10 38.507	0.807	0.000	1.27		108.5	SURCHARGED
2.001		11 38.232	0.715	0.000	4.14		213.5	SURCHARGED
2.005		12 37.869	0.381	0.000	0.04		17.4	SURCHARGED
1.005		13 37.873	1.301	0.000	0.05		23.2	SURCHARGED
1.006		14 37.884	1.986	0.000	0.07		10.9	SURCHARGED
5.000		15 37.866	0.216	0.000	0.04		0.7	SURCHARGED
5.001		16 37.874	0.553	0.000	0.07		1.4	SURCHARGED
6.000		17 38.385	0.585	0.000	0.83		94.0	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000		1
1.001		2
1.002		3
1.003	TANK IN	
1.004	TANK OUT	
2.000		4
2.001		5
2.002		6
2.003		7
2.000		8
2.004		9
2.000		10
2.001		11
2.005		12
1.005		13
1.006		14
5.000		15
5.001		16
6.000		17

ARP Associates		Page 18
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Building 1 SW calculations	
Date 15/11/2024 3:06pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 2465 01 SW NETWORK BUILDING 1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.001	18	15	Winter	100	+30%	30/15	Summer		37.930
5.002	19	1440	Winter	100	+30%	30/15	Summer		37.883
1.007	20(FC)	1440	Winter	100	+30%	1/15	Summer		37.889

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
6.001	18	0.775	0.000	2.45		93.4	SURCHARGED	
5.002	19	0.801	0.000	0.21		10.5	SURCHARGED	
1.007	20(FC)	2.392	0.000	0.14		3.0	SURCHARGED	

ARP Associates		Page 1
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	PN
S1	38.750	1.430	Open Manhole	1200	S1.000	37.320	225				
S2	38.500	1.430	Open Manhole	1200	S2.000	37.070	225				
S3	38.600	1.929	Open Manhole	1500	S1.001	36.671	375	S1.000	36.821	225	
								S2.000	36.821	225	
S4	38.600	1.993	Open Manhole	1500	S1.002	36.607	375	S1.001	36.607	375	
S5	38.850	1.575	Open Manhole	1500	S3.000	37.275	375				
S6	38.850	1.937	Open Manhole	1500	S3.001	36.913	375	S3.000	36.913	375	
S7	38.700	2.311	Open Manhole	1500	S1.003	36.389	375	S1.002	36.389	375	
								S3.001	36.389	375	
STANK IN	38.700	2.533	Junction		S1.004	36.167	-1	S1.003	36.167	375	
STANK OUT	38.700	2.748	Junction		S1.005	35.952	375	S1.004	35.952	-1	
S8	38.850	1.350	Open Manhole	1200	S4.000	37.500	150				
S9 (FC)	39.000	3.194	Open Manhole	2100	S1.006	35.806	150	S1.005	35.806	375	
								S4.000	37.054	150	
SPUMP STATION	39.000	3.291	Open Manhole	1500		OUTFALL		S1.006	35.709	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	423785.164	419687.651	423785.164	419687.651	Required	
S2	423855.789	419640.106	423855.789	419640.106	Required	
S3	423832.354	419650.763	423832.354	419650.763	Required	
S4	423840.748	419667.956	423840.748	419667.956	Required	
S5	423859.269	419717.452	423859.269	419717.452	Required	
S6	423843.977	419684.659	423843.977	419684.659	Required	
S7	423840.988	419677.401	423840.988	419677.401	Required	

Northwest House  
 Servia Hill  
 Leeds LS6 2QH

2465/01 Forge Lane  
 Dewsbury - Proposed SW  
 calcs Building 2



Date 15/11/2024 3:17pm  
 File 2465 01 SW Network Buil...

Designed by IC  
 Checked by

Innovyze

Network 2020.1.3

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
STANK IN	423838.976	419678.340			No Entry	
STANK OUT	423780.689	419705.965			No Entry	
S8	423761.383	419768.065	423761.383	419768.065	Required	
S9 (FC)	423742.546	419727.668	423742.546	419727.668	Required	
SPUMP STATION	423733.833	419723.411			No Entry	

ARP Associates		Page 3
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	38.750	37.320	1.205	Open Manhole	1200
S2.000	o	225	S2	38.500	37.070	1.205	Open Manhole	1200
S1.001	o	375	S3	38.600	36.671	1.554	Open Manhole	1500
S1.002	o	375	S4	38.600	36.607	1.618	Open Manhole	1500
S3.000	o	375	S5	38.850	37.275	1.200	Open Manhole	1500
S3.001	o	375	S6	38.850	36.913	1.562	Open Manhole	1500
S1.003	o	375	S7	38.700	36.389	1.936	Open Manhole	1500
S1.004	[ ]	-1	STANK IN	38.700	36.167	1.733	Junction	
S1.005	o	375	STANK OUT	38.700	35.952	2.373	Junction	
S4.000	o	150	S8	38.850	37.500	1.200	Open Manhole	1200
S1.006	o	150	S9 (FC)	39.000	35.806	3.044	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	59.897	120.0	S3	38.600	36.821	1.554	Open Manhole	1500
S2.000	25.744	103.4	S3	38.600	36.821	1.554	Open Manhole	1500
S1.001	19.133	299.0	S4	38.600	36.607	1.618	Open Manhole	1500
S1.002	9.448	43.3	S7	38.700	36.389	1.936	Open Manhole	1500
S3.000	36.183	100.0	S6	38.850	36.913	1.562	Open Manhole	1500
S3.001	7.849	15.0	S7	38.700	36.389	1.936	Open Manhole	1500
S1.003	2.220	10.0	STANK IN	38.700	36.167	2.158	Junction	
S1.004	64.502	300.0	STANK OUT	38.700	35.952	1.948	Junction	
S1.005	43.885	300.6	S9 (FC)	39.000	35.806	2.819	Open Manhole	2100
S4.000	44.573	100.0	S9 (FC)	39.000	37.054	1.796	Open Manhole	2100
S1.006	9.697	100.0	SPUMP STATION	39.000	35.709	3.141	Open Manhole	1500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	SPUMP STATION	39.000	35.709	0.000	1500	0

ARP Associates		Page 4
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
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)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

ARP Associates		Page 5
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S9(FC), DS/PN: S1.006, Volume (m³): 16.6

Unit Reference	MD-SHE-0061-1800-1200-1800
Design Head (m)	1.200
Design Flow (l/s)	1.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	61
Invert Level (m)	35.806
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	1.8
Flush-Flo™	0.265	1.5
Kick-Flo®	0.542	1.3
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)						
0.100	1.3	1.200	1.8	3.000	2.7	7.000	4.1
0.200	1.5	1.400	1.9	3.500	2.9	7.500	4.2
0.300	1.5	1.600	2.0	4.000	3.1	8.000	4.3
0.400	1.5	1.800	2.2	4.500	3.3	8.500	4.4
0.500	1.4	2.000	2.3	5.000	3.5	9.000	4.6
0.600	1.3	2.200	2.4	5.500	3.6	9.500	4.7
0.800	1.5	2.400	2.5	6.000	3.8		
1.000	1.7	2.600	2.6	6.500	3.9		

ARP Associates		Page 6
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor 1.000    Additional Flow - % of Total Flow 0.000  
Hot Start (mins) 0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm) 0    Inlet Coefficient 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 0  
Number of Online Controls 1    Number of Time/Area Diagrams 0  
Number of Offline Controls 0    Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)    19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0    DVD Status OFF  
Analysis Timestep    Fine Inertia Status OFF  
DTS Status    ON

Profile(s)    Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)    1, 2, 30, 100  
Climate Change (%)    0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	1	+0%	100/15 Summer			
S2.000	S2	15 Winter	1	+0%	100/15 Summer			
S1.001	S3	15 Winter	1	+0%	30/15 Summer			
S1.002	S4	15 Winter	1	+0%	100/15 Summer			
S3.000	S5	15 Winter	1	+0%				
S3.001	S6	15 Winter	1	+0%	100/15 Summer			
S1.003	S7	15 Winter	1	+0%	30/15 Summer			
S1.004	STANK IN	960 Winter	1	+0%				
S1.005	STANK OUT	960 Winter	1	+0%	30/120 Summer			
S4.000	S8	15 Winter	1	+0%	100/1440 Winter			
S1.006	S9(FC)	360 Summer	1	+0%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	37.417	-0.128	0.000	0.38		17.2	OK
S2.000	S2	37.166	-0.129	0.000	0.37		17.3	OK
S1.001	S3	36.863	-0.183	0.000	0.51		49.3	OK
S1.002	S4	36.739	-0.243	0.000	0.27		48.9	OK

ARP Associates		Page 7
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.000	S5	37.367	-0.283	0.000	0.13			24.1	OK
S3.001	S6	37.014	-0.274	0.000	0.16			45.1	OK
S1.003	S7	36.578	-0.186	0.000	0.51			93.8	OK
S1.004	STANK IN	36.249	-0.718	0.000	0.00			9.2	OK*
S1.005	STANK OUT	36.249	-0.078	0.000	0.08			8.7	OK*
S4.000	S8	37.535	-0.115	0.000	0.12			2.2	OK
S1.006	S9 (FC)	36.922	0.966	0.000	0.10			1.5	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	S1	
S2.000	S2	
S1.001	S3	
S1.002	S4	
S3.000	S5	
S3.001	S6	
S1.003	S7	
S1.004	STANK IN	
S1.005	STANK OUT	
S4.000	S8	
S1.006	S9 (FC)	

ARP Associates		Page 8
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor 1.000    Additional Flow - % of Total Flow 0.000  
Hot Start (mins) 0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm) 0    Inlet Coefficient 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 0  
Number of Online Controls 1    Number of Time/Area Diagrams 0  
Number of Offline Controls 0    Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)    19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0    DVD Status OFF  
Analysis Timestep    Fine Inertia Status OFF  
DTS Status    ON

Profile(s)    Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)    1, 2, 30, 100  
Climate Change (%)    0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	2	+0%	100/15 Summer			
S2.000	S2	15 Winter	2	+0%	100/15 Summer			
S1.001	S3	15 Winter	2	+0%	30/15 Summer			
S1.002	S4	15 Winter	2	+0%	100/15 Summer			
S3.000	S5	15 Winter	2	+0%				
S3.001	S6	15 Winter	2	+0%	100/15 Summer			
S1.003	S7	15 Winter	2	+0%	30/15 Summer			
S1.004	STANK IN	1440 Winter	2	+0%				
S1.005	STANK OUT	1440 Winter	2	+0%	30/120 Summer			
S4.000	S8	15 Winter	2	+0%	100/1440 Winter			
S1.006	S9(FC)	960 Summer	2	+0%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	37.433	-0.112	0.000	0.48		22.1	OK
S2.000	S2	37.181	-0.114	0.000	0.48		22.4	OK
S1.001	S3	36.895	-0.151	0.000	0.66		63.3	OK
S1.002	S4	36.759	-0.223	0.000	0.34		62.7	OK

ARP Associates		Page 9
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.000	S5	37.381	-0.269	0.000	0.17			31.2	OK
S3.001	S6	37.029	-0.259	0.000	0.21			58.3	OK
S1.003	S7	36.611	-0.153	0.000	0.65			120.4	OK
S1.004	STANK IN	36.317	-0.650	0.000	0.00			7.9	OK*
S1.005	STANK OUT	36.317	-0.010	0.000	0.01			1.7	OK*
S4.000	S8	37.540	-0.110	0.000	0.16			2.8	OK
S1.006	S9(FC)	37.136	1.180	0.000	0.10			1.5	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	S1	
S2.000	S2	
S1.001	S3	
S1.002	S4	
S3.000	S5	
S3.001	S6	
S1.003	S7	
S1.004	STANK IN	
S1.005	STANK OUT	
S4.000	S8	
S1.006	S9(FC)	

ARP Associates		Page 10
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 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 0  
Number of Online Controls 1      Number of Time/Area Diagrams 0  
Number of Offline Controls 0      Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model                      FSR                      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)                      19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0                      DVD Status OFF  
Analysis Timestep      Fine Inertia Status OFF  
DTS Status                      ON

Profile(s)                      Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)                      1, 2, 30, 100  
Climate Change (%)                      0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	30	+0%	100/15 Summer			
S2.000	S2	15 Winter	30	+0%	100/15 Summer			
S1.001	S3	15 Winter	30	+0%	30/15 Summer			
S1.002	S4	15 Winter	30	+0%	100/15 Summer			
S3.000	S5	15 Winter	30	+0%				
S3.001	S6	15 Winter	30	+0%	100/15 Summer			
S1.003	S7	15 Winter	30	+0%	30/15 Summer			
S1.004	STANK IN	960 Winter	30	+0%				
S1.005	STANK OUT	960 Winter	30	+0%	30/120 Summer			
S4.000	S8	15 Winter	30	+0%	100/1440 Winter			
S1.006	S9(FC)	1440 Summer	30	+0%	1/15 Summer			

PN	US/MH Name	Water Surcharged Flooded				Half Drain Pipe		Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Pipe Flow (l/s)	
S1.000	S1	37.510	-0.035	0.000	0.91		41.5	OK
S2.000	S2	37.278	-0.017	0.000	0.88		41.8	OK
S1.001	S3	37.086	0.040	0.000	1.27		121.7	SURCHARGED
S1.002	S4	36.981	-0.001	0.000	0.68		124.4	OK

ARP Associates		Page 11
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status
				Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)			
S3.000	S5	37.425	-0.225	0.000	0.33	59.2		OK
S3.001	S6	37.087	-0.201	0.000	0.43	122.8		OK
<b>S1.003</b>	<b>S7</b>	<b>36.883</b>	<b>0.119</b>	<b>0.000</b>	<b>1.26</b>	<b>233.0</b>		<b>SURCHARGED</b>
S1.004	STANK IN	36.530	-0.437	0.000	0.00	18.5		OK*
S1.005	STANK OUT	36.530	0.203	0.000	0.05	5.2		SURCHARGED*
S4.000	S8	37.557	-0.093	0.000	0.31	5.3		OK
S1.006	S9 (FC)	37.319	1.363	0.000	0.10	1.6		SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	S1	
S2.000	S2	
<b>S1.001</b>	<b>S3</b>	
S1.002	S4	
S3.000	S5	
S3.001	S6	
<b>S1.003</b>	<b>S7</b>	
S1.004	STANK IN	
S1.005	STANK OUT	
S4.000	S8	
S1.006	S9 (FC)	

ARP Associates		Page 12
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor 1.000    Additional Flow - % of Total Flow 0.000  
Hot Start (mins) 0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm) 0    Inlet Coefficient 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 0  
Number of Online Controls 1    Number of Time/Area Diagrams 0  
Number of Offline Controls 0    Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)    19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0    DVD Status OFF  
Analysis Timestep    Fine Inertia Status OFF  
DTS Status    ON

Profile(s)    Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)    1, 2, 30, 100  
Climate Change (%)    0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+30%	100/15 Summer			
S2.000	S2	15 Winter	100	+30%	100/15 Summer			
S1.001	S3	15 Winter	100	+30%	30/15 Summer			
S1.002	S4	15 Winter	100	+30%	100/15 Summer			
S3.000	S5	15 Winter	100	+30%				
S3.001	S6	15 Winter	100	+30%	100/15 Summer			
S1.003	S7	15 Winter	100	+30%	30/15 Summer			
S1.004	STANK IN	960 Winter	100	+30%				
S1.005	STANK OUT	1440 Winter	100	+30%	30/120 Summer			
S4.000	S8	1440 Winter	100	+30%	100/1440 Winter			
S1.006	S9(FC)	1440 Winter	100	+30%	1/15 Summer			

PN	US/MH Name	Water Surcharged Flooded				Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap. (l/s)	Time (mins)	Flow (l/s)	
S1.000	S1	38.565	1.020	0.000	1.28		58.8	FLOOD RISK
S2.000	S2	38.162	0.867	0.000	1.31		61.8	SURCHARGED
S1.001	S3	37.728	0.682	0.000	1.80		172.5	SURCHARGED
S1.002	S4	37.509	0.527	0.000	0.95		173.7	SURCHARGED

ARP Associates		Page 13
Northwest House Servia Hill Leeds LS6 2QH	2465/01 Forge Lane Dewsbury - Proposed SW calcs Building 2	
Date 15/11/2024 3:17pm File 2465 01 SW Network Buil...	Designed by IC Checked by	
Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow		Half Drain Time (mins)	Pipe Flow (l/s)	Status
					Cap.	(l/s)			
S3.000	S5	37.610	-0.040	0.000	0.54		97.3		OK
S3.001	S6	37.515	0.227	0.000	0.62		175.4		SURCHARGED
S1.003	S7	37.311	0.547	0.000	1.87		345.3		SURCHARGED
S1.004	STANK IN	36.957	-0.010	0.000	0.00		30.5		OK*
S1.005	STANK OUT	36.752	0.425	0.000	0.04		4.7		SURCHARGED*
S4.000	S8	37.685	0.035	0.000	0.03		0.5		SURCHARGED
S1.006	S9 (FC)	38.160	2.204	0.000	0.12		1.8		SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	S1	
S2.000	S2	
S1.001	S3	
S1.002	S4	
S3.000	S5	
S3.001	S6	
S1.003	S7	
S1.004	STANK IN	
S1.005	STANK OUT	
S4.000	S8	
S1.006	S9 (FC)	