Paul Waite Associates

Consulting Civil, Structural & Geo-Environmental Engineers

Flood Risk Assessment & Drainage Strategy

Victoria Mill, Sabden

Report Ref: 17140/CR/01B

Prepared For:
Skipton Properties Ltd

Date:
April 2018

Summit House
Riparian Way
The Crossing
Cross Hills
BD20 7BW

Tel: 01535 633350
E-mail: info@pwaite.co.uk

www.pwaite.co.uk
www.pwageo.co.uk

DOCUMENT CONTROL SHEET

Issued by: Paul Waite Associates Ltd
Summit House
Riparian Way
The Crossings
Cross Hills
Keighley
West Yorkshire
BD20 7BW
Tel: 01535 633350
E-mail: info@pwaite.co.uk

Client: Skipton Properties Ltd

Our Ref: 17140/CR/01B

Project: Victoria Mill, Sabden

Report: Flood Risk Assessment & Drainage Strategy

Status: Approval

Date: 12/04/2018

Document Production Record

Issue Details	Name	Signature
Prepared by:	Luke McCabe	LMcCabe
Check By:	Luke McCabe	LMcCabe

Document Revision Record

Issue No	Date	Revision Details
/	22/02/2018	Original Issue
A	28/02/2018	Report and appendices updated to suit latest site layout.
B	12/04/2018	Section 4.9 and Appendix E updated.

Contents

Appendices

Appendix A – Preliminary Site Layout
Appendix B - Topographical Survey
Appendix C - United Utility Records and Developer Enquiry Response
Appendix D - Environment Agency Data and Email Response
Appendix E - Drainage Drawings and Calculations

FOREWORD (Flood Risk Assessment)

This report has been prepared for the sole use and reliance of Skipton Properties Ltd. (the Client) named above and cannot be relied upon by any other parties without the express written authorisation of Paul Waite Associates Ltd. Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care.

The report should be read in its entirety, including all associated drawings and appendices. Paul Waite Associates Ltd cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from the sources listed, which Paul Waite Associates Ltd understands are reliable. All reasonable skill, care and diligence has been applied in examining the information obtained. However, Paul Waite Associates Ltd accepts no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

Paul Waite Associates Ltd reserves the right to amend their conclusions and recommendations in the light of further information that may become available.

1. INTRODUCTION

Paul Waite Associates have been appointed by Skipton Properties Ltd to undertake a Flood Risk Assessment for the proposed development of 30 No. residential dwellings on land located to the south-west of Watt St and Whalley Road, Sabden, Lancashire. The nearest significant watercourses to the proposed development site have been identified as Sabden Brook and the unnamed ordinary watercourse flowing into it from the north on-site.

Sabden Brook is classed as a main river and flows from east to west across the site, just south of Whalley Road eventually discharging into the River Calder to the south-west.

The development site covers an area of approximately 1.10ha and is mostly located in Flood Zone 3 according to the Environment Agency Flood Risk Map, being the zone comprising land as having a 1 in 100 or greater annual probability of river flooding; or land having a 1 in 200 or greater annual probability of sea flooding. than the 1 in 1,000 annual probability of a river or tidal/coastal flooding in any year (<0.1%).
Due to the development being residential, more vulnerable development and in excess of 1 Ha in area the NPPF classifies the development as 'Major' and as such the Lead Local Flood Authority are the statutory consultees.

2. APPROACH TO FLOOD RISK ASSESSMENT

2.1. Approach

The requirements for flood risk assessments are generally as set out in the 'Technical Guidance to the National Planning Policy Framework', published in March 2014; and in more detail from the Government website 'Planning Applications: assessing flood risk' available from https://www.gov.uk/planning-applications-assessing-flood-risk.

This methodology has been adopted to evaluate flood risk at the development site.

2.2.1 Application of the Sequential and Exceptions Test

The risk based sequential test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding, within Zone 1. The flood zones are the starting point for the sequential approach.
The development proposals incorporate construction of 30 residential properties, and as such Table 2 of the Technical Guidance to the National Planning Policy Framework (March 2012) indicates that the development is classified as 'more vulnerable'. The proposed residential development area is shown to be within Flood Zone 3; and is therefore subject to a very high risk of flooding from fluvial sources. No distinction between Flood Zone 3a and 3b was found within the Strategic Flood Risk Assessment by Ribble Valley Council dated May 2010. For the purposes of this report it is assumed the existing mill building that covered the site was not functional floodplain and therefore classed as Flood Zone 3a.

Table 1: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	X	Exception Test required	✓
	Zone 3b	Exception Test required		X	X	X

✓ Development is appropriate

X Development should not be permitted

In accordance with the vulnerability table above the type of development proposed requires an exception test. However, a previous FRA was carried out for the site, Ref: ELLUC-BW-329-270214-FRA-F1 dated February 2014. The report was acceptable for the Environment Agency to withdraw their objection to the development proposals in a letter to Ribble Valley Borough Council dated 20 October

2014, ref: 3/2014/0188. It also stated that it is for the local planning authority to determine whether it satisfies the Sequential Test and part a) of the Exception Test. This report provides an update to the previously approved FRA, on minimum FFL's and drainage strategy to account for current EA data and the 2016 updates to climate change allowances.

3. SITE DETAILS

3.1. Location

The site is centred on Ordnance Survey Grid Reference SD 775 372.
A site location plan showing the location of the proposed development is presented below.

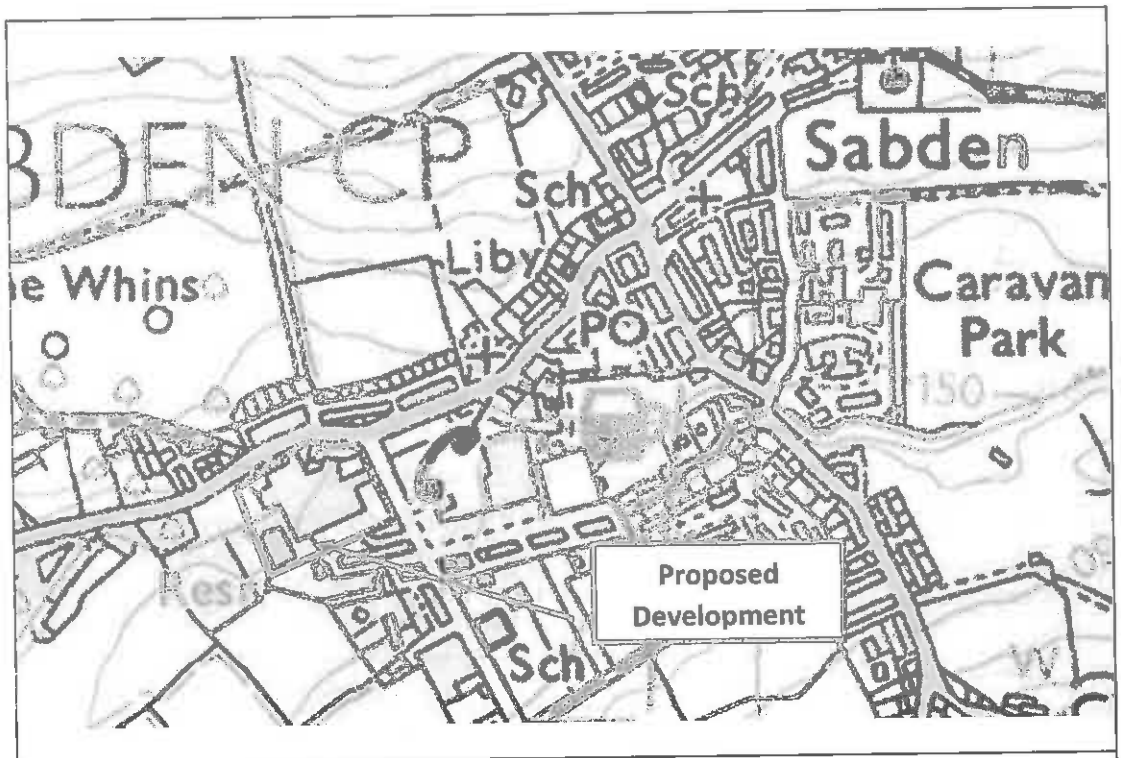


Figure 1: Location Plan – Whalley Road / Watt Street, Sabden, Lancashire.

Image reproduced with kind permission of Ordnance Survey. License No. 100054363.

3.2. Former/current use

A majority of the site is occupied by the Victoria Mill building, covering the central and south-western area of the site and was used for the last 30 years to house an antiques business. Two smaller adjoining buildings directly north and north-west of the mill building are present and there is also a separate building to the north-east. The buildings were home to manufacturing businesses. Historical OS maps show the mill building on a map dating back to 1895. Historical mapping data from 1848 shows a building

within the Victoria Mill site, which is likely to be the earlier spinning block immediately to the south of Whalley Road.

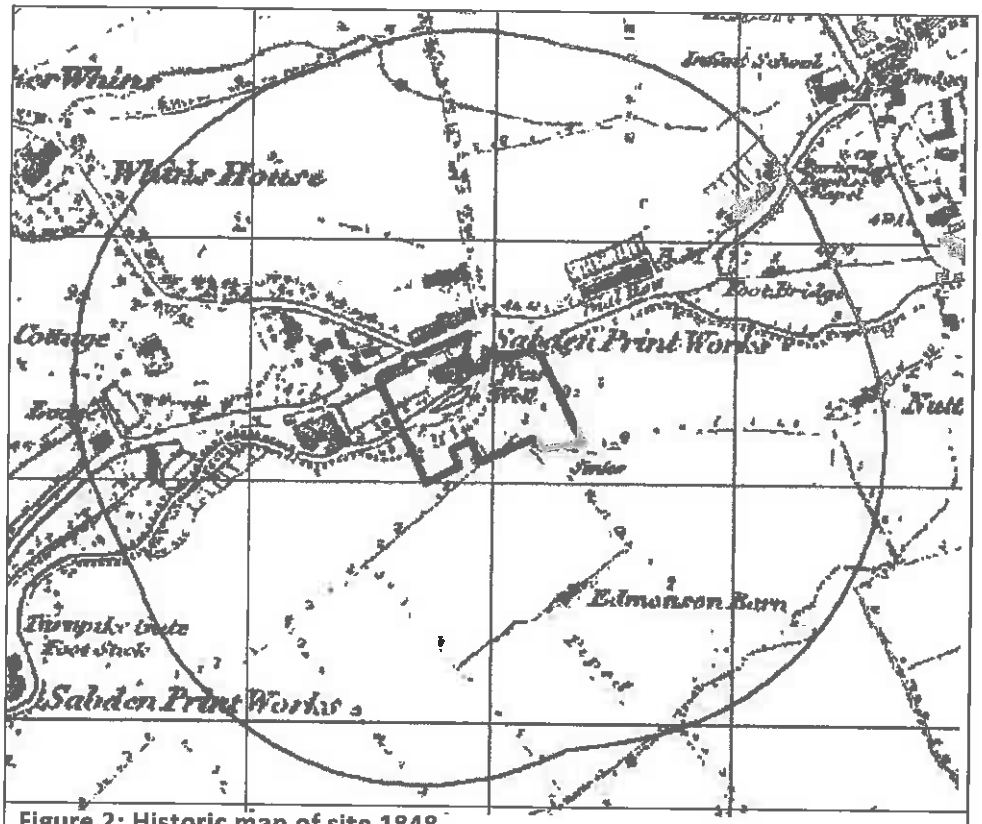


Figure 2: Historic map of site 1848

Image reproduced courtesy of Landmark Information Group (Envirocheck)

3.3. Development Proposals

Proposals for the development site are for the creation of 30 residential dwellings split into two groups of houses north and south of the culverted watercourse which will be completely daylighted (opened up) to the west. Approximately 6 houses will be built on the northern side of the site, with access by an adoptable turning head off Whalley Road. Approximately 24 houses will be built on the southern side of the site, with access from Watt Street by a proposed adoptable access road. The proposed development plans are included within Appendix A of this report.

3.4. Boundaries

The application site is situated approximately 6km to the south-east of Clitheroe and is within the planning district associated with Ribble Valley Borough Council. The existing site is bound to the north by Whalley Road, the east by Watt Street, the south by residential properties and the west by open countryside.

North	Whalley Road

East	Watt Street
South	Residential properties
West	Open countryside

3.5. Topography

The topographical survey by Sterling Surveys dated January 2018 (presented in Appendix B) shows the southern edge of the site at approximately 143.000m, the site falls in the north direction to approximately 140.000m along the northern edge of the mill building and route of the culverted watercourse. The site then rises further to the north to approximately 141.500m in the hardstanding areas north of the mill building. The eastern side of the site is at approximately 142.700m AOD with the western side of the site at approximately 140.000m. The floor level of the main mill building is at approximately 140.200m. The lowest level of the adjoining buildings is 139.930m, which is the building to the north-west.

Therefore, the site is relatively flat with the majority of the site covered by the mill building at 140.250m but with a general fall from west to east and from south to the northern edge of the mill building and the furthest north part of the site falling south to the same point.

A site plan showing topographical data is provided in Appendix B.

3.6. Existing Drainage/Infrastructure

3.6.1. On-Site

The site is drained by a private foul and surface water network. There is an open watercourse (Sabden Brook) that passes from the north-eastern side of the site from east to west and passes across a weir (approximately 50m from the eastern edge of the site) before entering a culverted section of watercourse underneath the mill building. The watercourse is culverted underneath the entire extents of the mill building to where it opens out on the western side of it.

3.6.2. Off-Site

The supplied sewer records are not clear but the UU sewer map (refer to Appendix C) appears to show a 225mm diameter foul sewer running partially within the western footpath to Watt Street, beginning near the access to site and eventually connecting into the manhole within the junction of Watt Street and Whalley Road. It meets a 300mm diameter foul sewer running from east to west at this point, running some distance past the development site along Whalley Road.

The watercourse described above passes as an open watercourse on the opposite side of Watt Street but is culverted through to the development site.

Sinks and issues are shown on mapping data along the treeline running north to south in the large undeveloped grassland area behind the residential properties on the northern side of Whalley Road. It is believed the flows are culverted underneath Whalley Road and discharge into the open section of Sabden Brook upstream of the development site.

3.7. History of Flooding

There are many articles on the internet reporting of localised flooding within Sabden and more extreme flooding. The articles reference Wesley Street and issues of flooding and culverts being blocked. The records of historic flooding range from 2016 to circa 1920. No specific records of the Victoria Mill building flooding were found.

3.8. Ribble Valley Borough Council SFRA (May 2010)

A Strategic Flood Risk Assessment – Level 1 was undertaken by Ribble Valley Borough Council completed in May 2010. The report references Sabden, in promoting land use / land management projects by land owners to reduce flood risk via Higher Level Stewardship. No specific flood risks were refenced for the Sabden area.

4. FLOODING MECHANISMS

4.1. Fluvial Flooding

Fluvial flooding occurs when watercourse such as rivers, streams and becks flood because of high or intense rainfall flowing into them. The development is shown to be situated within Flood Zone 3 of the Environment Agency Flood Map.

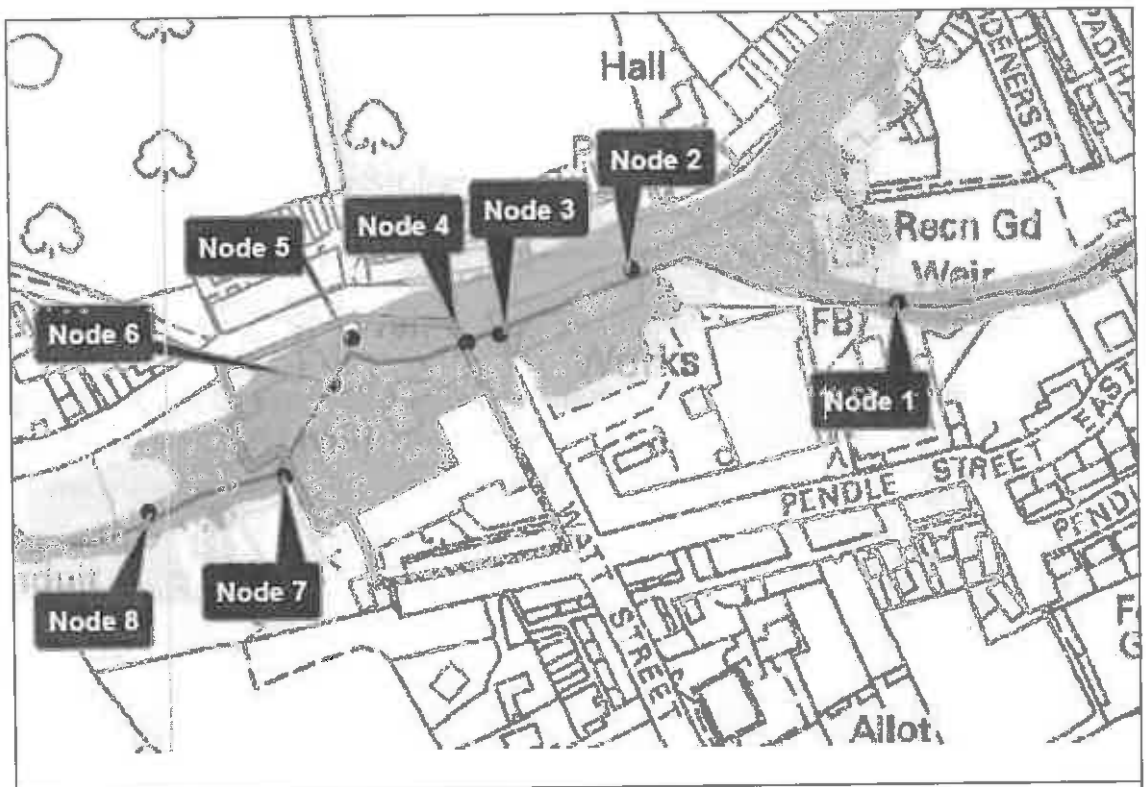


Figure 3: Environment Agency Flooding from Rivers and Sea.

Source: Environment Agency Product 4 data

As shown in Figure 3 above, information from the EA shows the primary source of fluvial flood risk to the proposed development site is Sabden Brook which passes through the development site. The dark blue shaded area is Flood Zone 3 and the lighter blue shaded areas are Flood Zone 2. For consideration in this report the unshaded areas, or Flood Zone 1 will be more accurately defined by the topographical survey and modelled node data.

The development site is at a high risk of flooding according to the Flood Zone 3 classification and the EA modelled data and climate change allowances are considered in Section 4.9.

4.2. Pluvial Flooding

Pluvial flooding occurs when rainfall generates overland flows which flood an area before it can enter a watercourse or sewer. Although it is usually the result of high rainfall intensities it can occur from lower rainfall intensities and/or melting snow when the ground is already saturated or frozen, or generally where an area has a low permeability or has been developed.

The Environment Agency 'Risk of Flooding from Surface Water' map indicates that the proposed development is at a high risk of surface water flooding around the mill and other buildings on site, with a low risk of surface on the buildings themselves. The extent of flooding associated with surface waters as shown in Figure 4.

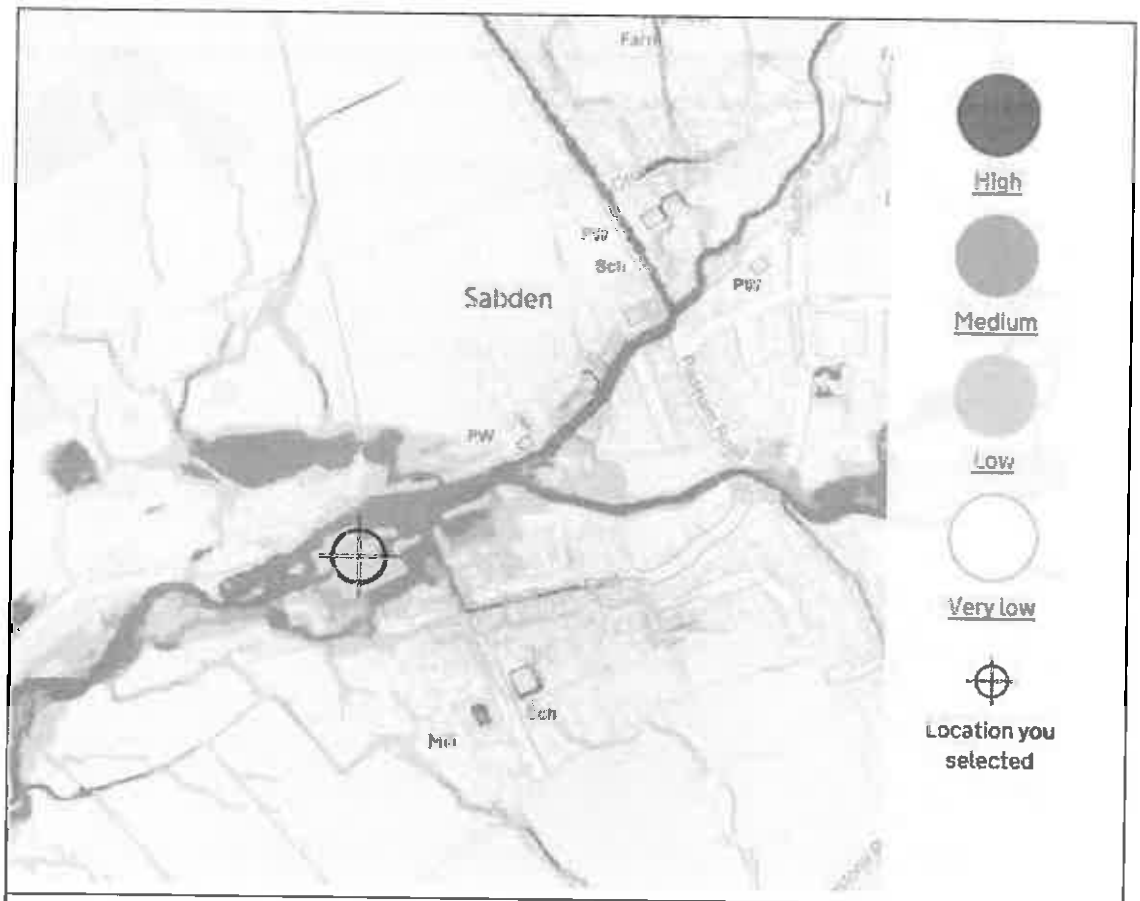


Figure 4: Environment Agency Risk of Flooding from Surface Water Map

Source: Environment Agency Website

The site falls approximately 3m from the southern edge of the site to Sabden Brook, with the building footprint relatively flat across most of the site. The lowest point of the development site is at 138.050m at north side of the Brook as it meets the wester boundary of the site.

Generally surface water will flow from the south across a majority of the site into the brook either side of the building and the remaining area to the north draining south into the brook. A general fall is present from east to west following the direction of the brook.

The external works will have to be designed to shed surface water into the Sabden Brook and when daylighting the brook as part of the development proposals, that the cross-section is sufficient to carry the anticipated flows.

4.3. Reservoir Flooding

The Churn Clough reservoir 1.25km to the north-east of the site has been identified which could potentially impact Sabden and the development site. The Environment Agency 'Risk of Flooding from Reservoirs' map (Refer to Figure 5 below) indicates most of the central and north-eastern areas of Sabden including the whole of the development site are within the maximum extent of flooding, associated with Churn Clough Reservoir flooding.

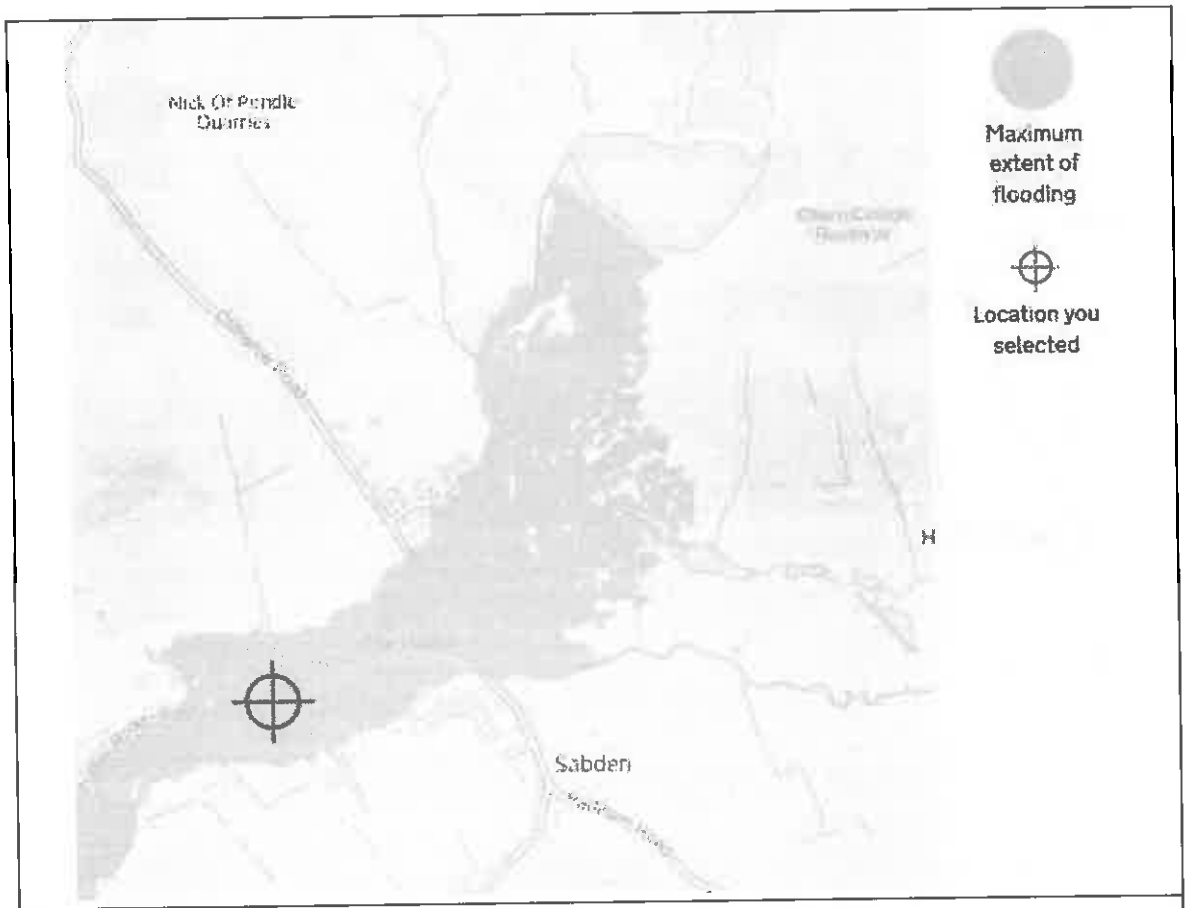


Figure 5: Environment Agency Risk of Flooding from Reservoirs Map

Source: Environment Agency Website

It is anticipated the risk of flooding from the reservoir to the development site is low subject to the reservoir being operated and maintained properly. External works design should also mitigate surface water flood risk associated with reservoir flooding.

4.4. Groundwater Flooding

Groundwater flooding occurs typically over relatively long rainfall durations and occurs when the ground becomes saturated and the water table rises above ground level. As such low-lying areas that may be protected from fluvial flooding and some distance away from watercourses can be affected.

It is thought due to the superficial deposits of till and bedrock deposits consisting of Sabden Shales (mudstone with subordinate beds of locally pebbly sandstone with thin layers of limestone and iron stone), that the site is unlikely to be affected by ground water.

Therefore, the risk of groundwater flooding associated with the site is considered to be low.

4.5. Sewer Capacity: Flood risk

There are no records of the public foul water sewer surrounding the site as having flooded. The public sewer records do not record any surface water sewers nearby the development site, however some of the large diameter public foul sewers may actually be carrying surface water (combined). It is thought the risk of sewer flooding to the development site is low as this is under regular maintenance and monitoring by United Utilities. The development discharges directly in to Sabden Brook and the foul to the public sewers via private drainage networks. The proposed development works will require the existing private drainage to be grubbed up and new private and adopted sewers installed to serve it. The new drainage systems will be designed to current standards and therefore be at low risk of flooding.

4.6. Infrastructure Failure and Blockage: Culverts, Weir and EA flood defence structures

According to the Product 4 EA flood data (refer to Appendix D), there are flood defences surrounding the edge of the banks to Sabden Brook on the development site before and after the culverting under the mill (consisting of high ground, offering fluvial protection and with overall condition grades of 3). The design standard (return period) protection offered by the structures varies from 5 and 10 years. The high ground naturally forms embankments to the watercourse and protection against elevated water levels. As the embankments have been present for some time it is thought the risk of collapse and slippage is low without excessive flows and loading above the bank. In some areas the banks will be retained and in others reprofiled due to raising of the site levels and daylighting of the culverted section of watercourse. The risk of failure through any alterations to the slopes can be mitigated by design and use of geotextiles, retaining structures and safe slopes or slope stabilisation. Cross sections are presented in Appendix E showing the comparison between the existing and proposed bankings.

A weir structure EA ref: 01210SABD0101R10001, offering fluvial protection has been rated with an overall condition grade of 3. A condition grade of 1 represents excellent, 5 as very poor.

The report by Ribble Rivers Trust – Flood and Geomorphology Risk Assessment ref: RLTFP07-08 reviews the existing weir construction and details proposed changes to the weir and the upstream and downstream elements to the watercourse. Originally the weir supplied water to Victoria Mill. The weir has an approximate head of 2m. As the weir is to remain as existing with minor changes, it will have the facility to overflow as in normal operation with elevated water levels and the risk of failure will be low. Opening up the watercourse downstream should mitigate the consequences of failure also.

The existing culverted section of Sabden Brook underneath Victoria Mill will be daylighted into an open channel. Therefore, the risk of blockage and flooding will be removed, and no increased risk of flooding from existing before the works are begun. Sabden Brook is culverted from the east to the west underneath Watt Street before opening up into a channel before the weir on site. According to the topographical survey exceedance flows from this culvert on the east side could exceed on to the road and would collect within the junction and eventually exceed back in to the watercourse or into the highway drainage.

4.7. Additional sources of flood risk

A mill pond is also within the development site, which anecdotal evidence suggests was used to store pumped water from the watercourse as a reserve for the firefighting / sprinkler system within the mill. No data exists to how the reservoir is maintained or operated but is likely to only pose a low risk of flooding as it is situated at a lower level which would directly exceed to the watercourse and away from the site to the west.

4.8. Emergency access and egress during times of flood

The majority of the proposed development site is located within Flood Zone 3, with only small areas to the north-west corner and the southern edge/south-eastern corner of the site as Flood Zone 1. The proposed development layout has two main accesses, one from Whalley Road and one from Watt Street.

Residents on the northern side of the development would be able to access Walley Road which is located in Flood Zone 1 from the proposed entrance and further to the west.

Residents on the southern side of the development would most likely have to use footpath link running between plots 4 and 5 to gain access to the section of Watt Street to the south-east which is located in Flood Zone 1. The other main access leads to the north-eastern corner of the site near the culvert which is located in Flood Zone 3, so would be only of use just before the flood water starts to exceed.

In all cases the external works design must provide finished floor levels elevated above the modelled flood levels as described in Section 4.9 below. The associated hardstanding areas and access roads are

also likely to be elevated to suit, therefore there should be safe access and egress to these points at all time (to low risk Flood Zone 1 areas) in the event of flood.

4.9. Environment Agency Flood Data

The site area is greater than 1 Ha in area and includes areas of Flood Zone 3, therefore Product 4 Environment Agency data was ordered and is included Appendix D. The Product 4 information from the EA provides a detailed flood risk assessment map, modelled flood levels and other information relating to flood defences. The fluvial climate change allowances applied to the 1 in 100-year data is 20% in the data (which needs to be explored against climate change allowances publication in February 2016 from the gov.uk website).

The EA modelled flood levels are tabulated below in Table 2, with Node 4 on the very eastern boundary of the site, Node 5 at the Weir, Node 6 just at the point the watercourse is culverted underneath the building and Node 7 on the very western side boundary of the site as it leaves the culverted section of watercourse beneath the mill.

Further to the February 2016 "Flood risk assessments: climate change allowances" published on the gov.uk website, allowances for climate change should be made in flood risk assessments. The climate change allowances cover anticipated change for peak river flow, peak rainfall intensity, sea level rise and offshore wind speed and extreme wave height.

The site is based in the north-west river basin/catchment area. As per the publication, the site is located within Flood Zone 3, so the residential more vulnerable classification should use the higher central and upper end to assess range of allowances. The higher central and upper end allowances are 35% and 70% for the time epochs of 2070 to 2115 (current guidance from the EA regarding lifetime of the residential development to be considered). The flood levels for these allowances have been calculated by extrapolation and are included with the EA data below in Table 2.

Table 2: Flood data from the Environment Agency and extrapolated 35% and 70% climate change levels

EA Flood data					Extrapolated data	
Node	Q100 Flow (m3/s)	Q100 level (mAOD)	Q100+20% Flow (m3/s)	Q100+20% Level	Q100+35% level	Q100+70% level
4	24.19	142.15	27.46	142.32	142.448	142.745
5	27.24	141.85	30.72	141.98	142.078	142.305
6	28.92	139.74	33.51	140.18	140.510	141.280
7	28.92	139.1	33.51	139.23	139.328	139.555

Following the governments flood risk assessment standing advice, ground floor levels should be as a minimum, the higher of 300mm above the general ground level of the site or 600mm above the estimated river or sea flood level. In this case the estimated river or sea flood level is more onerous so

a 600mm freeboard must be applied to the calculated 1 in 100 year +70% climate change levels. The extrapolated levels are similar to the Q1000 year levels, which can also be used as a proxy in absence of the modelled data.

The Flood Zones across the site vary along the length of Sabden Brook across the site, so ranges rather than definitive levels can be determined for the whole site. The extents of Flood Zone 3 vary from 142.15m AOD to 139.100m across the site from east to west (1 in 100-year flood level at each node). Flood Zone 2 extents are defined by the land having between a 1 in 100 and 1 in 1,000 annual probability of fluvial flooding or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding; generally, this is between 142.590mAOD (maximum Q1000 year level on site) and 139.100mAOD (minimum Q100 year level on site). An area of Flood Zone 1 exists in the south-eastern corner of the site which extends behind the line of the existing building at the entrance off Watt Street, to the south and around the back of Victoria Mill to the embankment above the reservoir. This is defined by the level of the Node 4 Q1000 year level of 142.590m AOD.

The minimum floor levels will also vary across the site and be affected by the design of the opened up culverted section of Sabden Brook beneath the mill building. Subject to detailed design the minimum FFL's for the site will be:

From Node 4 to Node 5 = 142.745m + 0.6m = 143.345mAOD (affecting plots 6, ,20, 22, 23 and 24 at the north-eastern corner of the site).

From Node 6 = 141.280m + 0.6m = 141.880mAOD (affecting plots 7, 12 to 19, 21 and 25 to 30).

The remaining units on Flood Zone 1 should be set no lower than 300mm above existing ground levels, which should be elevated above 143.345m (Node 4 and 5 levels), although we propose to except plots 1 to 5 and 8 to 11 from this rule. These plots will however be set higher than the minimum 141.880 level required for the adjacent plots which lie within Flood Zone 3 therefore not at risk of flooding.

It is also very important that external works are designed to have exceedance routes as demonstrated from east to west and into Sabden Brook, to avoid increasing flood risk to Watt Street, upstream areas and also downstream areas within the development site. Detailing in kerb upstands and forming channels and depressions in landscaping or paved areas sloping into the watercourse will achieve this.

The drainage design incorporates a 40% allowance for climate change to rainfall intensity (as per Table 2) and is for the upper end allowance for the time epoch of 2070 to 2115 which applies across all of England.

Tidal climate change allowances will not affect the modelled data because of the distance to sea and topography.

It is important to note that no works should take place within 8m of a watercourse (the edge of which defined as at the top of bank to it) without approval from the Environment Agency. The proposed development layout uses 4m, which was used in previous development proposals that were approved by the EA. It is assumed this will be approved again, although will be subject to approval by the EA. All works to Sabden Brook and 8m from the top of bank, including new headwall connections are subject to the appropriate Environmental and Flood risk activity permits from the Environment Agency.

5. DRAINAGE STRATEGY

5.1. Surface water drainage

In accordance with the Building Regulations Part H, the surface water from the development site should drain to soakaway, if not watercourse or sewer as the last resort.

The site cannot be drained to soakaway due to the nature of the soils comprising mostly of impermeable clays, along with the contamination that is present. Therefore, in line with the Building Regulations, discharge should be made to the watercourse (Sabden Brook). This is also the existing point of discharge of surface water drainage serving the Victoria Mill and adjacent buildings and hardstanding.

Sabden Brook is classed as a main river and subject to an Environment Agency flood risk activity permit for constructing the headwall outfalls to it.

In accordance with the Local Authority SuDS Officer Organisation (LASOO) Non-statutory technical standards for sustainable drainage documentation, the following criteria must be met in relation to the peak flow control and volume control to watercourse; for developments which were previously developed, the peak runoff rate from the development to any surface water body for the 1 in 1 and 1 in 100 year rainfall events must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event. Where reasonable practicable, for developments which were previously developed, the runoff volume from the development to any surface water body in the 1 in 100-year, 6-hour event must be constrained to a value as close as reasonably practicable to the greenfield runoff volume for the same event but should never exceed the runoff volume from the development prior to redevelopment for that event. Where it is not reasonably practicable to constrain the volume of runoff to any surface water body, the runoff volume must be discharged at a rate that does not adversely affect flood risk. The existing runoff rates and volumes are presented below in Table 3.

Table 3: Existing brownfield peak runoff rates and discharge volume

1 in 1-year peak flow rate	94.5 l/s
1 in 30-year peak flow rate	218.8 l/s
1 in 100-year peak flow rate	274.5 l/s
1 in 100-year discharge volume (for 6 hour event)	485.975 cu.m

The proposed drainage strategy layout in Appendix E illustrates the attenuation volumes that will be needed to meet the LASOO criteria subject to detailed design. As some areas of highway are proposed for adoption on site, and the levels fall generally away from the existing highway towards the brook, it will be necessary to drain surface water runoff from the highway, dwellings, hardstanding areas and private roads into the watercourse via an adoptable drainage network. The attenuation used is likely to be large oversized attenuation pipes which are restricted by a flow control device prior to discharging to the watercourse.

SUDS will be incorporated in the development by the use of oversized pipes/tanked systems to attenuate the flows with flow controls downstream, to limit flows to the existing brownfield run-off rates and volumes for the same rainfall event with an allowance for climate change (40%). This will be pro-rata based on the proposed impermeable areas to each outfall required. Other SUDS features will be incorporated by the use of porous paving with a sub-base and impermeable membrane below to reduce flow rates and offer water quality benefits before discharging into the watercourse.

Following the SUDS treatment train, a majority of the components using infiltration cannot be utilised due to the contamination issues on site. However, the source control and treatment stages such as the porous paving on an impermeable membrane, trapped gullies etc should remove sediment and silt and offer environmental benefits to the quality of the water discharged to the watercourse. Refer to Appendix E for the proposed preliminary drainage strategy.

5.2. Foul water drainage

The United Utilities sewer maps show a public 225mm diameter combined sewer within Watt Street, along with a 300mm public combined sewer in Whalley Road and another combined sewer to the south of the site. The proposed foul water networks should discharge to the public combined sewer at an unrestricted rate as advised by United Utilties in their pre-development enquiry response presented in Appendix C and will be subject to a S106 agreement with UU prior to any physical connection being made. Refer to the proposed preliminary drainage strategy in Appendix E for the foul drainage proposals.

6. SUMMARY AND CONCLUSIONS

The majority of the proposed development site is located within Flood Zone 3 according to the Environment Agency Flood Risk Map, being the zone comprising land as having a 1 in 100 or greater annual probability of a river flooding in any year and 1 in 200 or greater annual probability of sea flooding. The south-eastern part of the site lies within flood zone 1, being the zone comprising land as having a less than 1 in 1000 annual probability of flooding from rivers or sea.

The most significant sources of Flood Risk to the site relate to Fluvial Flooding associated with Sabden Brook which runs through the site from the north east in a south-westerly direction. This source of flood risk to the development can be managed by setting the finished floor levels across the site in accordance with the strategy drawing in appendix E.

Pluvial Flooding represents the second most significant source of Flood Risk to the development. If the external works and site levels are designed to shed surface water into the Sabden Brook and if when daylighting the Brook through the development the cross-section is sufficient to carry the anticipated flows the pluvial flood risk to the development can be managed.

The risk of reservoir flooding to the development can be managed in the same way as the pluvial flood risk.

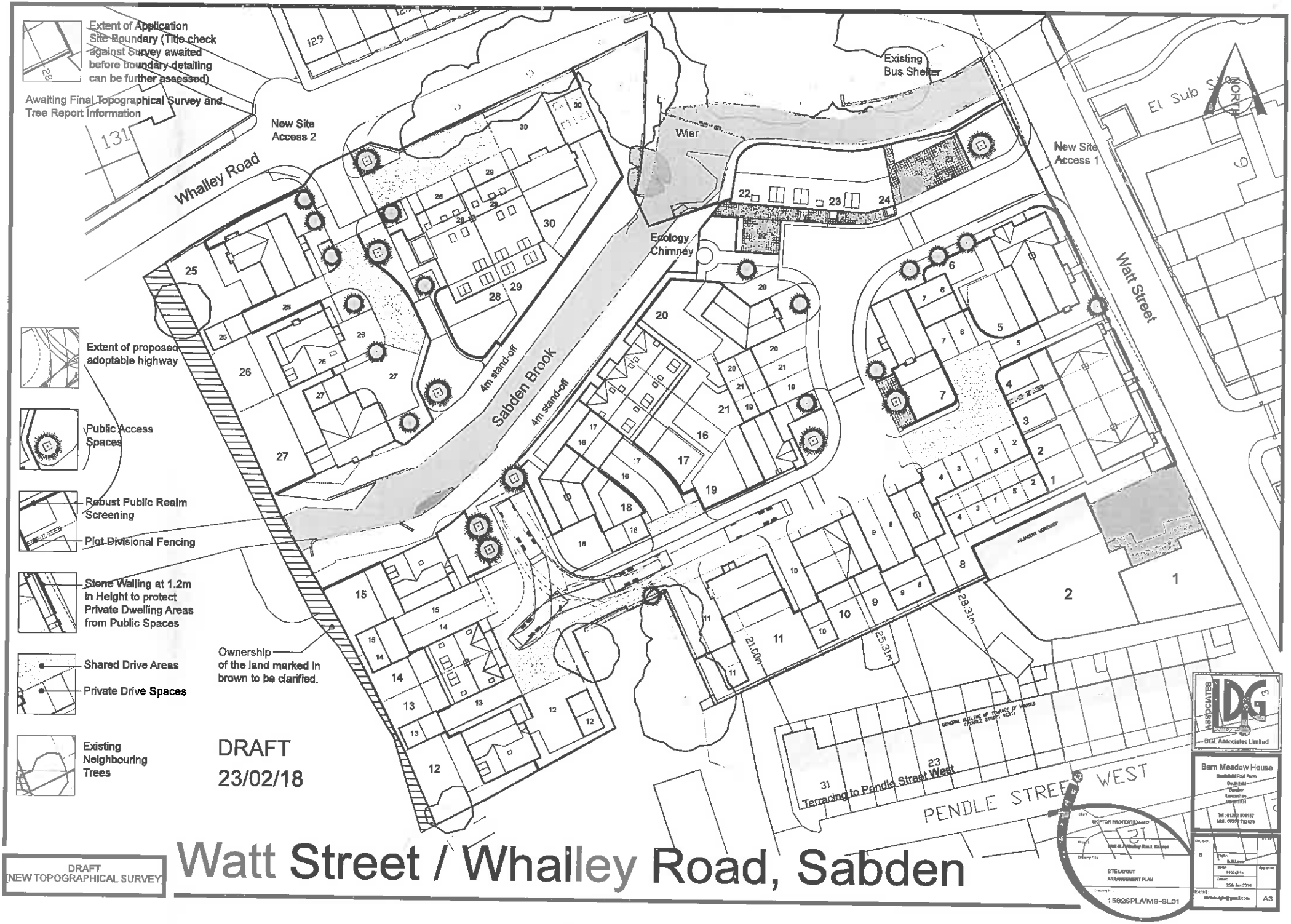
There are no specific historical records of the Victoria Mill building flooding.

All other sources of flood risk have been evaluated and deemed to pose a low risk.

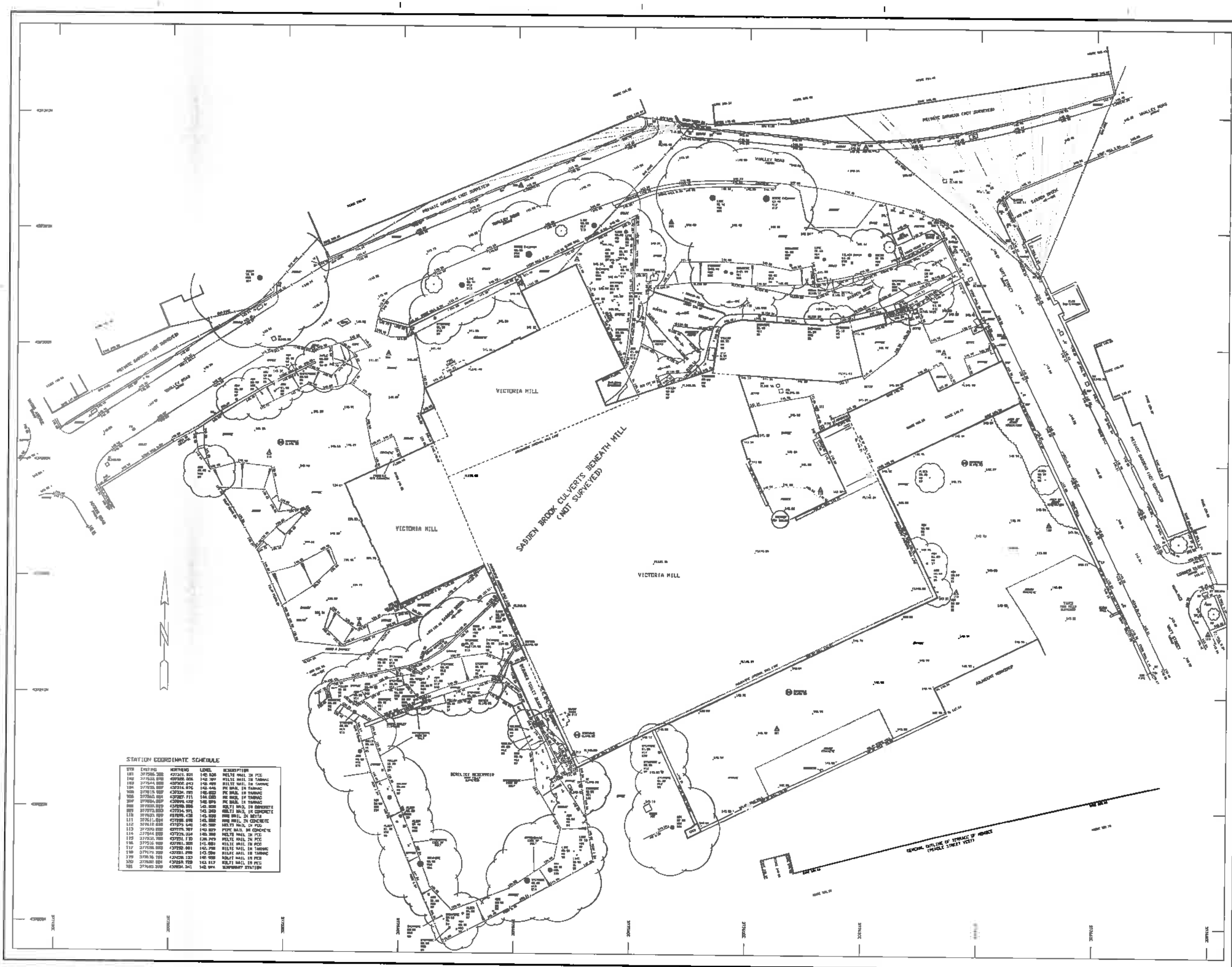
The proposed drainage strategy will utilise flow control devices and attenuation structures to manage the peak rate of surface water runoff from the development, along with the discharge volume do not exceed the existing rates and volumes, with an allowance made for climate change. Therefore, the development will not cause any increased flood risk downstream of the site.

In summary, with the mitigation measures proposed, coupled with the proposed drainage strategy, it is considered that the development will have no adverse effect on flood risk to both the site itself and downstream.

Appendix A
Preliminary Site Layout


Extent of Application Site Boundary (Title check against Survey awaited before boundary detailing can be further assessed)
Awaiting Final Topographical Survey and Tree Report Information
New Site Access 2
Whalley Road
Existing Bus Shelter
Wier
New Site Access 1
Watt Street
Ecology Chimney
Sabden Brook
4m stand-off
4m stand-off
Extent of proposed adoptable highway
Public Access Spaces
Robust Public Realm Screening
Plot Divisional Fencing
Stone Walling at 1.2m in Height to protect Private Dwelling Areas from Public Spaces
Shared Drive Areas
Private Drive Spaces
Existing Neighbouring Trees
Ownership of the land marked in brown to be clarified.
DRAFT
23/02/18
Terracing to Pendle Street West
PENDLE STREET WEST
28.31m
25.31m
21.00m
DRAFT
NEW TOPOGRAPHICAL SURVEY
Watt Street / Whalley Road, Sabden
SITE LAYOUT ARRANGEMENT PLAN
1582SPLA/MS-SL01
A3
Barn Meadow House
DGL Associates Limited

Appendix B
Topographical Survey



SURVEYED BY
STERLING surveys

LEGEND

NOTES

UNDERGROUND SERVICES INFORMATION

SKIPTON PROPERTIES
SKIPTON HOUSE
RIPARIAN WAY
CROSSHILLS
BD20 7BW

JOB TITLE

VICTORIA MILL
WHALLEY ROAD
SABDEN

DRAWING TITLE

SITE SURVEY

SCALE: 1:200

SURVEYOR AL | DRAWN PC | CHECKED LSP

Appendix C
United Utility Records and Developer Enquiry Response

United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

Commercial Drainage and Water Enquiry

Responses to a drainage and water enquiry for commercial premises or development sites.

This document was ordered by: -

ETSOS
Units 4-5 Willow Mill
Fell View
Caton
Lancaster
LA2 9RA

Client Ref: ATD-3640779-J5ZW

FAO:

This document was produced by: -

United Utilities Water Limited
Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone 0370 7510101

e-mail -
property.searches@uuplc.co.uk

DX 715568 Warrington 7

The information in this document refers to: -

Property: VICTORIA MILL WATT STREET SABDEN CLITHEROE BB7 9ED

For any queries relating to this report please e-mail, write or phone our Customer Liaison Team at the above address quoting United Utilities' Reference Number: 1282299

1. Section one: Introduction

The following records were searched in compiling this report:-

* The map of the public sewers
* The map of the waterworks
* Water and Sewerage billing records
* Adoption of public sewer records
* Building over public sewers records
* The properties subject to internal foul flooding
* Adoption of public water mains records
* The properties subject to poor water pressure and
* Water supply clarification.

All these are held by United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP.

Please Note - We must make you aware that due to the introduction of the open market with effect from 1st April 2017 for commercial customers, Property Searches will no longer be able to resolve issues regarding some discrepancies within the report. Due to the change in the structure of the market the retailer is now responsible for taking ownership of certain issues, particularly relating to billing/tariff charges as well as, but not limited to change of usage of a property.

If you are planning works anywhere in the North West, please read our access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx.

Interpretation of Drainage and Water Enquiry

Appendix 1 of this report contains definitions of terms and expressions used in the report.

Enquiries and Responses

The records were searched by Angela Gall for United Utilities who does not have, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

This search report was prepared by Angela Gall for United Utilities who does not have, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

Appendix 2 of this report contains the terms and conditions of sale

Appendix 3 of this report contains our formal complaints procedures

Commercial drainage and water search complaint procedure

In the event of any queries relating to this report please e-mail, write or phone our Customer Liaison Team at the address above quoting United Utilities reference. We will endeavour to resolve any telephone contact or complaint at the time of the call

Whilst we always try to resolve all complaints straightaway, if this is not possible and you are not happy with the course of action taken by us, you can ask us to escalate the issues internally or take your complaint to an independent third party.

We will listen to your complaint and do our best to deal with it immediately.

If we fail to give you a written substantive response within 5 working days Property Searches will compensate our client the original fee paid for a Property Searches Commercial Drainage and Water enquiry, regardless of the outcome of your complaint.

If it is a complex issue requiring more time, we will still get back to you within 5 days and notify you of progress and update you with the new timescales.

If we consider your complaint to be justified we will or we have made any errors that substantially change to outcome of the search we will-

- Refund your search fee
- Provide you with a revised search
- Take the necessary action within our power to put things right
- Keep you informed of any action required

If we cannot resolve your complaint or have failed to comply with the complaints procedure you can:
- Let us know and we can escalate your complaint
- Refer the issue to an independent body of your choice.

United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

To help understand the implications of the Drainage and Water Enquiries Report a summary guide to the content of the full report is provided below.

⚑ *The attention of the purchaser is drawn to this response. The purchaser may wish to make further investigations into this situation.*

✓ *This response represents the typical situation for a property.*

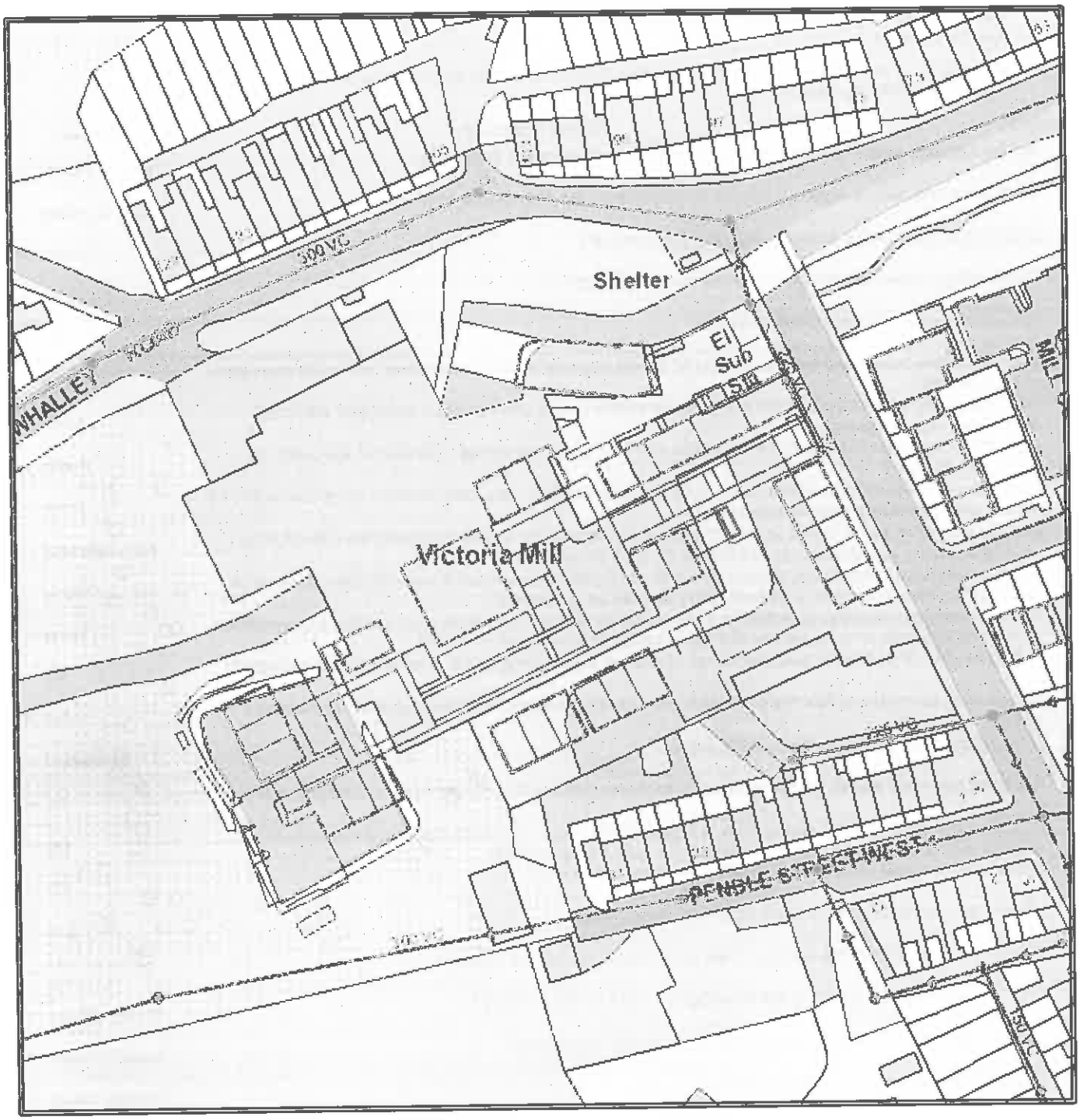
✖ *This response represents an uncommon situation for a property and the purchaser should carefully consider its implications.*

Question	Report Schedule	Answer
1	Where relevant, please include a copy of an extract from the public sewer map.	Yes & in vicinity ✓
2	Where relevant, please include a copy of an extract from the map of waterworks.	Yes & in vicinity ✓
3	Does foul water from the property drain to a public sewer?	Public ✓
4	Does surface water from the property drain to a public sewer?	Not Connected ✖
5	Is a surface water drainage charge payable?	No ⚑
6	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	None ✓
6.1	Does the public sewer map indicate any pumping station or any other ancillary apparatus within the boundaries of the property?	None ✓
7	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	Public ✓
7.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	None ✓
8.1	Are any sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?	Not applicable ✓
8.2	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	Not applicable ✓
9	Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	None ✓
10	Is the property, or part of the property, at risk of internal foul flooding due to overloaded public sewers?	No ✓
11	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	Yes ✓
12	Is the property connected to mains water supply?	Connected ✓
13	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	No ✓
14	Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?	No ✓
15	Is the building at risk of receiving low water pressure or flow?	No ✓
16	What is the clarification of the water supply for the property?	Very Soft ✓
18	Please include details of the location of any water meter serving the property.	Commercial - External ✓
19	Who is responsible for providing the sewerage services for the property?	United Utilities ✓
19	Who is responsible for providing the water services for the property?	United Utilities ✓
20	Who bills the property for sewerage services?	Retailer Sewer ⚑
21	Who bills the property for water services?	Retailer Water ⚑
AQ1	Has a customer been granted a trade effluent consent at this property?	No ✓
AQ2	Is there an easement affecting the property?	No ✓

United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

SEWER RECORD VICTORIA MILL WATT STREET SABDEN CLITHEROE BB7 9ED

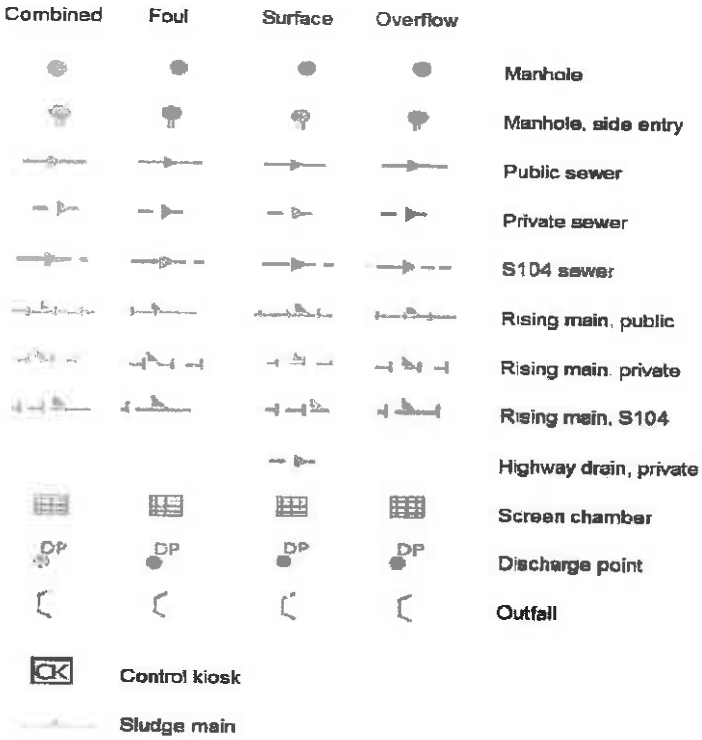


The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water Limited will not accept any liability for any damage caused by the actual positions being different from those shown.

United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

Waste Water Symbology

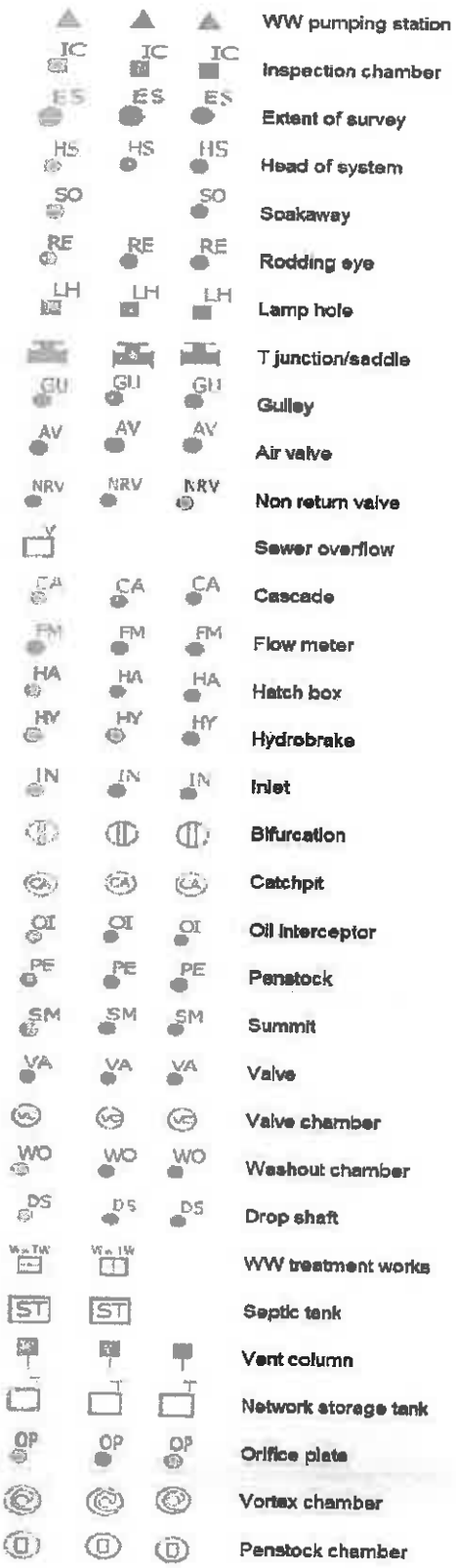


Abandoned pipe	
	Public sewer
	Rising main
	Private sewer
	Sludge main

Manhole function	
FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

Sewer shape			
CI	Circular	U	Unspecified
EG	Egg	SQ	Square
OV	Oval	TR	Trapezoidal
FT	Flat top	AR	Arch
RE	Rectangular	BA	Barrel
		HO	Horse shoe

Sewer material			
AC	Asbestos cement	DI	Ductile iron
BR	Brick	VC	Vitrified clay
CO	Concrete	PP	Polypropylene
CSB	Concrete segment	PF	Pitched fibre
CSU	Concrete segment	MA	Masonary, coursed
CC	Concrete box culverted	MA	Masonary, random
PSC	Plastic	RP	Reinforced plastic
GR	Glass reinforced	CI	Cast iron
GRP	Glass reinforced	SI	Spun iron
PVC	Polyvinyl chloride	ST	Steel
PE	Polyethelene	U	Unspecified



Clean Water Symbology

Proposed	Abandoned	Live	
			Distribution Main
			Trunk Main
			Comms Pipe
			Private Pipe
			Concessionary Service
			Raw Water
			LDTM Raw Water
			LDTM Treated Water

- Air Valve
- AC Valve, open
- AC Valve, closed
- CC Valve, open
- CC Valve, closed
- Non Return Valve
- Pressure Management Valve
- OMS Valve
- Stop Tap
- Flow Meter
- Domestic Meter
- Commercial Meter
- Pump
- Hydrant
- Fire Hydrant
- Anode
- Chlorination Point
- De-chlorination Point
- Strainer Point
- Access Point
- Hatch Box
- IP Point
- Sampling Station
- Logger Box

- Bore Hole
- Bulk Supply Point
- Inlet Point
- End Cap
- Site Termination
- Change of Characteristic

Property Types

- Water Tower
- Valve House
- Booster Pumping Station
- Intake Pumping Station
- Water Treatment Works
- Supply Reservoir
- Service Reservoir
- Impounding Reservoir
- Pipe Bridge
- Condition Report

Symbology for proposed assets is the same as above, but shown in .

Symbology for abandoned assets is the same as above, but shown in black.

Material Types

AC	Asbestos Cement
CI	Cast Iron
CU	Copper
CO	Concrete
DI	Ductile Iron
GI	Galvanised Iron
GR	Grey Iron
OT	Others
PB	Lead
PV	uPVC
SI	Spun Iron
ST	Steel
UN	Unknown
PE	Ployethelene

Lining Types

CL	Cement Lining
TB	Tar or Bitumen
ERL	Epoxy Resin

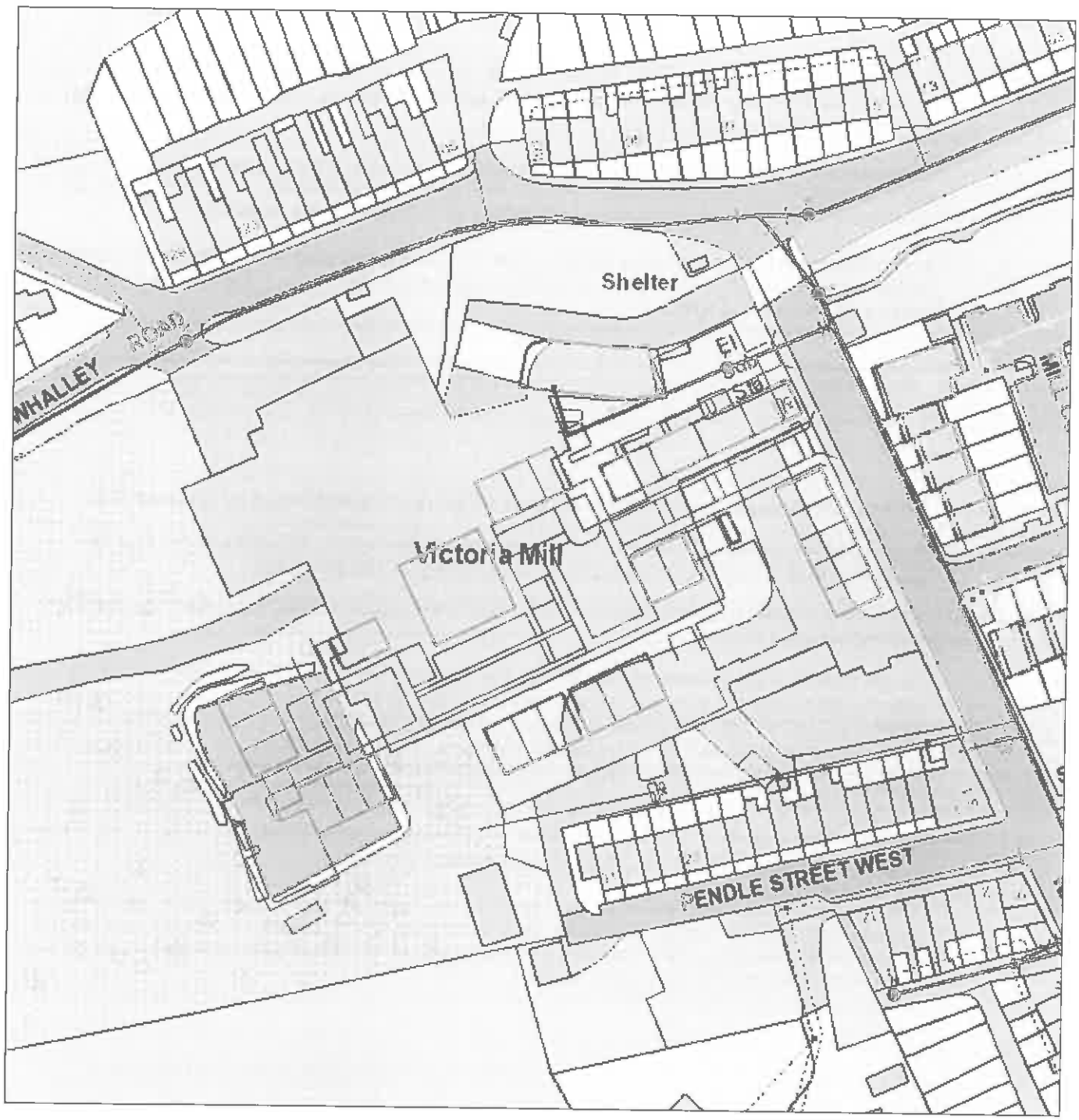
Insertion Types

DD	Die Drawn
DR	Directional Drilling
MO	Moling
PI	Pipeline
SL	Slip Lined

United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

WATER RECORD VICTORIA MILL WATT STREET SABDEN CLITHEROE BB7 9ED



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water Limited will not accept any liability for any damage caused by the actual positions being different from those shown.

Question 1 **Where relevant, please include a copy of an extract from the public sewer map.**

Answer **A copy of an extract of the public sewer map within the vicinity of the property is included.**

Informative

1. The Water Industry Act 1991 defines Public Sewers as those which (United Utilities) have responsibility for. Other assets and rivers, water courses, ponds, culverts or highway drains may be shown for information purposes only.

2. 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.

3. The Sewerage Undertaker has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the Sewerage Undertaker or its contractors needing to enter the property to carry out work.

Question 2 **Where relevant, please include a copy of an extract from the map of waterworks.**

Answer **A copy of an extract of the map of waterworks is included, showing water mains, resource mains or discharge pipes in the vicinity of the property.**

Informative

The "water mains" in this context are those which are vested in and maintainable by the Water Undertaker under statute.

Assets other than public water mains may be shown on the plan, for information only.
Water Undertakers are not responsible for private supply pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If an extract of the public water main record is enclosed, it 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.

The presence of a public water main running within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the Water Undertaker or its contractors needing to enter the property to carry out work.

Question 3 **Does foul water from the property drain to a public sewer?**

Answer **Records indicate that foul water from the property drains to a public sewer.**

Informative

Sewerage Undertakers are not responsible for any private drains or sewers that connect the property to the public sewerage system, and do not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If foul water does not drain to the public sewerage system the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant.

If an extract from the public sewer map is enclosed, this will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

Question 4 **Does surface water from the property drain to a public sewer?**

Answer **Records indicate that surface water from the property does not drain to a public sewer. If the property was constructed after the 6th April 2015 the surface water drainage may be served by a sustainable drainage system.**

Informative

Sewerage Undertakers are not responsible for any private drains or sewers that connect the property to the public sewerage system and do not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

In some cases, Sewerage Undertakers' records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Sewerage Undertaker.

If surface water does not drain to the public sewerage system the property may have private facilities in the form of a soakaway or private connection to a watercourse.
If an extract from the public sewer map is enclosed, this will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

Question 5 **Is a surface water drainage charge payable?**

Answer **Records confirm that a surface water drainage charge is not payable for the property.**

Informative Since 1st April 2017 commercial customers can choose their retailer for clean, waste or both services. For more information on any applicable surface water charges you will need to contact the current owner of the property to find out who the current retailer is. Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of water and waste water services for the property please visit www.open-water.org.uk.

Please note if the property was constructed after 6th April 2015 the Surface Water drainage may be served by a Sustainable Drainage System. Further information may be available from the Developer.

Question 6 **Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?**

Answer **The public sewer map included indicates that there are no public sewers, disposal mains or lateral drains within the boundary of the property. However from the 1st October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map which may further prevent or restrict development of the property. If you are considering any future development at this property which may require build over consent, please complete the enquiry form by accessing the following link http://www.unitedutilities.com/planning-wastewater-guidance.aspx.**

Informative The approximate boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.
The presence of a public sewer running within the boundary of the property may restrict further development.

United Utilities has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of United Utilities or its contractors needing to enter the property to carry out work.

Sewers 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 that these details be checked with the developer, if any.

Assets other than public sewers may be shown on the copy extract, for information only. Please note if the property was constructed after 1st July 2011 any sewers and/or lateral drains within the boundary of the property are the responsibility of the householder.

Question 6.1 **Does the public sewer map indicate any pumping station or any other ancillary apparatus within the boundaries of the property?**

Answer **The public sewer map included indicates that there is no public pumping station or other ancillary apparatus within the boundaries of the property. However, from the 1st October 2016 private pumping stations which serve more than one property will be transferred into public ownership but may not be recorded on the public sewer map until that time**

Informative

From 1 October 2016 United Utilities will be responsible for private pumping stations (though we may take ownership of some stations before this date) that either:

- serve a single property, and are outside the property boundary or
- serves two or more properties

Only private pumping stations installed before 1st July 2011 will be transferred into our ownership. United Utilities will be responsible for all associated costs, maintenance, repairs and any necessary upgrade work.

If you think there might be a private pumping station on your land or near your business property, please let us know by completing this questionnaire with as much information as possible, please visit our website http://www.unitedutilities.com/ppstransfer.aspx

United Utilities has rights of access to maintain this asset on a regular basis.

Question 7 **Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?**

Answer **The public sewer map included indicates that there are public sewers within 30.48 (100 feet) of a building within the boundary of the property. However from the 1st October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map which may further prevent or restrict development of the property. Please refer to the answer of the question "sewer in boundary" for further details.**

Informative

From 1st October 2011 there may be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are also within 30.48 metres (100 feet) of a building within the property.
The presence of a public sewer within 30.48 metres (100 feet) of the building(s) within the property can result in the Local Authority requiring a property to be connected to the public sewer.
The measure is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public sewer.
Sewers 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 that these details are checked with the developer, if any.
Assets other than public sewers may be shown on the copy extract for information only.
Where the property is part of a very recent or ongoing development and the sewers/pumping station are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains, sewers and pumping stations for which they will hold maintenance and renewal liabilities.

Question 7.1 **Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?**

Answer **The public sewer map included indicates that there is no public pumping station or other ancillary apparatus within 50 metres of any buildings within the property. However, from 1st October 2016 private pumping stations which serve more than one property will be transferred into public ownership but may not be recorded on the public sewer map until that time.**

Informative

From 1 October 2016 United Utilities will be responsible for private pumping stations (though we may take ownership of some stations before this date) that either:
" serve a single property, and are outside the property boundary or
" serves two or more properties
Only private pumping stations installed before 1st July 2011 will be transferred into our ownership. United Utilities will be responsible for all associated costs, maintenance, repairs and any necessary upgrade work.
If you think there might be a private pumping station on your land or near your business property, please let us know by completing this questionnaire with as much information as possible, please visit our website http://www.unitedutilities.com/ppstransfer.aspx
Where the property is part of a very recent or ongoing development and the sewers/pumping station are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains, sewers and pumping stations for which they will hold maintenance and renewal liabilities.

Question 8.1 **Are any sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?**

Answer **The property is part of an established development and is not subject to an adoption agreement**

Informative

This enquiry is of interest to purchasers of new property who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Question 8.2 **Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?**

Answer **The property is part of an established development and is not subject to an adoption agreement**

Informative

This enquiry is of interest to purchasers of new property who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Question 9 **Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?**

Answer **There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.**

Informative

From the 1st October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership and the sewerage undertaker may not have granted approval or been consulted about any plans to erect a building or extension on the property over or in the vicinity of these assets.

Prior to 2003 United Utilities Water Limited had sewerage agency agreements with the local authorities therefore details of any agreements/consents or rejections may not have been forwarded on to our offices before this date.

Buildings or extensions erected over a sewer in contravention of building controls may have to be removed or altered.

Question 10 **Is the property, or part of the property, at risk of internal foul flooding due to overloaded public sewers?**

Answer **The building is not recorded as being at risk of internal flooding due to overloaded public sewers. From the 1st October 2011 private sewers, disposal mains and lateral drains were transfered into public ownership it is therefore possible that a property may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.**

Informative

1. 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.

2. "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.

3.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 Sewerage Undertaker's reporting procedure.

4. Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included.

5. Properties may be at risk of flooding but not included where flooding incidents have not been reported to the Sewerage Undertaker.

6. Public sewers are defined as those for which the Sewerage Undertaker holds statutory responsibility under the Water Industry Act 1991.

7. It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Sewerage Undertaker.

8. This report excludes flooding from private sewers and drains and the Sewerage Undertaker makes no comment upon this matter. For reporting purposes buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.

Question 11 **Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.**

Answer **The nearest Sewage Treatment Works is 2.36 miles (3.79 km), South West of the property. The name of the Sewage treatment works is PORTFIELD BAR WWTW.**

The owner is United Utilities

Informative The nearest sewage treatment works will not always be the sewage treatment works serving the catchment within which the property is situated i.e. the property may not necessarily drain to this works.

The Sewerage Undertaker's records were inspected to determine the nearest sewage treatment works.

It should be noted therefore that there may be a private sewage treatment works closer than the one detailed above that has not been identified. As a responsible utility operator, United Utilities Water Limited seeks to manage the impact of odour from operational sewage works on the surrounding area.

This is done in accordance with the "Code of Practice on Odour Nuisance from Sewage Treatment Works" issued via the Department of Environment, Food and Rural Affairs (DEFRA).

This Code recognises that odour from sewage treatment works can have a detrimental impact on the quality of the local environment for those living close to works.

However DEFRA also recognises that sewage treatment works provide important services to communities and are essential for maintaining standards in water quality and protecting aquatic based environments. For more information visit www.unitedutilities.com.

Question 12 **Is the property connected to mains water supply?**

Answer **Records indicate that the property is connected to mains water supply.**

Informative If the property is suplied by private water mains please note that details of private supplies are not kept by the Water Undertaker. The situation should be checked with the current owner of the property.

Question 13 **Are there any water mains, resource mains or discharge pipes within the boundaries of the property?**

Answer **The map of waterworks does not indicate any water mains, resource mains or discharge pipes within the boundaries of the property.**

Informative The boundary of the property has been determined by reference to the Ordnance Survey record.

The presence of a public water main within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice.

This may result in employees of the Water Undertaker or its contractors needing to enter the property to carry out work.

Question 14 **Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?**

Answer **Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.**

Informative This enquiry is of interest to purchasers of new premises who will want to know whether or not the property will be linked to the mains water supply.

Question 15 **Is the building at risk of receiving low water pressure or flow?**

Answer **Records confirm that the building is not recorded by the water undertaker as being at risk of receiving low water pressure or flow.**

Informative

The boundary of the property has been determined by reference to the Ordnance Survey record.
"Low water pressure" means water pressure below the regulatory reference level which is the minimum pressure when demand on the system is not abnormal.

Water Undertakers report properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level).

The reference level of service is a flow of 9 litres/minute at a pressure of 10 metres head on the customer's side of the main stop tap. The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap. The reference level applies to a single property.

Allowable exclusions:
The Water Undertaker to include in the properties receiving pressure below the reference level, provided that allowable exclusions listed below do not apply.

Abnormal demand:
This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand, which are normally expected. Water Undertakers exclude from figures properties which are affected by low pressure only on those days with the highest peak demands. During the report year Water Undertakers may exclude, for each property, up to five days of low pressure caused by peak demand.

Planned maintenance:
Water Undertakers will not report low pressures caused by planned maintenance.
It is not intended that Water Undertakers identify the number of properties affected in each instance. However, Water Undertakers must maintain sufficiently accurate records to verify that low-pressure incidents that are excluded because of planned maintenance, are actually caused by maintenance.

One-off incidents:
This exclusion covers a number of causes of low pressure; mains bursts; failures of company equipment (such as pressure reducing valves or booster pumps); fire fighting and action by a third party.
However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Low pressure incidents of short duration:
Properties affected by low pressures that only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded.

It should be noted that low water pressure can occur from private water mains, private supply pipes (the pipework from the external stop cock to the property) or internal plumbing which are not the responsibility of the Water Undertaker. This report excludes low water pressure from private water mains, supply pipes and internal plumbing and the Water Undertaker makes no comment upon this matter.

Question 16 **What is the clarification of the water supply for the property?**

Answer **The water supplied to the property has an average water hardness of 27 mgl calcium carbonate which is defined as very soft by United Utilities.**

Informative

The hardness of water is due to the presence of calcium and magnesium minerals that are naturally present in the water. The usual signs of a hard water supply are scaling inside kettles, poor lathering of soaps and scum.

What is water hardness?
Hard water is formed when water passes through or over limestone or chalk areas and calcium and magnesium ions dissolve into the water. The hardness is made up of two parts: temporary (carbonate) and permanent (non-carbonate) hardness. When water is boiled, calcium carbonate scale can form, which can deposit on things like kettle elements. The scale will not stick to kettles that have a plastic polypropylene lining but will float on the surface. The permanent hardness that comprises calcium and magnesium sulphate does not go on to form scale when heated or boiled.

How is water hardness measured?
Hardness is usually expressed in terms of the equivalent quantity of calcium carbonate (CaCO3) in milligrams per litre or parts per million. You may also see hardness expressed as degrees of hardness in Clark (English) degrees, French or German degrees. Interconversion between the different measurements can be made by using the appropriate conversion factors below.
There are no standard levels as to what constitutes a hard or a soft water. Table 1 gives an indication of the equivalents of calcium and calcium carbonate and the relative degree of hardness.

Water quality standards
There are no regulatory standards for water hardness in drinking water.

Water hardness in the North West
The majority of raw water in the United Utilities region comes from upland surface water reservoirs. The water in the reservoirs has little chance of passing through rocks and to dissolve the minerals that make water hard. Therefore, the majority of water in this region is soft or very soft. We supply water from a number of boreholes in the south of the region that are reasonably hard, but these tend to be blended with softer sources to meet demand. No water supply in the North West is artificially softened.

Can hard water be softened?
Yes, water can be softened artificially by the installation of a water softener or the use of 'jug type' filters. Medical experts recommend that a non-softened supply is maintained for drinking purposes because softened water may contain high levels of sodium. Softeners should be fitted after the drinking water tap and comply with the requirements of the Water Supply (Water Fittings) Regulations 1999. They should be maintained in accordance with manufacturers' instructions.

If you're interested in finding out more about the quality of your drinking water, please visit www.unitedutilities.com/waterquality and enter your postcode..

The Drinking Water Inspectorate is responsible for ensuring the quality of public water supplies. Visit their website at: www.dwi.defra.gov.uk

Table 1 Drinking water hardness

mg Ca/l	mg $CaCO_3$/l	Clark Degrees	French Degrees	German Degrees	Hardness
<30	<75	<5.3	<7.5	<4.2	Very soft
30-50	75 – 125	5.3 – 8.8	7.5 – 12.5	4.0 – 7.0	Soft
50-100	125 – 250	8.8 – 17.5	12.5 – 25.0	7.0 – 14.0	Mod. hard
100-150	250 – 375	17.5 – 26.3	25.0 – 37.5	14.0 – 21.0	Hard
>150	>375	>26.3	>37.5	>21.0	Very hard

Question 18	**Please include details of the location of any water meter serving the property.**
Answer	**Records indicate that the property is served by a water meter, which is located externally to the building within the property boundary. We have the location as grass verge opposite 125 whalley road.**
Informative	Where the property is not served by a meter the current occupier can contact the retailer directly to advise on the current charging method, details of the retailer can also be found on the current occupiers bill.
Question 19	**Who is responsible for providing the sewerage services for the property?**
Answer	**United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP is the sewerage undertaker for the area and United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP is the water undertaker for the area.**
Informative	Not Applicable
Question 20	**Who bills the property for sewerage services?**
Answer	**Since 1st April 2017 commercial customers can choose their retailer. If you wish to know who currently bills the property for sewerage services you will need to contact the current owner of the property to find out who the current retailer is.**
Informative	Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of waste water services for the property please visit www.open-water.org.uk
Question 21	**Who bills the property for water services?**
Answer	**Since 1st April 2017 commercial customers can choose their retailer. If you wish to know who currently bills the property for water services you will need to contact the current owner of the property to find out who the current retailer is.**
Informative	Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of water services for the property please visit www.open-water.org.uk

Additional Questions

Additional Question 1

Has a customer been granted a trade effluent consent at this property?

Answer

There is no record of a Trade Effluent consent at this property. Applications for Trade Effluent consents should be submitted via your retailer for info please visit https://www.unitedutilities.com/services/wholesale-services/trade-effluent/

Informative

The owner/occupiers of Trade Premises do not have the right to discharge Trade Effluent to the public wastewater network. Any Trade Effluent Discharge Consent will be issued under Section 118 of the Water Industry Act 1991 and will be subject to conditions set by the Sewerage Undertaker.

Generally these conditions are to ensure:
a) The Health and Safety of staff working within the wastewater network and at wastewater treatment plants.

b) The apparatus of the wastewater network is not damaged.

c) The flow of the contents of the wastewater network is not restricted.

d) Equipment, plant, and processes at treatment works are not disrupted or damaged.

e) Treatment of sewage sludge is not impeded and sludges are disposed of in an environmentally friendly manner.

f) Final effluent discharge from wastewater treatment plants has no impact on the environment or prevents the receiving waters from complying with EU Directives.

g) Potential damage to the environment via storm water overflows is minimised.

Disputes between an occupier of a Trade Premise and the Sewerage Undertaker can be referred to the Director General of Water Services (OFWAT).
Protecting Public Sewers - Discharges Section 111 of the Water Industry Act 1991, places prohibition on the discharge of the following into a public sewer, drain or a sewer that communicates with a public sewer.

i) Any matter likely to injure the sewer or drain, to interfere with the free flow of its contents or to affect prejudicially the treatment or disposal of its contents.

ii) Any chemical refuse or waste steam or any liquid of temperature higher than 43.3 degrees Celsius (110 degrees Fahrenheit).

iii) Any petroleum spirit or carbide of calcium.
On summary conviction offences under this Section carry a fine not exceeding the statutory maximum or a term of imprisonment not exceeding two years, or both.
Please note any existing consent is dependant on the business being carried out at the property and will not transfer automatically upon change of ownership.

Additional Question 2

Is there an easement affecting the property?

Answer

There is no record of a formal easement agreement affecting this property.

Informative

Not Applicable.

Appendix 1 - General Interpretation

1. (1) In this Schedule-

"the 1991 Act" means the Water Industry Act 1991(a);

"the 2000 Regulations" means the Water Supply (Water Quality) Regulations 2000(b);

"the 2001 Regulations" means the Water Supply (Water Quality) Regulations 2001(c);

"adoption agreement" means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act (d);

"bond" means a surety granted by a developer who is a party to an adoption agreement;

"bond waiver" means an agreement with a developer for the provision of a form of financial security as a substitute for a bond;

"calendar year" means the twelve months ending with 31st December;

"discharge pipe" means a pipe from which discharges are made or are to be made under Section 165(1) of the 1991 Act;

"disposal main" means (subject to Section 219(2) of the 1991 Act) any outfall pipe or other pipe which-
(a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a sewerage undertaker or of any other person; and
(b) is not a public sewer;

"drain" means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or any buildings or yards appurtenant to buildings within the same curtilage;

"effluent" means any liquid, including particles of matter and other substances in suspension in the liquid;

"financial year" means the twelve months ending with 31st March;

"lateral drain" means-
(a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or
(b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act (e);

"licensed water supplier" means a company which is the holder for the time being of a water supply licence under Section 17A(1) of the 1991 Act(f);

"maintenance period" means the period so specified in an adoption agreement as a period of time-
(a) from the date of issue of a certificate by a Sewerage Undertaker to the effect that a developer has built (or substantially built) a private sewer or lateral drain to that undertaker's satisfaction; and
(b) until the date that private sewer or lateral drain is vested in the Sewerage Undertaker;

"map of waterworks" means the map made available under Section 198(3) of the 1991 Act (g) in relation to the information specified in subsection (1A);

"private sewer" means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a Sewerage Undertaker;

"public sewer" means, subject to Section 106(1A) of the 1991 Act(h), a sewer for the time being vested in a Sewerage Undertaker in its capacity as such, whether vested in that undertaker-
(a) by virtue of a scheme under Schedule 2 to the Water Act 1989(i);
(b) by virtue of a scheme under Schedule 2 to the 1991 Act (j);

(c) under Section 179 of the 1991 Act (k); or
(d) otherwise;

"public sewer map" means the map made available under Section 199(5) of the 1991 Act (l);

"resource main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of-
(a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or
(b) giving or taking a supply of water in bulk;

"sewerage services" includes the collection and disposal of foul and surface water and any other services which are required to be provided by a Sewerage Undertaker for the purpose of carrying out its functions;

"Sewerage Undertaker" means the company appointed to be the Sewerage Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated;

"surface water" includes water from roofs and other impermeable surfaces within the curtilage of the property;

"water main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the water Undertaker, which is used or to be used by a Water Undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers;

"water meter" means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises;

"Water Undertaker" means the company appointed to be the Water Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated.

(2) In this Schedule, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

(a) 1991 c. 56.
(b) S.I. 2000/3184. These Regulations apply in relation to England.
(c) S.I. 2001/3911. These Regulations apply in relation to Wales.
(d) Section 51A was inserted by Section 92(2) of the Water Act 2003 (c. 37). Section 104(1) was amended by Section 96(4) of that Act.
(e) Various amendments have been made to Sections 102 and 104 by Section 96 of the Water Act 2003.
(f) Inserted by Section 56 of and Schedule 4 to the Water Act 2003.
(g) Subsection (1A) was inserted by Section 92(5) of the Water Act 2003.
(h) Section 106(1A) was inserted by Section 99 of the Water Act 2003.
(i) 1989 c. 15.
(j) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
(k) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
(l) Section 199 was amended by Section 97(1) and (8) of the Water Act 2003.

United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

Appendix 2 - DRAINAGE AND WATER ENQUIRY (COMMERCIAL) AGREEMENT

The Customer, the Client and the Purchaser are asked to note this Agreement which govern the basis on which this drainage and water report is supplied

Definitions

Company' means United Utilities Water Limited who produce the Report; its registered office being at Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3LP, company number 2366678.

'Order' means any request completed by the Customer requesting the Report.

'Report' means the drainage and water report prepared by the Company in respect of the Property.

'Property' means the address or location supplied by the Customer in the Order.

'Customer' means the person, company, firm or other legal body placing the Order, either on their own behalf as Client, or, as an agent for a Client.

'Client' means the person, company or body who is the intended recipient of the Report with an actual or potential interest in the Property.

'Purchaser' means the actual or potential purchaser of the Property including their mortgage lender.

Agreement

1.1 The Company agrees to supply the Report to the Customer and the Client subject to this Agreement. The scope and limitations of the Report are described in clause 2 of this Agreement.
Where the Customer is acting as an agent for the Client then the Customer shall be responsible for bringing this Agreement to the attention of the Client and the Purchaser.

1.2 The Customer, the Client and the Purchaser agree that the placing of an Order for a Report and the subsequent provision of a copy of the Report to the Client and/ or the Purchaser indicates their acceptance of this Agreement.

The Report

Whilst the Company will use reasonable care and skill in producing the Report, it is provided to the Customer, the Client and the Purchaser on the basis that they acknowledge and agree to the following:

2.1 The information contained in the Report can change on a regular basis so the Company cannot be responsible to the Customer, the Client and the Purchaser for any change in the information contained in the Report after the date on which the Report was produced and sent to the Client.

2.2 The Report does not give details about the actual state or condition of the Property nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as a substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained.

2.3 The information contained in the Report is based upon the accuracy, completeness and legibility of the address and/or plans supplied by the Customer or Client or Purchaser.

2.4 The Report provides information as to the location and connection status of existing services and other information in relation to drainage and water enquiries and should not be relied on for any other purpose. The Report may contain opinions or general advice to the Customer, the Client and the Purchaser. The Company cannot ensure that any such opinion or general advice is accurate, complete or valid and therefore accepts no liability in relation thereto.

2.5 The position and depth of apparatus shown on any maps attached to the Report are approximate and are furnished as a general guide only, and no warranty as to its correctness is given or implied. The exact positions and depths should be obtained by excavation trial holes and the maps must not be relied on in the event of excavation or other works made in the vicinity of the Company's apparatus.

Liability

3.1 The Company shall not be liable to the Client or the Purchaser for any failure defect or non-performance of its obligations arising from any failure to provide or delay in providing the Report to the extent that such failure or delay is due to an event or circumstance beyond the reasonable control of the Company including but not limited to any delay, failure of or defect in any machine, processing system or transmission link or any failure or default of a supplier or sub-contractor of the Company or any provider of any third party Information except to the extent that such failure or delay is caused by the negligence of the Company.

3.2 Where a Report is requested for an address falling within a geographical area where two different companies separately provide Water and Sewerage Services, then it shall be deemed that liability for the information given by either company will remain with that company in respect of the accuracy of the information supplied.
A company supplying information which has been provided to it by another company for the purposes outlined in this agreement will therefore not be liable in any way for the accuracy of that information and will supply that information as an agent for the company from which the information was obtained.

3.2 The Report is produced for use in relation to individual commercial property transactions where the property is used solely for carrying on a trade or business, the property is intended to be developed for commercial gain or the property is not a single residential, domestic property. The Company's entire liability (except to the extent provided by clause 3.5) in respect of all causes of action arising by reason of or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) shall be limited to £2,000,000.

3.3 In any event, the Company shall not have any liability in contract, negligence or any other tort or for breach of statutory duty or otherwise in respect of any loss of profit, loss of revenue, loss of opportunity or anticipated savings, or any indirect or consequential loss or damage that may be suffered by the Customer, the Client or the Purchaser howsoever arising. The plans attached to the report are provided pursuant to the Company's statutory duty to make such plans available for inspection (notwithstanding the provisions of this clause) and attention is drawn to the notice on the plan(s) attached to the report which applies to the plan and its contents.

3.4 Where the Customer sells this Report to a Client or Purchaser under its own name or as a reseller of the Company (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) the Company shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty, restitution or otherwise at all) be liable to the Customer for any loss (whether direct, indirect or consequential loss (all three of which terms include without limitation, pure economic loss, loss of profit, loss of business, depletion of goodwill and like loss)) or damage whatsoever caused in respect of the Report or any use of the Report or reliance placed upon it and the Customer shall indemnify and keep indemnified the Company in respect of any claim by the Client or the Purchaser that the Company may incur or suffer.

3.5 Nothing in this Agreement shall exclude the Company's liability for death or personal injury arising from its negligence or for fraud.

Copyright and Confidentiality

4.1 The Customer, the Client and the Purchaser acknowledge that the Report is confidential and is intended for the personal use of the Client and the Purchaser. The copyright and any other intellectual property rights in the Report shall remain the property of the
Company. No intellectual or other property rights are transferred or licensed to the Customer, the Client or the Purchaser except to the extent expressly provided herein.

4.2 The Customer or the Client or the Purchaser is entitled to make copies of the Report but may only copy Ordnance Survey mapping or data contained in or attached to the Report if they have an appropriate licence from the originating source of that mapping or data.

4.3 The Customer, The Client and the Purchaser agree (in respect of both the original and any copies made) to respect and not to alter any part of the Report including but not limited to the trademark, copyright notice or other property marking which appears on the Report.

4.4 The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose outside the context of the Report.

4.5 The enquiries in the Report are protected by copyright by the Law Society of 113 Chancery Lane, London WC2A 1PL and must not be used for any purpose outside the context of the Report.

4.6 The Customer, the Client and the Purchaser agree to indemnify the Company against any losses, costs, claims and damage suffered by the Company as a result of any breach by either of them of the provisions of clauses 4.1 to 4.4 inclusive.

Payment

5.1 Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay the price of the Report specified by the Company, without any set off, deduction or counterclaim.

5.2 Payment must be received in advance unless an account has been set up with the Company. In these cases, payment terms will be as agreed with the Company, but in any event any invoice must be paid within 30 days.

5.3 The Company reserves the right to increase fees on reasonable prior written notice at any time.

Appendix 2 continued - DRAINAGE AND WATER ENQUIRY (COMMERCIAL) AGREEMENT

Data Protection

6.1 We will process any personal data you provide to us in accordance with the Data Protection Act 1998. Any personal information you provide to us may be used for the purposes for which the information is provided and to assist with our debt recovery processes. We may also disclose it to other companies in the United Utilities group (being United Utilities Group PLC and its subsidiary companies) and their sub-contractors in connection with those purposes, but it will not be processed for other purposes or disclosed to other third parties without your express permission. We may also utilise any information we collect so that we are able to correctly administer, develop and improve the business and services we provide to our customers.

General

7.1 If any provision of this Agreement is or becomes invalid or unenforceable, it will be taken to be removed from the rest of this Agreement to the extent that it is invalid or unenforceable. No other provision of this Agreement shall be affected.

7.2 This Agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.

7.3 Nothing in this Agreement and conditions shall in any way restrict the Customer's the Client's or the Purchaser's statutory or any other rights of access to the information contained in the Report.

7.4 This Agreement and conditions may be enforced by the Customer, the Client and the Purchaser.

7.5 Before you agree to this Agreement, please note it is your responsibility to ensure your client/customer is aware of them and that any objections are raised accordingly.

Luke McCabe

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 29 November 2017 15:37
To: Luke McCabe
Cc: Wastewater Developer Services
Subject: Pre Development Enquiry for Victoria Mill Sabden - Our ref 4200018997
Attachments: PDE 4200018997: 17140 - Victoria Mill, Sabden - Pre-development enquiry - due 30.11.17

Importance: High

Dear Sir

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

Foul

Foul will be allowed to drain to the public combined/ foul sewer network. It seems that the site will be split into two by the culverted watercourse and it is highly unlikely that you will be able to drain to a single point of discharge. You may connect all or part of the site into either point of discharge offered. This should give you sufficient flexibility when designing the drainage scheme.

Our preferred points of discharge would be to either the 300mm combined sewer on Whalley Rd at an unrestricted rate OR to the 300mm combined sewer running down Pendle Street West and through the field behind the site at an unrestricted rate.

Surface Water

Surface water from this site should drain to either soak away or directly to the watercourse crossing the site. Discharge rates and consents must be discussed and agreed with all interested parties.

Connection Application

Although we may discuss and agree discharge points & rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below

http://www.unitedutilities.com/connecting-public-sewer.aspx

Sewer Adoption Agreement

You may wish to offer the proposed new sewers for adoption. United Utilities assess adoption application based on Sewers adoption 6th Edition and for any pumping stations our company addenda document. Please refer to link below to obtain further guidance and application pack:

http://www.unitedutilities.com/sewer-adoption.aspx

Please be aware that on site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

Please note, if you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements of Sewers for adoption and United Utilities Asset Standards. The proposed design should give consideration to long term operability and give United Utilities a cost effective proposal for the life of the assets. Therefore, further to this enquiry should you wish to progress a Section 104 agreement, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 agreement, has been assessed and accepted in writing by United Utilities. Any works carried out prior to the technical assessment being approved is done entirely at the developers own risk and could be subject to change.

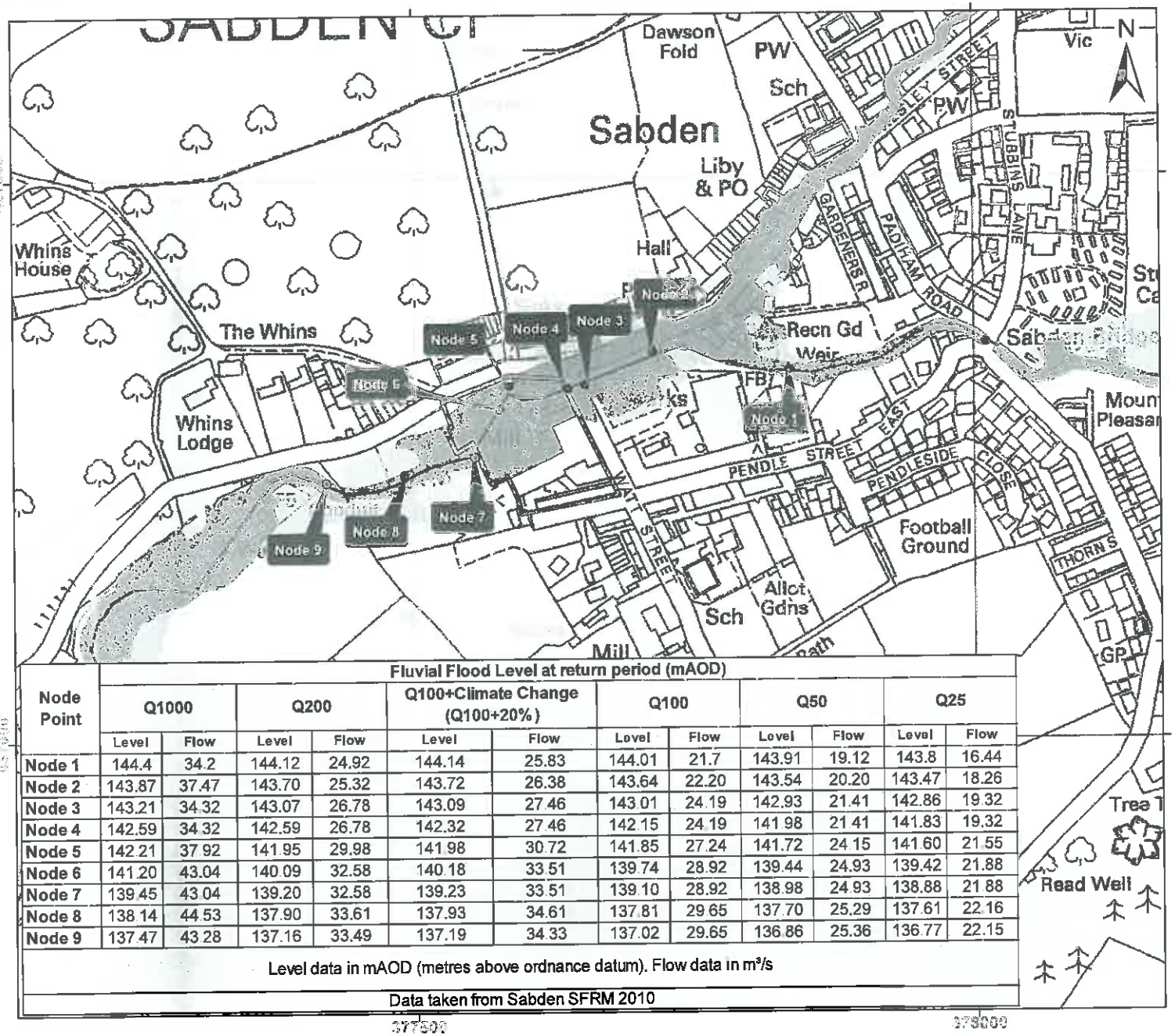
Regards

Graham Perry

Development Engineer
Developer Services and Planning
Business Operations
United Utilities

T: 01925 679405 (internal 79405)
E: graham.perry@uuplc.co.uk
unitedutilities.com

Appendix D
Environment Agency Data and Email Responses



Node Point	Fluvial Flood Level at return period (mAOD)											
	Q1000		Q200		Q100+Climate Change (Q100+20%)		Q100		Q50		Q25	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
Node 1	144.4	34.2	144.12	24.92	144.14	25.83	144.01	21.7	143.91	19.12	143.8	16.44
Node 2	143.87	37.47	143.70	25.32	143.72	26.38	143.64	22.20	143.54	20.20	143.47	18.26
Node 3	143.21	34.32	143.07	26.78	143.09	27.46	143.01	24.19	142.93	21.41	142.86	19.32
Node 4	142.59	34.32	142.59	26.78	142.32	27.46	142.15	24.19	141.98	21.41	141.83	19.32
Node 5	142.21	37.92	141.95	29.98	141.98	30.72	141.85	27.24	141.72	24.15	141.60	21.55
Node 6	141.20	43.04	140.09	32.58	140.18	33.51	139.74	28.92	139.44	24.93	139.42	21.88
Node 7	139.45	43.04	139.20	32.58	139.23	33.51	139.10	28.92	138.98	24.93	138.88	21.88
Node 8	138.14	44.53	137.90	33.61	137.93	34.61	137.81	29.65	137.70	25.29	137.61	22.16
Node 9	137.47	43.28	137.16	33.49	137.19	34.33	137.02	29.65	136.86	25.36	136.77	22.15

Level data in mAOD (metres above ordnance datum). Flow data in m³/s

Data taken from Sabden SFRM 2010

377500 378000

Environment Agency

Fluvial Flood Levels Map: Victoria Mill, Watt Street, Sabden, Clitheroe BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

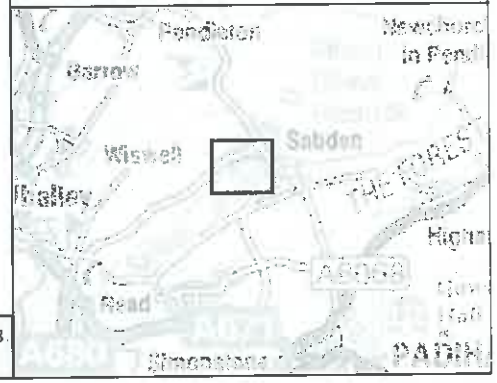
Key

- Main River
- Areas Benefitting from Defences
- Historic Flooding
- Flood Zone 3
- Flood Zone 2

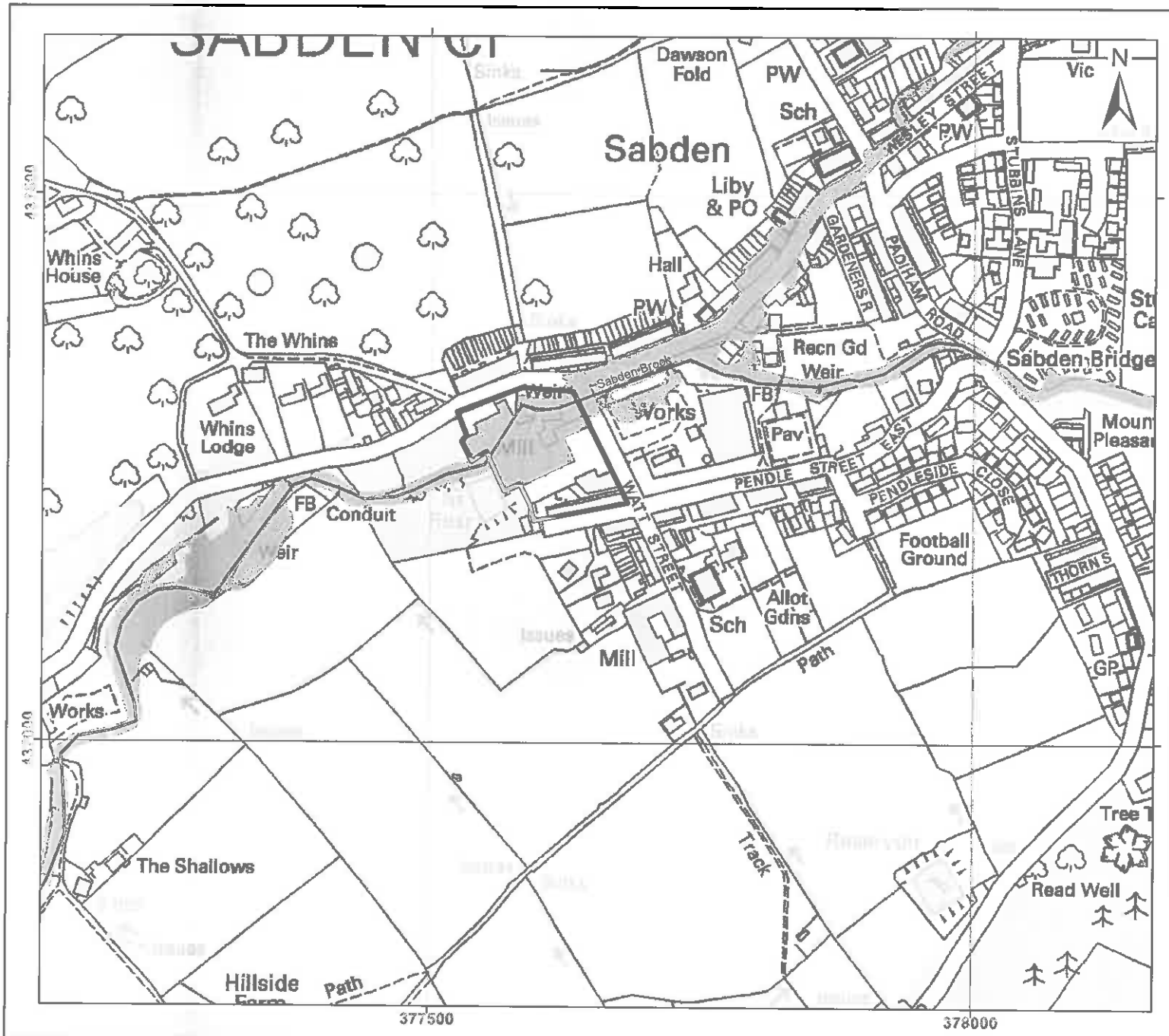
Flood Zone 3 shows the area that could be affected by flooding
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event.



Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk



Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

Modelled Flood Outlines: Victoria Mill, Watt Street, Sabden, Clitheroe, BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

Key

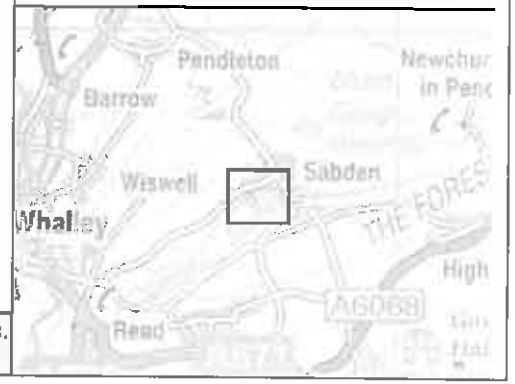
Main River

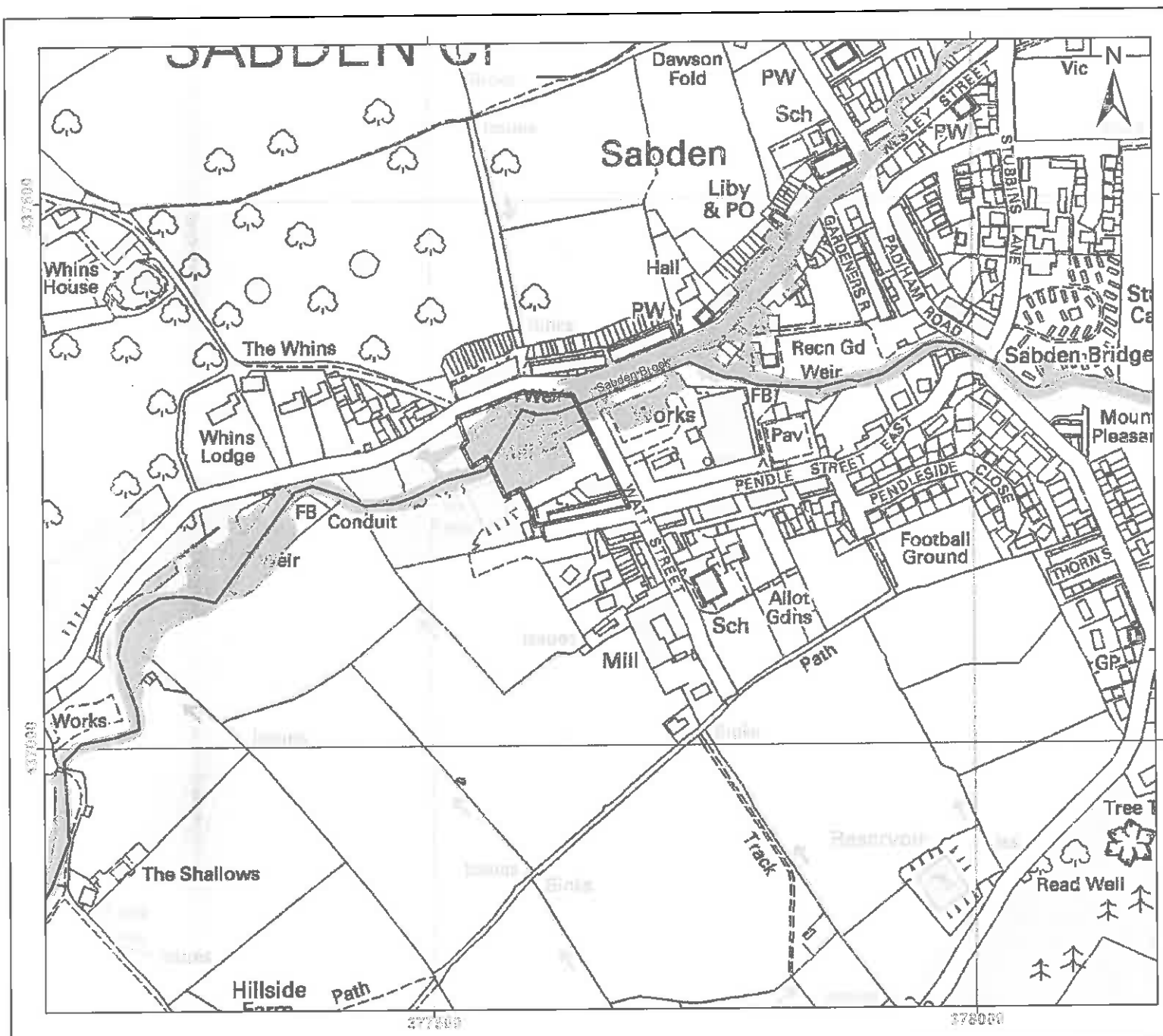
1 in 25 Year Modelled Flood Outline

Flood Zone 3 shows the area that could be affected by flooding
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event.





Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

Modelled Flood Outlines: Victoria Mill, Watt Street, Sabden, Clitheroe, BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

Key

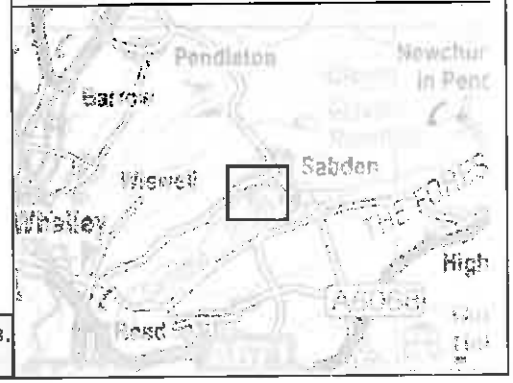
Main River

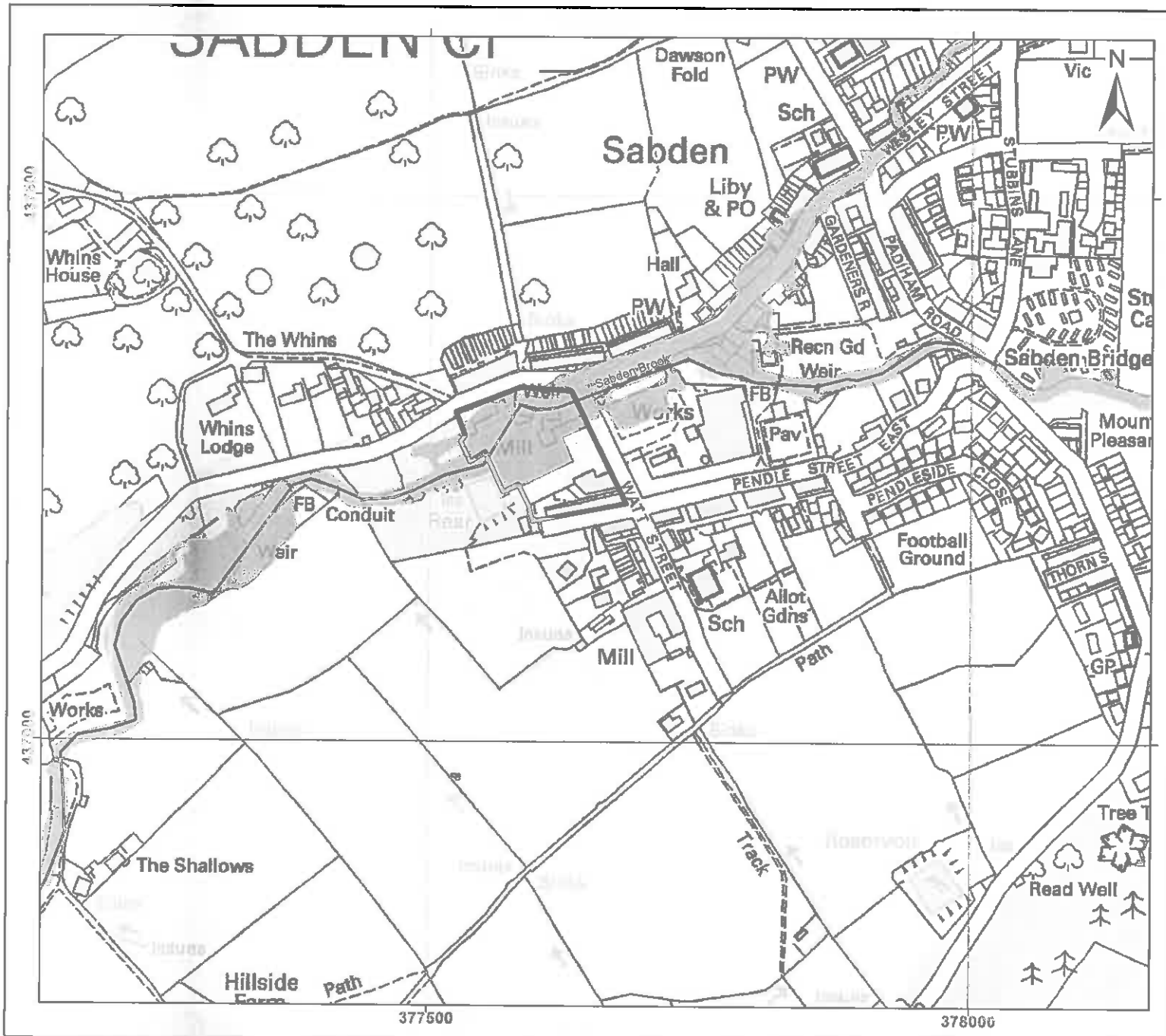
1 in 50 Year Modelled Flood Outline

Flood Zone 3 shows the area that could be affected by flooding
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event





Environment Agency

Modelled Flood Outlines: Victoria Mill, Watt Street, Sabden, Clitheroe, BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

Key

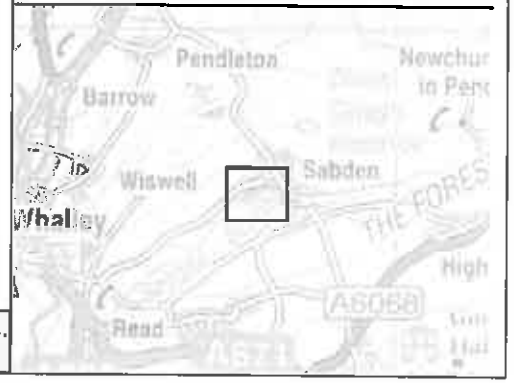
Main River

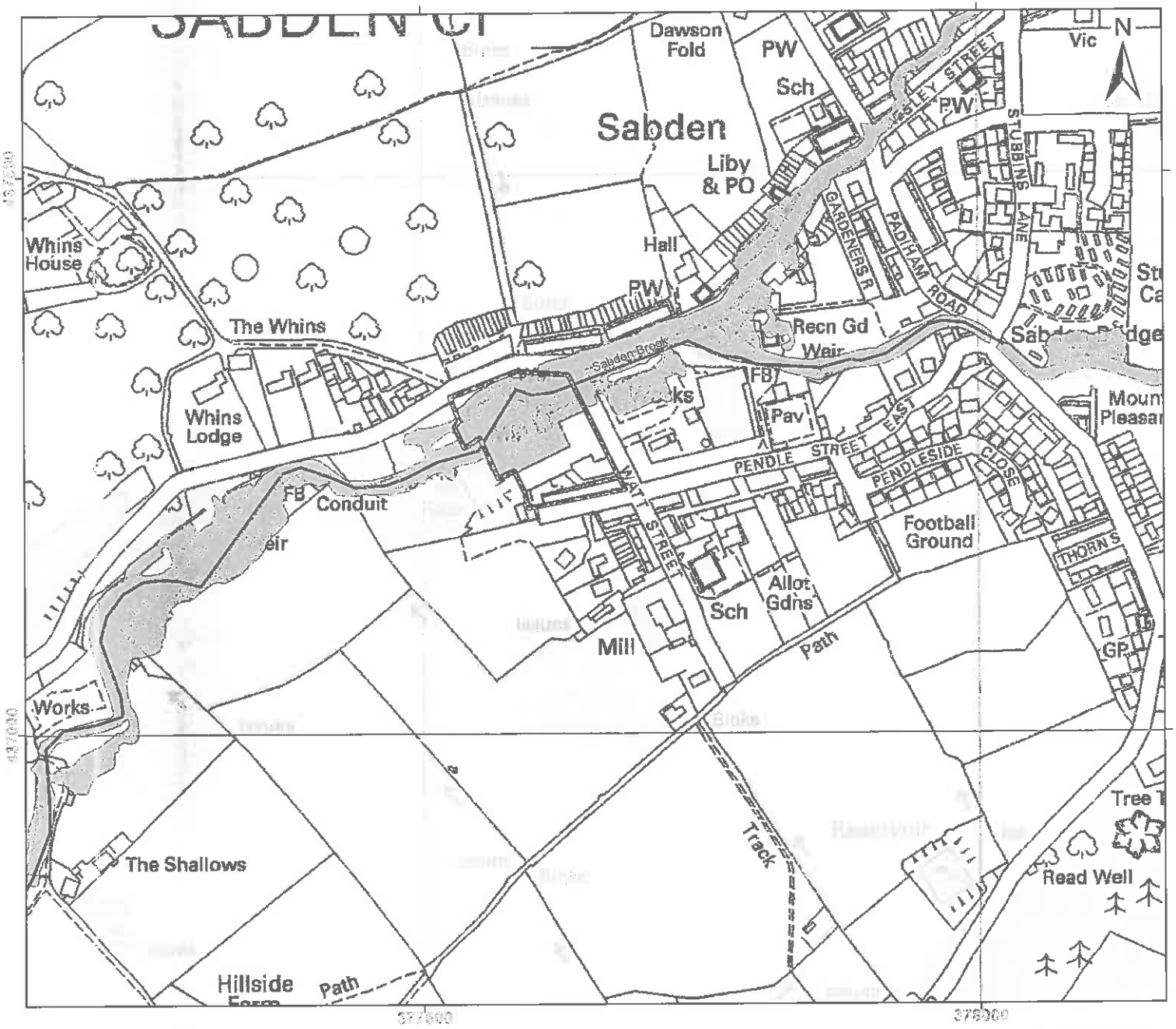
1 in 100 Year Modelled Flood Outline

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event.





Environment Agency

Modelled Flood Outlines: Victoria Mill, Watt Street, Sabden, Clitheroe, BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

Key

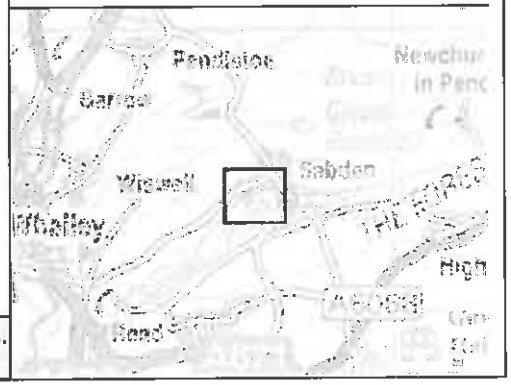
Main River

1 in 200 Year Modelled Flood Outline

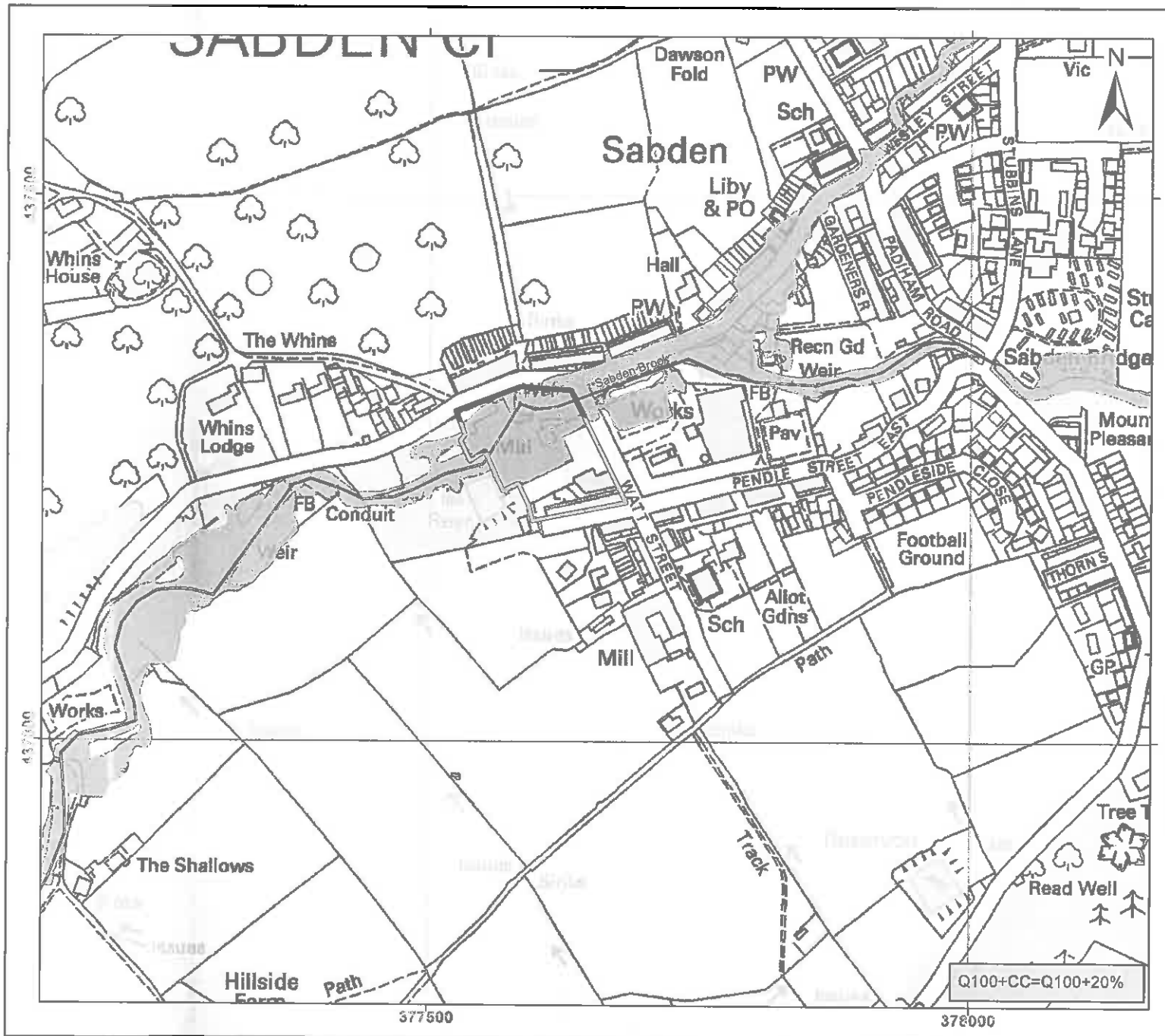
Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event.



Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk



Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency

Modelled Flood Outlines: Victoria Mill, Watt Street, Sabden, Clitheroe, BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

Key

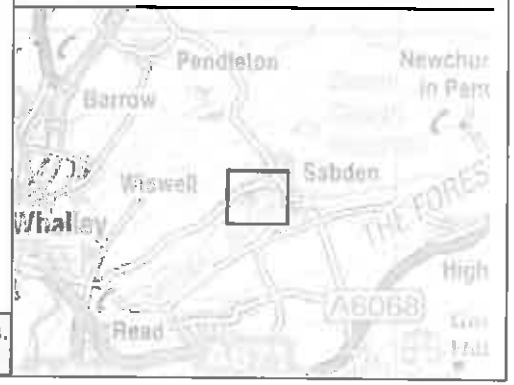
Main River

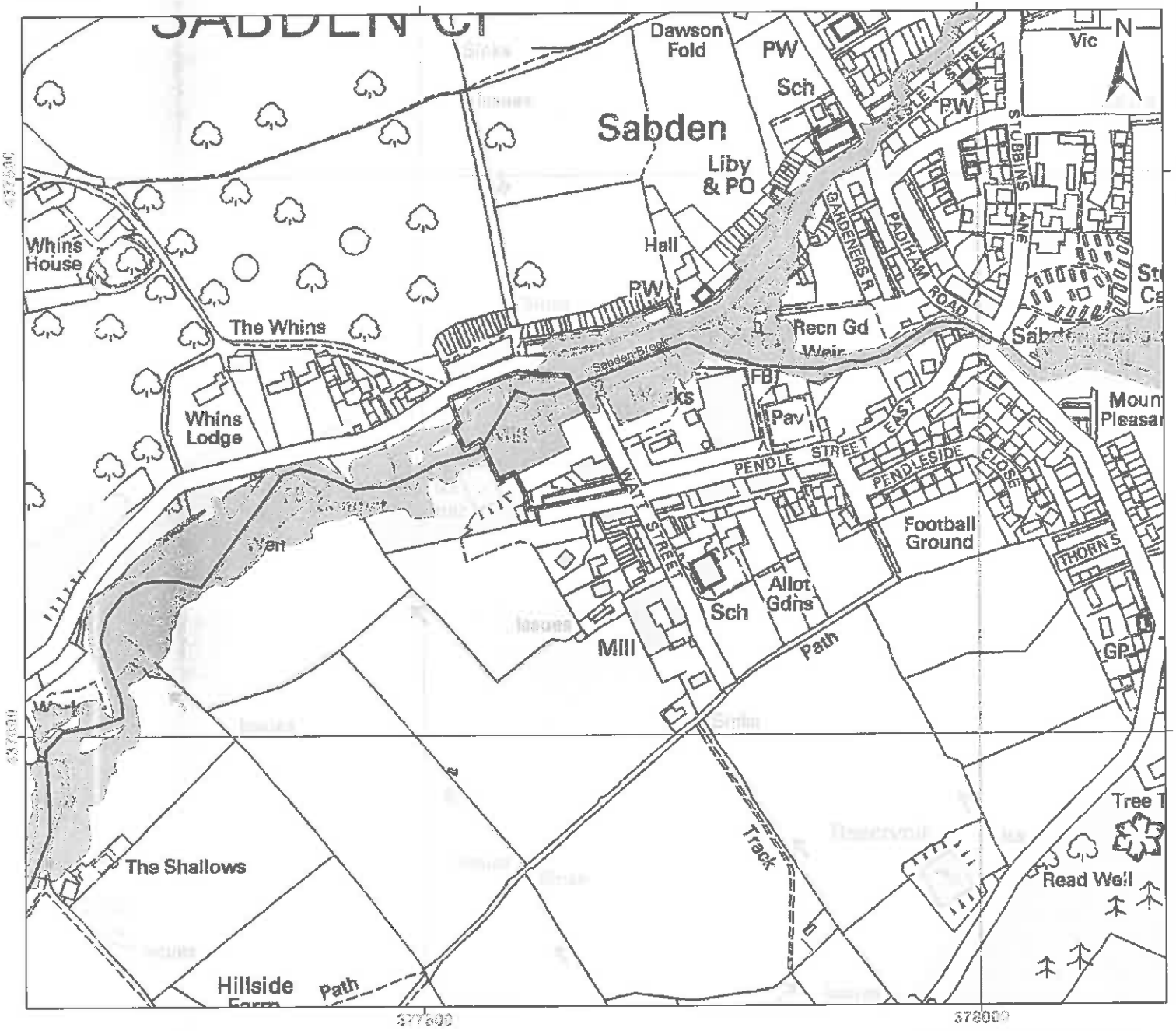
1 in 100 Year+Climate Change Modelled Flood Outline

Flood Zone 3 shows the area that could be affected by flooding
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event.





Modelled Flood Outlines: Victoria Mill, Watt Street, Sabden, Clitheroe, BB7 9EG

Produced: 5th September 2017
Our Ref: CL57155
NGR: SD 77581 37271

Key

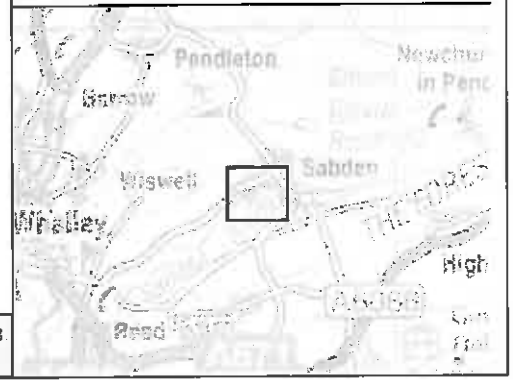
Main River

1 in 1000 Year Modelled Flood Outline

Flood Zone 3 shows the area that could be affected by flooding
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

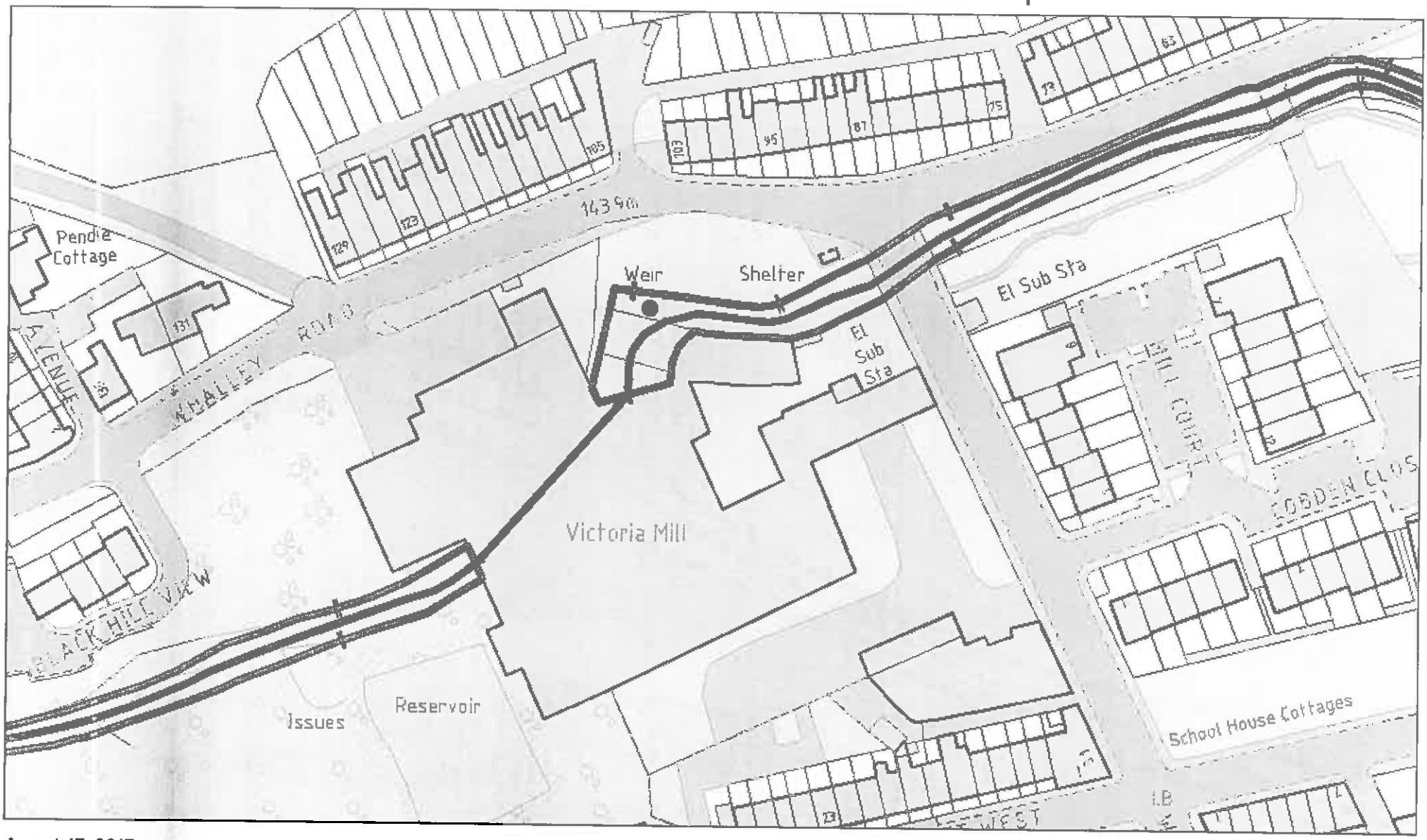
Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 1 in 200 tidal, or 1 in 100 fluvial flood event.



Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

CL57155 Victoria Mill, Sabden - Overview Map



August 17, 2017

Structures — CARTO_TEXT

Channels

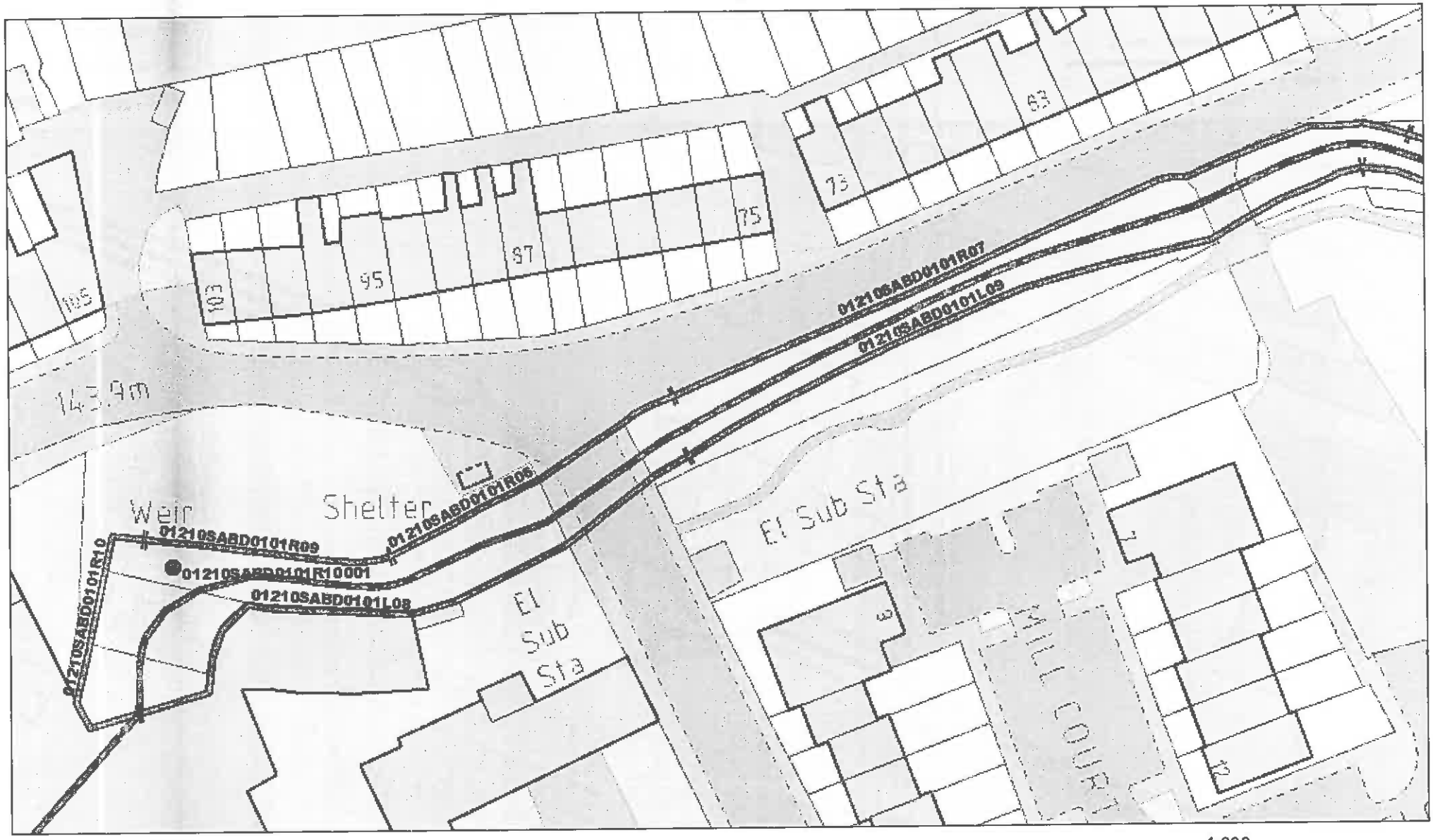
Defences

1:1,025

0 0.0075 0.015 0.03 mi

0 0.0125 0.025 0.05 km

CL57155 Victoria Mill, Sabden - Map 1



August 17, 2017

Structures — CARTO_TEXT

Channels

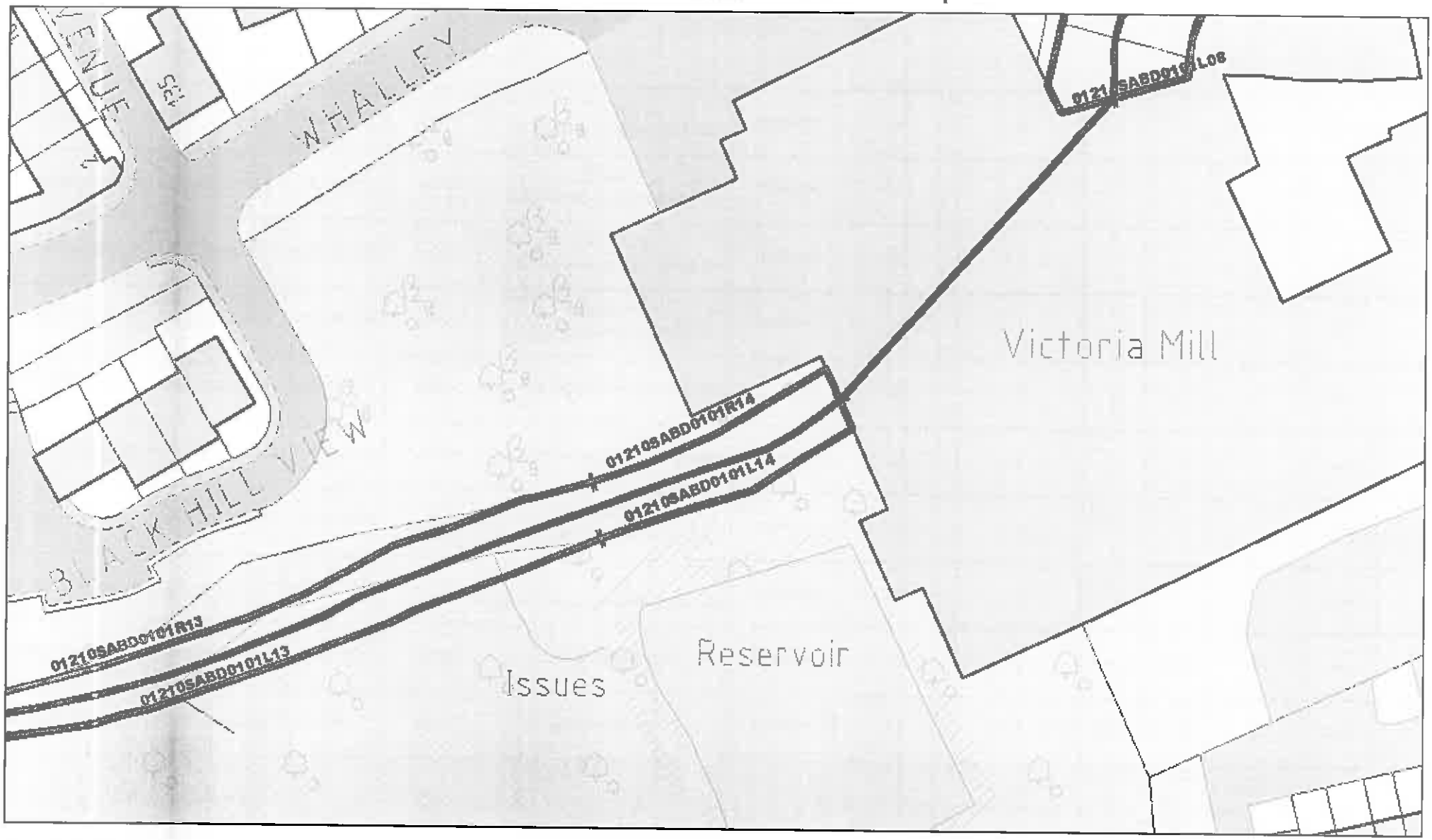
Defences

1:609

0 0.005 0.01 0.02 mi

0 0.0075 0.015 0.03 km

CL57155 Victoria Mill, Sabden - Map 2



August 17, 2017

Structures — CARTO_TEXT

Channels

Defences

1:577

0 0.00475 0.0095 0.019 mi

0 0.0075 0.015 0.03 km

Site Location	Victoria Mill, Sabden	CL57155

Fluvial Defences

Asset Ref.	National Grid Reference	Asset Type	Protection Type	Location	Maintained By	Design Standard (Return Period)	Overall Condition Grade (Excellent 1- 5 Very Poor)	Effective Crest Level (m)		E.C.L Data Quality (Reliable 1-4 Unreliable)	Length (m)	Height (m)
								UCL (mAOD)	DCL (mAOD)			
01210SABD0101R07	SD 77738 37359	Wall	Fluvial	Trib to Watt Street	Unknown	10	3	144.22	142.13	2	94.6	-
01210SABD0101L09	SD 77732 37355	Wall	Fluvial	Trib to Watt Street	Unknown	5	2	144.04	142.89	2	88	-
01210SABD0101R06	SD 77650 37329	High Ground	Fluvial	Watt Street to Downstream of Watt Street	Unknown	10	3	-	-	-	38.8	-
01210SABD0101L08	SD 77651 37322	High Ground	Fluvial	Watt Street to Culvert Inlet at Victoria Mill	Unknown	5	3	-	-	-	78.6	-
01210SABD0101R09	SD 77616 37310	High Ground	Fluvial	Downstream of Watt Street to Weir	Unknown	5	3	-	-	-	29.6	-
01210SABD0101R10	SD 77587 37313	High Ground	Fluvial	Weir to Culvert Inlet at Victoria Mill	Unknown	10	3	-	-	-	33.7	-
01210SABD0101R14	SD 77554 37261	High Ground	Fluvial	Culvert Outlet at Victoria Mill to Start of Wall	Unknown	5	3	-	-	-	33.2	-
01210SABD0101L14	SD 77557 37255	High Ground	Fluvial	Culvert Outlet at Victoria Mill to Start of Wall	Unknown	25	3	-	-	-	34.5	-
01210SABD0101R13	SD 77527 37249	High Ground	Fluvial	Start of Wall to End of Allotment Gardens	Unknown	5	3	-	-	-	119.7	-
01210SABD0101L13	SD 77528 37242	High Ground	Fluvial	Start of Wall to End of Allotment Gardens	Unknown	5	3	-	-	-	121.1	-

Consent is REQUIRED for any works undertaken within 8 metres of these defences

Site Location	Victoria Mill, Sabden	CL57155

Fluvial Structures

Asset Ref.	National Grid Reference	Asset Type	Protection Type	Location	Maintained By	Design Standard (Return Period)	Overall Condition Grade (Excellent 1- 5 Very Poor)	Length (m)	Height (m)
01210SABD0101R10001	SD 77590 37309	Weir	Fluvial	Victoria Mill	Unknown	-	3	-	-

Appendix E
Drainage Drawings and Calculations

NOTES:

1. COPYRIGHT IN THIS DOCUMENT BELONGS TO PAUL WAITE ASSOCIATES LIMITED & ALL RIGHTS IN IT ARE RESERVED BY THE OWNER.
2. NO PART OF THIS DRAWING MAY BE COPIED, TRANSFERRED, OR MADE AVAILABLE TO USERS OTHER THAN THE ORIGINAL RECIPIENT, INCLUDING ELECTRONICALLY, WITHOUT PRIOR PERMISSION FROM PAUL WAITE ASSOCIATES LIMITED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & SPECIFICATIONS.
4. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES.
5. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING.
6. ONLY PDF/HARD COPIES OF DRAWINGS SHOULD BE REFERRED TO FOR CONSTRUCTION USE. THE USE OF AUTOCAD DRAWINGS/DWG'S IS UNDERTAKEN ENTIRELY AT THE DEVELOPERS RISK AND ALL DIMENSIONS AND SETTING OUT MUST BE CHECKED IN CONJUNCTION WITH THE ARCHITECT AND ENGINEERS CONSTRUCTION DRAWINGS. ALL DRAWINGS SHOULD BE CONFIRMED AS LATEST ISSUE ON THE DOCUMENT ISSUE SHEET PRIOR TO COMMENCEMENT OF WORKS AND SHOULD BE USED ONLY FOR THEIR DEFINED DRAWING STATUS. ANY DISCREPANCIES BETWEEN THE ARCHITECT AND ENGINEERS DRAWINGS ARE TO BE IMMEDIATELY NOTIFIED TO ALL PARTIES.

EXISTING IMPERMEABLE AREA

EXISTING IMPERMEABLE AREA DRAINING TO SABDEN BROOK = 5,210m² (0.520ha)

STATION COORDINATE SCHEDULE

STN	EASTING	NORTHING	LEVEL	DESCRIPTION
101	377396.392	437321.531	142.536	HILTI NAIL IN PEG
102	377532.272	437322.008	142.997	HILTI NAIL IN TARMAC
103	377444.063	437302.843	142.419	HILTI NAIL IN TARMAC
104	377633.387	437346.876	142.446	PK NAIL IN TARMAC
105	377619.967	437234.731	142.633	PK NAIL IN TARMAC
106	377360.864	437327.731	144.002	PK NAIL IN TARMAC
107	377384.367	437299.478	142.875	PK NAIL IN TARMAC
108	377257.819	437294.886	141.633	HILTI NAIL IN CONCRETE
109	377570.082	438814.971	141.942	HILTI NAIL IN CONCRETE
110	377583.789	437299.492	141.830	MAG NAIL IN SETTS
111	377611.814	437899.889	141.802	MAG NAIL IN CONCRETE
112	377618.418	437895.849	142.882	HILTI NAIL IN PEG
113	377370.822	437829.787	140.219	PIPE NAIL IN CONCRETE
114	377544.209	437239.034	140.798	HILTI NAIL IN PEG
115	377532.790	437251.880	139.749	HILTI NAIL IN PEG
116	377516.905	437201.305	141.083	HILTI NAIL IN PEG
117	377688.073	437892.878	142.790	HILTI NAIL IN TARMAC
118	377673.759	437251.292	142.590	HILTI NAIL IN TARMAC
119	377636.193	437254.138	142.580	HILTI NAIL IN PEG
120	377658.184	437894.729	143.117	HILTI NAIL IN PEG
121	377605.378	437234.341	142.974	TEMPORARY STATION

Rev	Remarks	Date	By	Check
A	UPDATED TO REFLECT LATEST TOPOGRAPHICAL SURVEY BY STERLING SURVEYS.	01/03/18	LMc	LMc

Paul Waite Associates
Consulting Civil, Structural & Geo-Environmental Engineers

Client: SKIPTON PROPERTIES

Job: PROPOSED RESIDENTIAL DEVELOPMENT
FORMER VICTORIA MILL
SABDEN

Drawing: EXISTING IMPERMEABLE AREA PLAN

Date	Drawn	Checked	Drawing No.	Rev
13/10/17	IC	LMc	17140-C-SK.01	A
PRELIMINARY	1:250	A1		

Paul Waite Associates		Page 1
Summit House Riparian Way Keighley BD20 7BW	17140 Former Victoria Mill, Sabden Ex. Runoff Rate Calculations	
Date 13/10/2017 File 17140 - Ex Brownfield M...	Designed by IC Checked by LMc	
Infrasoft	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.600	Add Flow / Climate Change (%)	0
Ratio R	0.250	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

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	5.000	0.033	151.5	0.820	4.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	5.000	0.033	151.5	0.000	0.00	0.0	0.600	o	375	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	4.06	8.500	0.820	0.0	0.0	0.0	1.47	162.3	111.0
1.001	50.00	4.11	8.467	0.820	0.0	0.0	0.0	1.47	162.3	111.0

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 100.0 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, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	15 Winter	1	+0%	30/15 Summer				8.796	-0.079	0.000
1.001	2	15 Winter	1	+0%	30/15 Summer				8.763	-0.079	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.97		95.7	OK	
1.001	2	0.96		94.5	OK	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 100.0 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, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	15 Winter	30	+0%	30/15 Summer				9.435	0.560	0.000
1.001	2	15 Winter	30	+0%	30/15 Summer				9.109	0.267	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	2.20		217.8	SURCHARGED	
1.001	2	2.21		218.8	SURCHARGED	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.600 Cv (Summer) 0.750
Region England and Wales Ratio R 0.250 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 100.0 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, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	15 Winter	100	+0%	30/15 Summer				9.795	0.920	0.000
1.001	2	15 Winter	100	+0%	30/15 Summer				9.286	0.444	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	2.77		274.2	SURCHARGED	
1.001	2	2.78		274.5	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.600	Add Flow / Climate Change (%)	0
Ratio R	0.250	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

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	5.000	0.033	151.5	0.820	4.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	5.000	0.033	151.5	0.000	0.00	0.0	0.600	o	375	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	4.06	8.500	0.820	0.0	0.0	0.0	1.47	162.3	111.0
1.001	50.00	4.11	8.467	0.820	0.0	0.0	0.0	1.47	162.3	111.0

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.600
Region	England and Wales	Ratio R	0.250
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 100.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	360
Return Period(s) (years)	100
Climate Change (%)	0

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Discharge Vol (m³)
1.000	1	360 minute 100 year Winter I+0%	10.000	8.703	-0.172	0.000	0.57		485.788
1.001	2	360 minute 100 year Winter I+0%	10.000	8.670	-0.172	0.000	0.57		485.975

PN	US/MH Name	Pipe Flow (l/s)	Status
1.000	1	56.6	OK
1.001	2	56.6	OK

NOTES:

1. COPYRIGHT IN THIS DOCUMENT BELONGS TO PAUL WAITE ASSOCIATES LIMITED & ALL RIGHTS IN IT ARE RETAINED BY THE OWNER.
2. NO PART OF THIS DRAWING MAY BE COPIED, TRANSFERRED, OR MADE AVAILABLE TO USERS OTHER THAN THE ORIGINAL RECIPIENT, INCLUDING ELECTRONICALLY, WITHOUT PRIOR PERMISSION FROM PAUL WAITE ASSOCIATES LIMITED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & SPECIFICATIONS.
4. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES.
5. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING.
6. ONLY PDF/RAMP COPIES OF DRAWINGS SHOULD BE REFERRED TO FOR CONSTRUCTION USE. THE USE OF AUTOCAD DRAWINGS/DWG'S IS UNDERTAKEN ENTIRELY AT THE DEVELOPERS RISK AND ALL DIMENSIONS AND SETTING OUT MUST BE CHECKED IN CONJUNCTION WITH THE ARCHITECT AND ENGINEERS CONSTRUCTION DRAWINGS. ALL DRAWINGS SHOULD BE CONFIRMED AS LATEST ISSUE OR THE DOCUMENT ISSUE SHEET PRIOR TO COMMENCEMENT OF WORKS AND SHOULD BE USED ONLY FOR THEIR DEFINED DRAWING STATUS. ANY DISCREPANCIES BETWEEN THE ARCHITECT AND ENGINEERS DRAWINGS ARE TO BE IMMEDIATELY NOTIFIED TO ALL PARTIES.

KEY:

- AREA OF FLOOD ZONE 1 FFL'S TO BE A MINIMUM OF 300mm ABOVE EXISTING GROUND LEVELS
- AREA OF FLOOD ZONE 2 (NODE'S 4 & 5) FFL'S TO BE A MINIMUM OF 143.345m AOD
- AREA OF FLOOD ZONE 3 (NODE 6) FFL'S TO BE A MINIMUM OF (THE HIGHER OF) 141.38m AOD OR 300mm ABOVE EXISTING GROUND LEVELS
- EXCEEDANCE ROUTES - MUST BE IMPLEMENTED AS SHOWN TO AVOID FLOOD RISK UPSTREAM AND DOWNSTREAM
- FFL 0.00 MINIMUM FINISH FLOOR LEVEL
- PROPOSED PLOTS WITHIN FLOOD ZONE 1 BUT MAY SET A MINIMUM OF 300mm ABOVE EXISTING GROUND LEVELS AS THE LEVELS PROPOSED ARE STILL HIGHER THAN THE 141.38AOD MINIMUM LEVEL REQUIRED FOR THE ADJACENT AREA OF FLOOD ZONE 3 (NODE 6)

Rev	Description	Date	By	Check
B	FFL STRATEGY FOR PLOTS 1 TO 5 & 8 AMENDED AND KEY UPDATED TO SUIT.	12/04/18	LMc	LMc
A	UPDATED TO SUIT REVISED SITE LAYOUT.	01/03/18	LMc	LMc

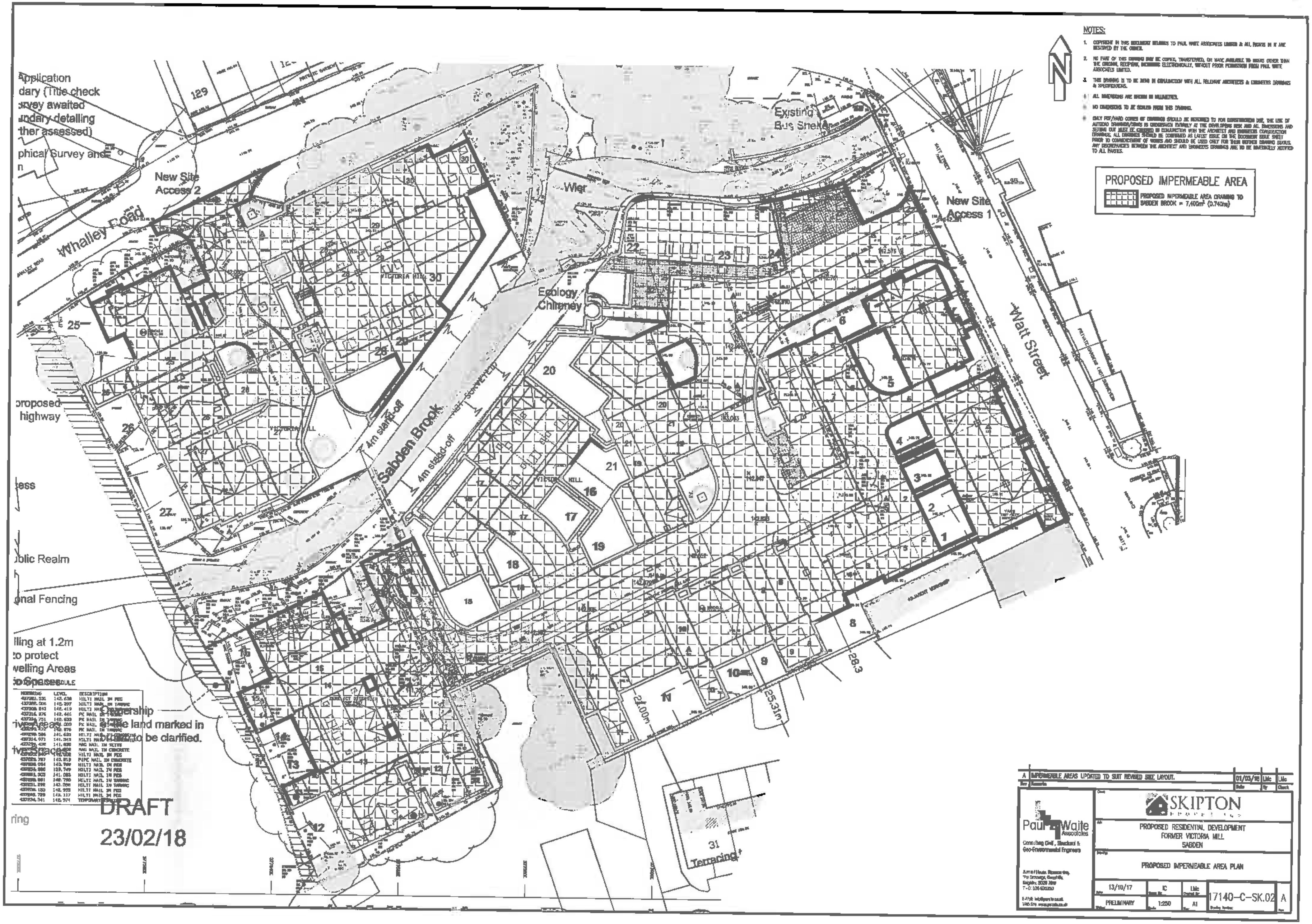
Paul Waite Associates
Consulting Civil, Structural & Geo-Environmental Engineers

SKIPTON PROPERTIES

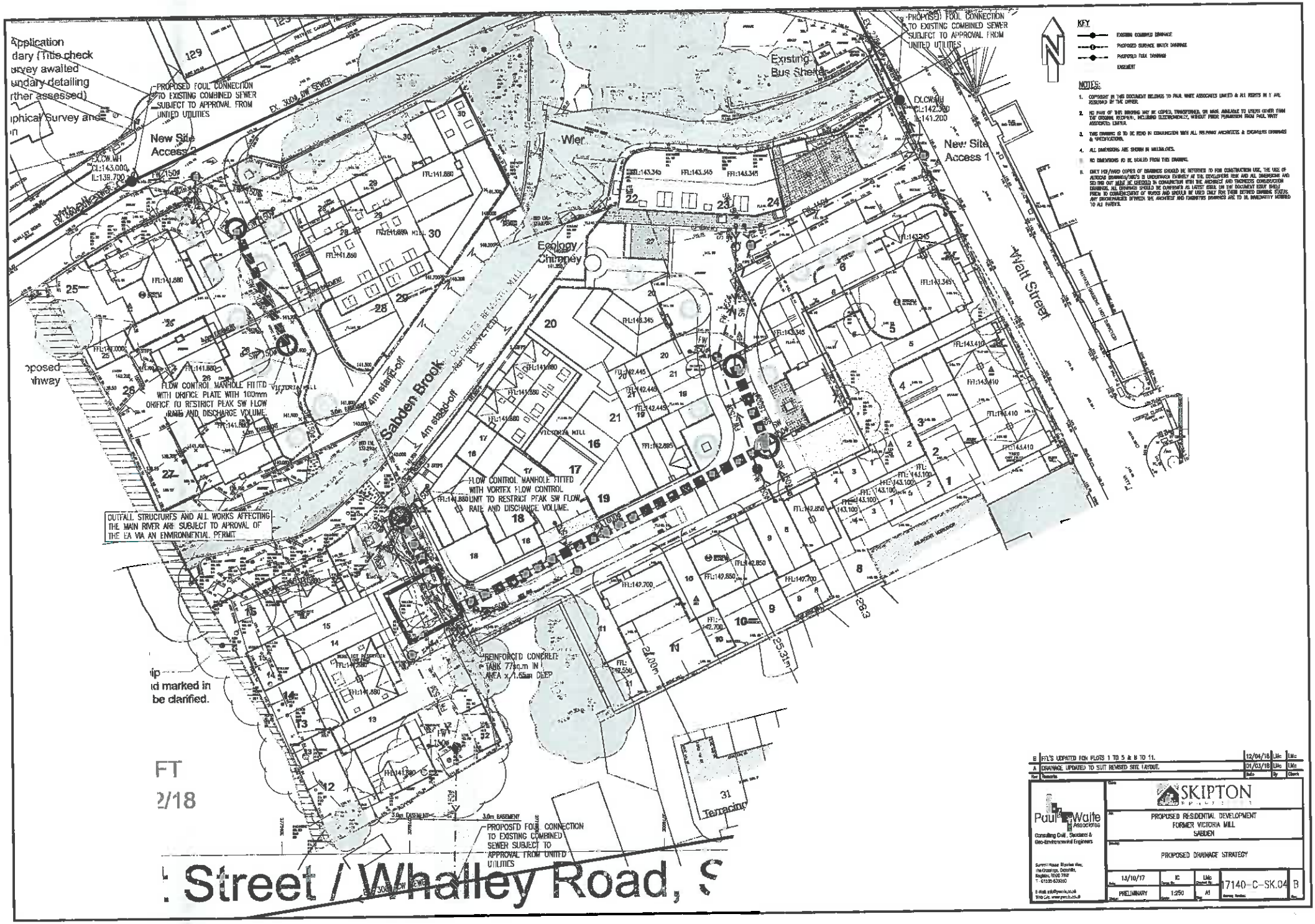
PROPOSED RESIDENTIAL DEVELOPMENT
FORMER VICTORIA MILL
SABDEN

PROPOSED FINISH FLOOR LEVEL STRATEGY PLAN

Date	Drawn By	Checked By	Job No. / Drawing Number	Rev.
13/10/17	IC	LMc	17140-C-SK.03	B
Status: PRELIMINARY	Scale: 1:250	Size: A1		



NOTES:
PROPOSED IMPERMEABLE AREA
PROPOSED IMPERMEABLE AREA DRAINING TO SABDEN BROOK = 7,400m² (0.740ha)
Watt Street
New Site Access 1
New Site Access 2
Whalley Road
Existing Bus Shelter
Wier
Ecology Chimney
Sabden Brook
4m stand-off
4m stand-off
Terracing
28.3
25.31m
21.00m
DRAFT
23/02/18
A IMPERMEABLE AREAS UPDATED TO SUIT REVISED SITE LAYOUT. 01/03/18
Paul Waite Associates
Consulting Civil, Structural & Geo-Environmental Engineers
SKIPTON
PROPOSED RESIDENTIAL DEVELOPMENT
FORMER VICTORIA MILL
SABDEN
PROPOSED IMPERMEABLE AREA PLAN
13/10/17
PRELIMINARY
1:250
A1
17140-C-SK.02
A


Application
dary (Title check
urvey awaited
undary detailing
rther assessed)
iphical Survey and
n
PROPOSED FOUL CONNECTION TO EXISTING COMBINED SEWER SUBJECT TO APPROVAL FROM UNITED UTILITIES
EX. 300d DW SEWER
New Site Access 2
EX.CW MH CL:143.600 IL:139.700
EX.150d SW SEWER
FFL:141.880
FLOW CONTROL MANHOLE FITTED WITH ORIFICE PLATE WITH 100mm ORIFICE TO RESTRICT PEAK SW FLOW RATE AND DISCHARGE VOLUME.
Sabden Brook
4m stand-off
Victoria Mill
Ecology Chimney
Wier
Existing Bus Shelter
PROPOSED FOUL CONNECTION TO EXISTING COMBINED SEWER SUBJECT TO APPROVAL FROM UNITED UTILITIES
EX.CW MH CL:142.300 IL:141.200
New Site Access 1
Wyatt Street
FFL:143.345
FFL:142.445
FFL:142.895
FFL:143.100
FFL:143.410
FFL:142.850
FFL:147.700
FLOW CONTROL MANHOLE FITTED WITH VORTEX FLOW CONTROL UNIT TO RESTRICT PEAK SW FLOW RATE AND DISCHARGE VOLUME.
OUTFALL STRUCTURES AND ALL WORKS AFFECTING THE MAIN RIVER ARE SUBJECT TO APROVAL OF THE EA VIA AN ENVIRONMENTAL PERMIT
REINFORCED CONCRETE TANK 77sq.m IN AREA x 1.65m DEEP
24.00m
25.31m
26.3
3.0m EASEMENT
PROPOSED FOUL CONNECTION TO EXISTING COMBINED SEWER SUBJECT TO APPROVAL FROM UNITED UTILITIES
Terracing
Street / Whalley Road, S
KEY
EXISTING COMBINED DRAINAGE
PROPOSED SURFACE WATER DRAINAGE
PROPOSED FOUL DRAINAGE
EASEMENT
NOTES:
1. COPYRIGHT IN THIS DOCUMENT BELONGS TO PAUL WAITE ASSOCIATES LIMITED & ALL RIGHTS IN IT ARE RESERVED BY THE OWNER.
2. NO PART OF THIS DRAWING MAY BE COPIED, TRANSFERRED, OR MADE AVAILABLE TO USERS OTHER THAN THE ORIGINAL RECIPIENT, INCLUDING ELECTRONICALLY, WITHOUT PRIOR PERMISSION FROM PAUL WAITE ASSOCIATES LIMITED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & SPECIFICATIONS.
4. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES.
5. NO DIMENSIONS ARE TO BE SCALED FROM THIS DRAWING.
6. ONLY PDF/HARD COPIES OF DRAWINGS SHOULD BE REFERRED TO FOR CONSTRUCTION USE. THE USE OF AUTOCAD DRAWINGS/DWG'S IS UNDERTAKEN ENTIRELY AT THE DEVELOPERS RISK AND ALL DIMENSIONS AND SETTING OUT MUST BE CHECKED IN CONJUNCTION WITH THE ARCHITECT AND ENGINEERS CONSTRUCTION DRAWINGS. ALL DRAWINGS SHOULD BE CONFIRMED AS LATEST ISSUE ON THE DOCUMENT ISSUE SHEET PRIOR TO COMMENCEMENT OF WORKS AND SHOULD BE USED ONLY FOR THEIR DEFINED DRAWING STATUS. ANY DISCREPANCIES BETWEEN THE ARCHITECTS' AND ENGINEERS DRAWINGS ARE TO BE IMMEDIATELY REFERRED TO ALL PARTIES.
B FFL'S UPDATED FOR PLOTS 1 TO 5 & 8 TO 11. 12/04/18 LMc LMc
A DRAINAGE UPDATED TO SUIT REVISED SITE LAYOUT. 01/03/18 LMc LMc
Rev Remarks Date By Check
Paul Waite Associates
Consulting Civil, Structural & Geo-Environmental Engineers
SKIPTON
PROPOSED RESIDENTIAL DEVELOPMENT
FORMER VICTORIA MILL
SABDEN
PROPOSED DRAINAGE STRATEGY
13/10/17 IC LMc
PRELIMINARY 1:250 A1
17140-C-SK.04 B

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

* - 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	28.000	0.093	300.0	0.192	4.00	0.0	0.600	o	1200	Pipe/Conduit	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	150	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	4.22	7.900	0.192	0.0	0.0	0.0	2.15	2437.0	26.0
1.001	50.00	4.38	7.807	0.192	0.0	0.0	0.0	1.00	17.8«	26.0

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)
1.001		8.733	7.707	0.000	0	0

Online Controls for Storm

Orifice Manhole: 2, DS/PN: 1.001, Volume (m³): 36.9

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 7.807

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 * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.600
Region	England and Wales	Ratio R	0.250
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	100.0
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, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	30 Winter	1	+0%	100/60 Winter				8.099	-1.001
1.001	2	30 Winter	1	+0%	1/15 Summer				8.098	0.141

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.01		16.5	OK	
1.001	2	0.000	0.65		10.3	SURCHARGED	

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 * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region England and Wales		Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	100.0
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, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	30 Winter	30	+0%	100/60 Winter				8.452	-0.648
1.001	2	30 Winter	30	+0%	1/15 Summer				8.448	0.491

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.02		39.4	OK	
1.001	2	0.000	0.99		15.7	SURCHARGED	

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 * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm) 18.600 Cv (Summer)	0.750
Region	England and Wales	Ratio R 0.250 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	100.0
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, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	60 Winter	100	+40%	100/60 Winter				9.169	0.069
1.001	2	60 Winter	100	+40%	1/15 Summer				9.168	1.211

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.03		52.1	SURCHARGED	
1.001	2	0.000	1.42		22.5	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.600	Add Flow / Climate Change (%)	0
Ratio R	0.252	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

Network Design Table for Storm

« - 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	28.000	0.093	300.0	0.192	4.00	0.0	0.600	o	1200	Pipe/Conduit	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	150	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	4.22	7.900	0.192	0.0	0.0	0.0	2.15	2437.0	26.0
1.001	50.00	4.38	7.807	0.192	0.0	0.0	0.0	1.00	17.8«	26.0

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)
1.001		8.733	7.707	0.000	0	0

Online Controls for Storm

Orifice Manhole: 2, DS/PN: 1.001, Volume (m³): 36.9

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 7.807

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	100.0
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
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Status
1.000	1	360 minute 100 year Winter I+40%	10.000	8.431	-0.669	0.000	0.01	159.232	OK
1.001	2	360 minute 100 year Winter I+40%	10.000	8.428	0.471	0.000	1.00	159.196	SURCHARGED

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.600	Add Flow / Climate Change (%)	0
Ratio R	0.252	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

Network Design Table for Storm

« - 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	13.500	0.135	100.0	0.000	4.00	0.0	0.600	o	1600	Pipe/Conduit	
1.001	55.000	0.550	100.0	0.438	0.00	0.0	0.600	o	1600	Pipe/Conduit	
1.002	9.500	0.095	100.0	0.109	0.00	0.0	0.600	o	1600	Pipe/Conduit	
1.003	4.000	0.040	100.0	0.000	0.00	0.0	0.600	o	150	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	4.05	7.200	0.000	0.0	0.0	0.0	4.46	8972.4	0.0
1.001	50.00	4.26	7.065	0.438	0.0	0.0	0.0	4.46	8972.4	59.3
1.002	50.00	4.29	6.515	0.547	0.0	0.0	0.0	4.46	8972.4	74.1
1.003	50.00	4.36	6.420	0.547	0.0	0.0	0.0	1.00	17.8«	74.1

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)
1.003		7.820	6.380	0.000	0	0

Online Controls for Storm

Crown Vortex Valve® Manhole: 4, DS/PN: 1.003, Volume (m³): 30.7

Design Head (m) 2.800 Vortex Valve® Type RI SW Only Invert Level (m) 6.420
Design Flow (l/s) 10.5 Diameter (mm) 103

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	0.800	5.6	2.000	8.9	4.000	12.5	7.000	16.6
0.200	3.2	1.000	6.3	2.200	9.3	4.500	13.3	7.500	17.2
0.300	3.4	1.200	6.9	2.400	9.7	5.000	14.0	8.000	17.7
0.400	4.0	1.400	7.4	2.600	10.1	5.500	14.7	8.500	18.3
0.500	4.4	1.600	7.9	3.000	10.9	6.000	15.4	9.000	18.8
0.600	4.9	1.800	8.4	3.500	11.7	6.500	16.0	9.500	19.3

Storage Structures for Storm

Tank or Pond Manhole: 3, DS/PN: 1.002

Invert Level (m) 6.565

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	77.0	1.200	77.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	77.0	1.400	77.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	77.0	1.600	77.0	2.800	0.0	4.000	0.0		
0.600	77.0	1.650	77.0	3.000	0.0	4.200	0.0		
0.800	77.0	1.651	0.0	3.200	0.0	4.400	0.0		
1.000	77.0	2.200	0.0	3.400	0.0	4.600	0.0		

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 * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	100.0
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, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	60 Winter	1	+0%	100/360 Winter				7.200	-1.600
1.001	2	15 Winter	1	+0%	100/240 Winter				7.125	-1.540
1.002	3	240 Winter	1	+0%	100/120 Winter				7.018	-1.097
1.003	4	240 Winter	1	+0%	1/15 Summer				7.020	0.450

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.00		0.0	OK	
1.001	2	0.000	0.01		40.9	OK	
1.002	3	0.000	0.00		7.3	OK*	
1.003	4	0.000	0.39		4.9	SURCHARGED	

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 * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	100.0
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, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	360 Winter	30	+0%	100/360 Winter				7.556	-1.244
1.001	2	360 Winter	30	+0%	100/240 Winter				7.556	-1.109
1.002	3	360 Winter	30	+0%	100/120 Winter				7.556	-0.559
1.003	4	360 Winter	30	+0%	1/15 Summer				7.558	0.988

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.00		0.4	OK	
1.001	2	0.000	0.00		22.0	OK	
1.002	3	0.000	0.00		12.6	OK*	
1.003	4	0.000	0.53		6.7	SURCHARGED	

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 * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	100.0
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, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	480 Winter	100	+40%	100/360 Winter				9.164	0.364
1.001	2	480 Winter	100	+40%	100/240 Winter				9.165	0.500
1.002	3	480 Winter	100	+40%	100/120 Winter				9.165	1.050
1.003	4	480 Winter	100	+40%	1/15 Summer				9.165	2.595

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.00		0.9	SURCHARGED	
1.001	2	0.000	0.01		29.6	SURCHARGED	
1.002	3	0.000	0.01		20.9	SURCHARGED*	
1.003	4	0.000	0.83		10.4	SURCHARGED	

Paul Waite Associates		Page 1
Summit House Riparian Way Keighley BD20 7BW	17140 - Former Victoria Mill, Sabden Prop. SW Volum - South Outfall	
Date 02/03/2018 File 17140 - Proposed SW Cal...	Designed by LMc Checked by LMc	
Infrasoft	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.600	Add Flow / Climate Change (%)	0
Ratio R	0.252	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

Network Design Table for Storm

« - 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	13.500	0.135	100.0	0.000	4.00	0.0	0.600	o	1600	Pipe/Conduit	
1.001	55.000	0.550	100.0	0.438	0.00	0.0	0.600	o	1600	Pipe/Conduit	
1.002	9.500	0.095	100.0	0.109	0.00	0.0	0.600	o	1600	Pipe/Conduit	
1.003	4.000	0.040	100.0	0.000	0.00	0.0	0.600	o	150	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	4.05	7.200	0.000	0.0	0.0	0.0	4.46	8972.4	0.0
1.001	50.00	4.26	7.065	0.438	0.0	0.0	0.0	4.46	8972.4	59.3
1.002	50.00	4.29	6.515	0.547	0.0	0.0	0.0	4.46	8972.4	74.1
1.003	50.00	4.36	6.420	0.547	0.0	0.0	0.0	1.00	17.8«	74.1

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)
1.003		7.820	6.380	0.000	0	0

Online Controls for Storm

Crown Vortex Valve® Manhole: 4, DS/PN: 1.003, Volume (m³): 30.7

Design Head (m) 2.800 Vortex Valve® Type R1 SW Only Invert Level (m) 6.420
Design Flow (l/s) 10.5 Diameter (mm) 103

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	0.800	5.6	2.000	8.9	4.000	12.5	7.000	16.6
0.200	3.2	1.000	6.3	2.200	9.3	4.500	13.3	7.500	17.2
0.300	3.4	1.200	6.9	2.400	9.7	5.000	14.0	8.000	17.7
0.400	4.0	1.400	7.4	2.600	10.1	5.500	14.7	8.500	18.3
0.500	4.4	1.600	7.9	3.000	10.9	6.000	15.4	9.000	18.8
0.600	4.9	1.800	8.4	3.500	11.7	6.500	16.0	9.500	19.3

Storage Structures for Storm

Tank or Pond Manhole: 3, DS/PN: 1.002

Invert Level (m) 6.565

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	77.0	1.200	77.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	77.0	1.400	77.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	77.0	1.600	77.0	2.800	0.0	4.000	0.0		
0.600	77.0	1.650	77.0	3.000	0.0	4.200	0.0		
0.800	77.0	1.651	0.0	3.200	0.0	4.400	0.0		
1.000	77.0	2.200	0.0	3.400	0.0	4.600	0.0		

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.600	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.250	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	100.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Scatus	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)
1.000	1	15 minute 100 year Summer I+40%	10.000	7.319	-1.481	0.000	0.00	-0.198
1.001	2	360 minute 100 year Winter I+40%	9.830	8.995	0.330	0.000	0.01	355.114
1.002	3	360 minute 100 year Winter I+40%	9.500	8.995	0.880	0.000	0.00	323.763
1.003	4	360 minute 100 year Winter I+40%	9.300	8.995	2.425	0.000	0.80	309.142

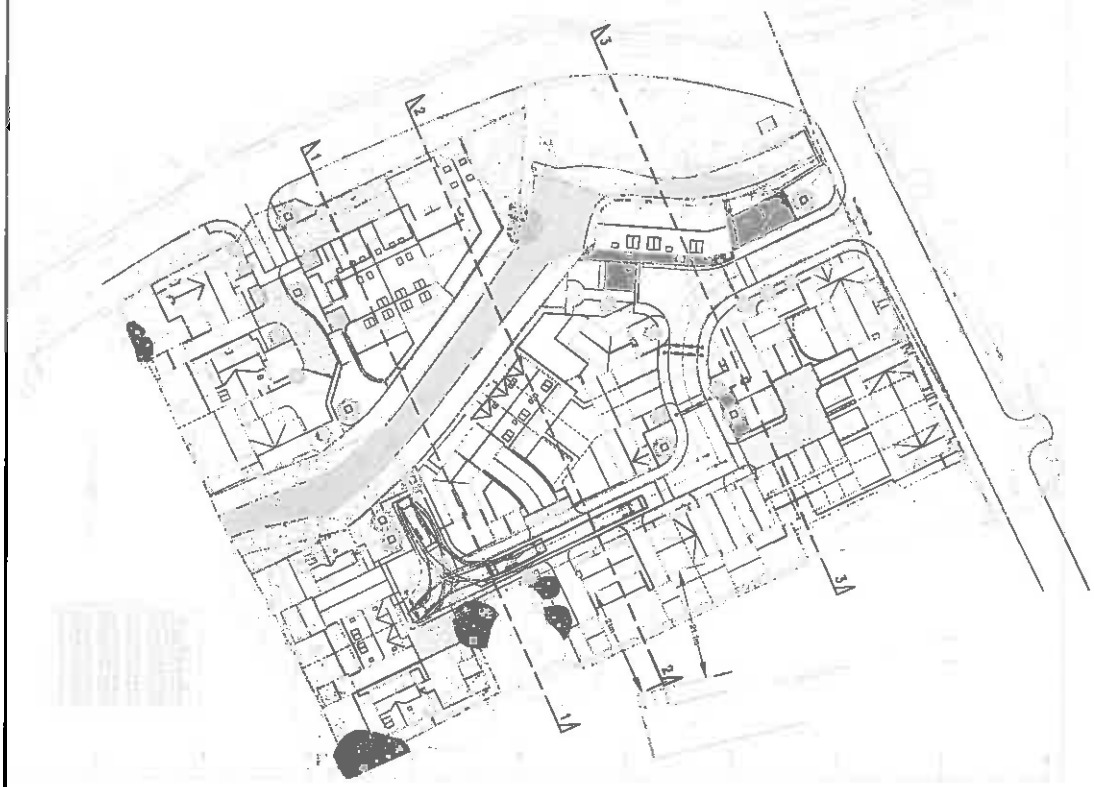
PN	US/MH Name	Status
1.000	1	OK
1.001	2	SURCHARGED
1.002	3	SURCHARGED*
1.003	4	SURCHARGED

NOTES:

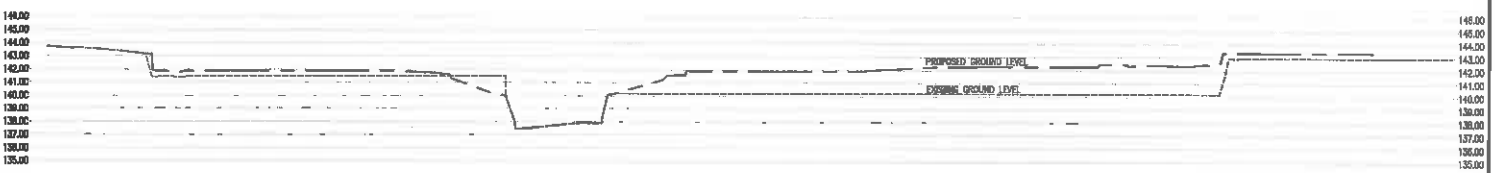
1. COPYRIGHT IN THIS DOCUMENT BELONGS TO PAUL WAITE ASSOCIATES LIMITED & ALL RIGHTS IN IT ARE RESERVED BY THE OWNER.
2. NO PART OF THIS DRAWING MAY BE COPIED, TRANSFERRED, OR MADE AVAILABLE TO USERS OTHER THAN THE ORIGINAL RECIPIENT, INCLUDING ELECTRONICALLY, WITHOUT PRIOR PERMISSION FROM PAUL WAITE ASSOCIATES LIMITED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & SPECIFICATIONS.
4. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES.
5. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING.
6. ONLY PDF/HARD COPIES OF DRAWINGS SHOULD BE REFERRED TO FOR CONSTRUCTION USE. THE USE OF AUTOCAD DRAWINGS/DWG'S IS UNDERTAKEN ENTIRELY AT THE DEVELOPERS RISK AND ALL DIMENSIONS AND SETTING OUT MUST BE CHECKED IN CONJUNCTION WITH THE ARCHITECT AND ENGINEERS CONSTRUCTION DRAWINGS. ALL DRAWINGS SHOULD BE CONFIRMED AS LATEST ISSUE ON THE PLANNING ISSUE SHEET PRIOR TO COMMENCEMENT OF WORKS AND SHOULD BE USED ONLY FOR THEIR DEFINED DRAWING STATUS. ANY DISCREPANCIES BETWEEN THE ARCHITECT AND ENGINEERS DRAWINGS ARE TO BE IMMEDIATELY NOTIFIED TO ALL PARTIES.

PRELIMINARY CUT AND FILL VOLUMES:

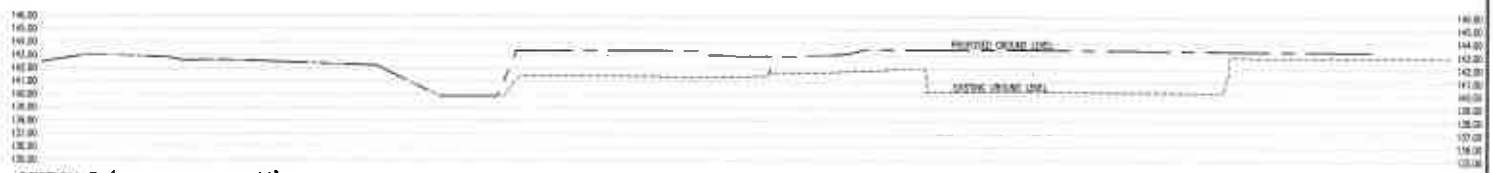
CUT=	958m³
FILL=	12197m³
NET (FILL)=	11239m³



SECTION 1 (H= 1:200 V= 1:200)



SECTION 2 (H= 1:200 V= 1:200)



SECTION 3 (H= 1:200 V= 1:200)

		By	Check
Rev			

Paul Waite Associates
Consulting Civil, Structural & Geo-Environmental Engineers

SKIPTON PROPERTIES LTD

SABDEN VILLAGE DEVELOPMENT
FORMER VICTORIA MILL
SABDEN

SITE CROSS SECTIONS
SHOWING EXISTING AND PROPOSED LEVELS

Date: FEB 2018	Drawn By: LUKE D	Checked By: PW	17140-C-100 /
Status: PRELIMINARY	Scale: AS SHOWN	Size: A1	Drawing Number / Rev