S|C|P

Transportation Planning : Infrastructure Design

Flood Risk Assessment

Lidl Clitheroe Store Extension

Shawbridge St, Clitheroe

Lidl UK GmbH

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1.0 EXECUTIVE SUMMARY

1.1 Lidl UK GmbH are proposing to extend their existing store located in Clitheroe. This store, located on the junction of Peel St, Shawbridge St and the A671, sits on the confluence of the Mearley Brook and Shaw Brook and sits within a Flood Zone 3 area.

1.2 The extension is to be constructed on an area of municipal car parking and hard standing which is currently protected by the flood defences constructed behind the store when it was initially built.

1.3 The site is currently at high risk of fluvial flooding. This is an existing risk and the site is protected by flood defences. This risk is managed through the use of flood management techniques and a raised finished floor level above the 1% flood height. This is the situation with the existing store.

2.0 INTRODUCTION

Appointment

2.1 SCP has been commissioned by Lidl UK GmbH to provide a site specific Flood Risk Assessment and Outline Drainage Strategy to support a full planning application for an extension and new car park for an existing store in Clitheroe.

Proposed Development

2.2 The planning application proposes the construction of an extension to an existing store on an existing municipal car parking area.

2.3 The extension is 390m2 in size, with the new car parking area being 340m2 in size. There is a proposed 100m2 landscaped area to be provided with the development.

2.4 The extension and the car parking area are located in Flood Zone 3.

2.5 A plan showing the catchment areas of the site can be found in drawing 17247-SK01 in Appendix A.

Objective of Strategy

2.6 The objective of the strategy is to undertake a Flood Risk Assessment in accordance with the National Planning Policy Framework (NPPF).

2.7 The detail and complexity of a Flood Risk Assessment should reflect the level of risk to the site. The NPPF is the official document that regulates the assessment of flood risks and their appropriate mitigations to the planning process.

2.8 Section 9 to 19 of the 'Technical Guidance to the National Planning Policy Framework' provides requirements for a Site Specific FRA, which can be summarised as follows:

- Be proportionate to the risk and appropriate to the scale, nature and location of the site;
- Consider the risk of flooding arising from development in addition to the risk of flooding to the site;
- Take the impacts of climate change into account;
- Consider both the potential adverse and beneficial effects of flood risk management infrastructure including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure;

- Consider the vulnerability of those that could occupy and use the site, taking account of the Sequential and Exception Tests and the vulnerability classification including arrangements for safe access/ egress;
- Consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- Consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as 'residual') risks after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular development or land use;
- Consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of development may affect drainage systems;
- Be supported by appropriate data and information, including historical information on previous events.

2.9 This report therefore assesses flood risk to the site and any impact on flood risk to other land because of the development proposals.

Limitations

2.10 This report has been prepared for exclusive use by Lidl UK GmbH for the purpose of assisting them in evaluating the potential risk of flooding associated with the site and in making a Full Planning Application.

2.11 SCP accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of SCP. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole.

2.12 SCP has endeavoured to assess all information provided to them during this appraisal and therefore this report has been compiled from a number of external sources.

2.13 The Flood Risk Assessment addresses the flood risk posed to and from the proposed development, the extent of which is shown on the Proposed Site Plan, prepared by Cassidy + Ashton, 8704-P02 Rev A. This is in Appendix B.

2.14 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

2.15 An intrusive site investigation for the development has also not been undertaken and it is therefore recommended that this is carried out prior to detailed design in order to assess soil conditions should discharge of surface water via infiltration be an option.

3.0 POLICY & GUIDANCE

3.1 In carrying out our assessment and preparing this report, regard has been taken of the provisions of the development plan and a range of other material considerations. However, it is the Government's National Planning Policy Framework, South Oxfordshire SFRA and CIRIA document C624 which provide the most up to date and specific guidance on the Scope of Flood Risk Assessments.

National Planning Policy Framework & Planning Policy Statement 25

3.2 The National Planning Policy Framework (NPPF) was published in England in March 2012. As a result, all previous Planning Policy Guidance Notes (PPGs) and Planning Policy Statements (PPSs) were superseded. This included PPS25: Development and Flood Risk, along with its supplement on Development and Coastal Change.

3.3 One of the key aims of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

3.4 It advises that where new development is necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible should reduce flood risk overall.

3.5 The NPPF's flood risk advice is set out in paragraphs 100-103 of the Framework document. It is also accompanied by a Technical Guidance document which contains more details of carrying out development with regard to flood risk.

3.6 A comparison of the new NPPF Technical Guidance and the PPS25 documents reveals that the technical approach to the FRA process is largely unchanged with the presumption for development in Flood Zone 1.

3.7 Notable topics that have been retained from PPS25 within NPPF and its Technical Guidance include:

- The same Flood Zone definitions and vulnerability classifications of development are retained.
- The Sequential & Exceptions tests tie in more closely with NPPF's principle to promote the most sustainable development.
- Climate Change and Sea Level rise are key considerations in the assessment.
- Management of Residual Risk discusses matters of Flood Risk Management and Mitigation, including Flood Resistance and Resilience. This clearly allows for development opportunities

in areas where prospective sites are in Flood Zones 2 and 3, as long as flood ingress, impact, rate of onset etc. are understood and mitigated.

Flood and Water Management Act 2010

3.8 The Flood and Water Management Act 2010 received Royal Assent on 8th April 2010. This Act provides duties on the Environment Agency, Local Authorities, Developers and other bodies to manage flood risks. The Act has significant planning and design implications for Developers.

3.9 It should be noted that these standards and procedures are being reviewed by the respective regulatory bodies and third parties against the requirements imposed by the Flood and Water Management Act 2010. The advice and recommendations provided may change when associated regulations have been issued in order to implement the full scope of the Act.

3.10 The main areas affecting Developers are:

- Lead Local Flood Authority (LLFA) to adopt sustainable urban drainage systems (SUDS). The LLFA may be either a Unitary or County Council;
- Approval fees and non-performance bonds to be standardised;
- A National Standard for SUDS design, construction, maintenance and operation to be issued. This guidance will emphasise the preference for surface SUDS features and the need to incorporate green corridors into the masterplan. A DRAFT version of this document was issued for consultation in December 2011. The final version was expected to be issued in 2014 however, DEFRA reported a delay and to date have not advised when the revised issue date is likely to be.
- Changes to the rights to connect to sewers will restrict automatic connection rights to only Section 104 sewer schemes or approved SUDS schemes constructed to a new national sewer or new SUDS standard respectively;
- Two options for the SUDS approval process. Either directly to the SUDS Approval Body or as a combined application to the Planning Authority as part of the Planning Application.

Lancashire and Blackpool Flood Risk Management Strategy (FRMS)

3.11 Local Planning Authorities are required to produce Local Development Frameworks, which are a portfolio of Local Development Documents that collectively deliver the spatial planning strategy for the Authority area. The LDD's undergo a Sustainability Appraisal which assists Planning Authorities in ensuring their policies fulfil the principles of sustainability. Flood Risk Assessments are one of the documents to be used as the evidence base for planning decisions and are a

component of the Sustainability Appraisal process. Therefore, FRAs should be used in the review or production of LDD's.

3.12 FRA's assess the risk associated with all types of flooding and provide the information required to identify the amount of development permitted in an area; how the drainage systems in the area should function and also how the risks in vulnerable areas can be reduced and/or mitigated. The National Planning Policy Framework states that Regional Planning Bodies (RPB's) or Local Planning Authorities (LPA's) should prepare FRA's in consultation with the Environment Agency.

3.13 In this area, an FRMS has been produced which covers the Ribble Valley, Lancashire and adjacent flood risk management areas.

3.14 The FRMS assesses the current and historical flood risk for the interest area and identifies the areas most at risk of flooding. The FRMS additionally identifies assets which are maintained by the local boroughs and district authorities.

3.15 The FRMS has not provided any specific policy guidelines or requirements for flood risk management and consenting however it provides aims and objectives for planning and the county council for consenting of schemes. The FRMS accepts that new schemes need to be sustainable especially in areas of high and medium flood risk with improvements to existing developments where possible.

CIRIA Guidance

3.16 The CIRIA publication 'C624 Development and Flood Risk – Guidance for the Construction Industry', define three levels of FRA which can be undertaken:

Table 1 - Levels of Flood Risk Assessment

FRA Level	Description/Scope
Level 1	Screening Study to identify whether there are any flooding or surface water management issues related to a development site that may warrant further consideration. This should be based on readily available existing information, including the SFRA, Environment Agency Flood Map and Standing Advice. The Screening Study will ascertain whether a FRA is required.
Level 2	Scoping Study to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding or that the site may increase flood risk due to increased run-off. This Study should confirm the sources of flooding which may affect the site and should include the following: • An appraisal of the availability and adequacy of existing information; • A qualitative appraisal of the flood risk posed to the site, and potential impact of the development on flood risk elsewhere; • An appraisal of the scope of possible measures to reduce the flood risk to acceptable levels. • The Scoping Study may identify that sufficient quantitative information is already available to complete a FRA appropriate to the scale and nature of the development.
Level 3	Detailed Study to be undertaken if the Level 2 FRA concludes that further quantitative analysis is required to assess flood risk issues related to the development site. The Study should include: • Quantitative appraisal of the potential flood risk to the development; • Quantitative appraisal of the potential impact of development site on flood risk elsewhere; • Quantitative demonstration of the effectiveness of any proposed mitigation measures.

3.17 Although consultation is ongoing, a level 2 flood risk assessment should be sufficient as the size of the development is negligible, the scope for the development to increase runoff is reduced, but the site sits within Flood Zone 3.

4.0 EXISTING SITE

Site Location

4.1 The site is an existing store located at Shawbridge Street, Clitheroe.

4.2 An approximate postcode for the site is BB7 1LZ and OS Co-ordinates 374611E, 441681N.

Table 2 - Site Description

Area		0.083 Hectares
Existing Surfacing		The existing site is surfaced with asphalt and block paving.
General Topography		The site slopes from south east to the north west towards Mearley Brook.
Current Use		The current site is used as a car park by the local authority.
Boundaries	**North**	Mearley Brook & Existing Lidl Store
	East	Peel Street
	South	Existing Houses
	West	Queensway
Access	**Vehicular**	Access is provided to the site from the east via Peel Street
	Pedestrian	Access is provided to the site from the east via Peel Street

Existing Public Sewers

4.3 There is an existing network of combined sewers which are located under Peel Street to the east. The existing combined sewer conveys surface water and foul water from adjacent properties and is 900mm in diameter. This sewer flows to the south west continuing towards a waste water treatment works outside of Clitheroe.

Existing Private Drainage

4.4 The existing car park has an existing drainage system which outfalls into the combined sewer system under Peel Street.

Watercourses, Land Drainage and other Waterbodies

4.5 Mearley Brook is a main river located to the north west of the site. Shaw Brook is located to the north east of the site and this flows into Mearley Brook via a culvert located under Shawbridge Street and the north of the existing store car park.

Existing Flood Defences and Other Structures

4.6 The existing store has a flood defence wall which was constructed when the store was developed.

4.7 Mearley Brook is bridged by Queensway to the north of the site.

Historical Land Use

4.8 The site itself has been historically used as a car park. Previous uses of the site is not known.

Historical Flood Records

4.9 The table below summarises the historical flood records obtained through consultation with the various bodies contacted as part of this study.

Information Source	Flood Records/Details
Environment Agency	There is no specific anecdotal or specific information issued by the EA regarding flooding on the existing car park or the area of land proposed for the extension. While Contact has been made with the EA, no consultation response has been received.
LCC FRMS	No information regarding flooding on this site is provided in the FRMS. While Contact has been made with LCC, no consultation response has been received.
Envirocheck	Flood Mapping has been procured from Envirocheck. The historic data does not show any history of flooding at this site.

Flood Mapping

Envirocheck Flood Screening Report

4.10 The Envirocheck Flood Screening Report indicates that the existing site is located in Flood Zone 3 (low risk) based on the EA/NRW maps.

4.11 However, the JBA flood risk maps show that the site is not a risk of flooding in the 1 in 75, 1 in 100 and 1 in 200 scenarios. Flooding only occurs in the 1 in 1000 (0.1%) scenario. This means that the site where the extension and new car park is proposed is not in Flood Zone 3. This information is in Appendix D.

4.12 Flood zone designation ignores the presence of any flood defences and only considers flooding from fluvial and tidal sources. The existing mapping does not include the flood defences constructed when the store was built on the EA/NRW maps. The JBA maps also assume that the site is undefended.

EA Reservoir Flood Mapping

4.13 The Environment Agency website does not locate the site within an area at risk from reservoir flooding.

Figure 1 - Reservoir Flooding

British Geological Survey Flood Data

4.14 The BGS Flood Data Map website indicates that the site does not contain the potential for groundwater flooding to occur. This is shown in the Envirocheck data in Appendix D.

5.0 DEVELOPMENT PROPOSALS

5.1 The proposed development comprises of the construction of an extension to an existing Lidl store and the redevelopment of a car park for the store. The site is split as follows:

- Impermeable Areas within the Site – 0.073 Ha
- Permeable Areas within the Site – 0.01 Ha
- Total Developed Area: 0.083 Ha

5.2 This site split is shown on drawing 17247-SK01 in Appendix A.

5.3 The impermeable and permeable areas are similar to those on the existing development.

6.0 SOURCES OF FLOOD RISK

Source	Likelihood
Fluvial	High
Coastal - Sea	Not Applicable
Coastal - Estuarine	Not Applicable
Pluvial	Low
Sewer – SWS, FWS, CS, CSO	Low
Groundwater	Low
Other Sources	Low

Fluvial Flood Risk

6.1 Information relating to flood risk at the site has been obtained via Envirocheck Flood Screening report and also the Environment Agency's online flood mapping tool. This information has been provided in Appendix D.

6.2 Examination of the flood maps show that the site is located within an area classified as Flood Zone 3 and the risk of flooding is high, with flooding likely to occur at a greater than 1 in 1000 (0.1%) event.

6.3 Adjacent to Mearley Brook and it is from this watercourse that the flood risk originates. This flood risk is only shown on the EA/NRW information and on the gov.uk Flood Risk Information service. The JBA mapping does not show that this site is at risk of flooding from Mearley Brook.

6.4 To mitigate risk of flooding inside the store, the finished floor level will be set at 75.95m AOD.

6.5 On this basis, the Fluvial Flood Risk is high.

Pluvial Flood Risk

6.6 Pluvial flooding is defined as flooding resulting from rainfall-generated overland flow, before runoff enters any watercourse or sewer.

6.7 It is usually associated with high intensity rainfall events but can also occur with low intensity rainfall or melting snow where ground is saturated, frozen, developed or otherwise has low permeability resulting in overland flow and ponding in depressions in the topography. Large catchment areas are particularly prone to this type of flooding.

6.8 Surface water flood maps can be found in Appendix D. They demonstrate that even after a 1 in 1000 year rainfall event the site is not prone to flooding. However this mapping will be based on coarse level data and can be considered indicative only. Furthermore, site levels will be re-engineered to ensure that there is no risk of surface water flooding to the proposed development.

6.9 The topography of the site and surrounding area means that there is little likelihood of significant flows impacting on the proposed development or on land and property adjacent to the development. The only flows that are likely to be present on site are from direct rainfall on areas of hardstanding.

6.10 The proposed store extension will utilise the existing drainage network for the store. The car park will utilise the existing car park drainage and discharge point.

Sewer Flood Risk

6.11 The risk of a surcharge from the existing sewers on the existing site is unknown. The existing store discharges directly into the adjacent Mearley Brook. The existing store's foul system connects into the combined sewers.

6.12 The existing car park discharges into the existing combined sewer via a manhole located to the south west of the existing store. This manhole will not be impacted by the proposed store extension.

6.13 As long as the above is taken into consideration, it is considered that the risk of flooding to the site from surcharged sewers is low.

Groundwater Flood Risk

6.14 In general terms groundwater flooding can occur from three main sources, raised water tables, seepage and percolation, and groundwater recovery or rebound.

6.15 If groundwater levels are naturally close to the surface then this can present a flood risk during intense rainfall. Having reviewed groundwater flood maps from Environment Agency and the British Geological Survey it indicates that the site is in an area where there is no risk for flooding from the water table.

6.16 The BGS Flood Data states that there is a risk for groundwater flooding at surface level. However this is mirrored by other data sources.

Flooding from Other Sources

6.17 Non-natural or artificial sources of flooding can include reservoirs, lakes and canals etc.

6.18 No risk of reservoir or other artificial flooding is identified on the Envirocheck or the Environment Agency maps.

6.19 No other potential sources of flood risk have been identified immediately affecting the site.

Historical and Anecdotal Flooding Information

6.20 There is no evidence available of any flooding on the site, however given the nature of the site, flooding is thought to have previously occurred during the major events of the last ten years.

Flood Risk Vulnerability Classification

6.21 The proposed development is industrial and can be considered to be classified as 'less vulnerable' within *Table 2: Flood Risk Vulnerability Classification* of the NPPF. Therefore this type of development would be wholly appropriate for Flood Zone 1.

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

7.0 SURFACE WATER MANAGEMENT

Introduction

7.1 The National Planning Policy Framework (NPPF)[1] and accompanying Planning Practice Guidance[2] indicate surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.

7.2 Consideration should therefore firstly be given to using sustainable urban drainage (SUDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2010)[3] sets out a hierarchy for the disposal of surface water which encourages a SUDS approach, as detailed above.

Climate Change

7.3 There are indications that the climate in the UK is changing significantly and it is widely believed that the nature of climate change will vary greatly by region. Current expert opinion indicates the likelihood that future climate change would produce more frequent short duration and high intensity rainfall events with the addition of more frequent periods of long duration rainfall.

7.4 The NPPF Technical Guidance Table 5 states that the recommended national precautionary sensitivity ranges for increase of peak rainfall intensity is 30% until 2115. However, The Environment Agency (EA) issued new advice which updated previous climate change allowances outlined in the NPPF. The table below, extracted from the Guidance for Flood risk Assessment: Climate Change Allowances (Table 2)[4] shows anticipated changes in extreme rainfall intensity in small and urban catchments. For Flood Risk Assessments and Strategic Flood Risk Assessments, The Environment Agency recommend both the central and upper end allowances are assessed to understand the range of impact.

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[1] *Department for Communities and Local Government 2012 – National Planning Policy Framework*
[2] *Department for Communities and Local Government 2016– Planning Practice Guidance*
[3] *HM Government Building Regulations 2010 – Approved Document part H*
[4] *ENVIRONMENT AGENCY 2016 FLOODING AND COASTAL CHANGE –FLOOD RISK ASSESSMENTS: CLIMATE CHANGE ALLOWANCES TABLE 2*

Table 3 - Urban Catchment Climate Change Growth – North West

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	25%	35%	70%
Central	20%	30%	35%

7.5 As recommended by the EA, both the central and upper end allowances have been considered for the purpose of surface water drainage strategy and assessment of exceedance flow pathways.

7.6 For this development, a climate change growth factor of **30%** has been used for the surface water runoff.

Pre-development Surface Water Runoff

7.7 The proposed development extends over an area of **0.083 ha** and currently the existing car park drains into the United Utilities combined sewer.

7.8 The existing site has an existing impermeable area of **0.083 Ha,** and permeable area of **0.0 Ha.**

7.9 The existing runoff of the site has been estimated using the Modified Rationale Method and the IH124 method. The Modified Rationale Method is used for the impermeable areas with the IH124 method used for the permeable areas.

IH124 Method for Runoff Rates – Permeable Areas (Greenfield Runoff)

7.10 The runoff rates from the permeable (Greenfield) areas of the site have been initially calculated using the HR Wallingford Sustainable Drainage Tool (http://www.uksuds.com/greenfieldrunoff_js.htm) which utilises either the Institute of Hydrology Report 124 Method or the FEH Statistics Method.

7.11 The IH124 publication provides the essential design elements for determining the estimated Greenfield runoff rate which is based on the site area, soil type, and average annual rainfall, which is influenced by the location of the site within the United Kingdom. This methodology is recommended within R&D Technical Report W5-074/A/TR/1 'Preliminary Rainfall Runoff Management for Developments'(2012).

7.12 The IH 124 equation to calculate runoff is:

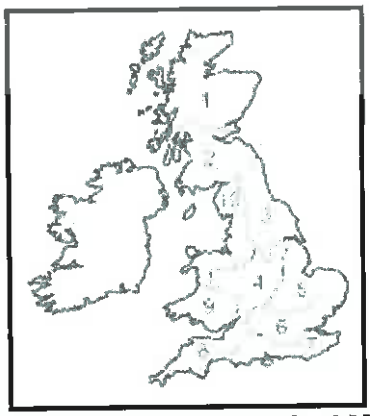
$$Q_{BAR} = 0.00108^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$$

Where:

- Qbar = Mean Annual Flood (m3/s). A return period in the region of 2.3 years.
- SAAR = Standard Average Annual Rainfall (mm)
- A = Area (ha) of the catchment.
- SOIL = Soil index value obtained from soil maps in the Flood Studies Report or the WRAP map of the Wallingford Procedure.

7.13 The SAAR value for the site and soil value were obtained automatically through the HR Wallingford website. The analysis for determining the peak Greenfield discharge rate uses 50 ha in the formula and linearly interpolates the flow rate value based on the ratio of the development to 50ha.

7.14 The Standard Percentage Runoff coefficient (SPR) values are determined by the SOIL category. These SOIL categories range from 1 to 5 with 1 being sandy highly permeable materials and 5 (rarely used) being exposed rock. Based on the Soil Type (Freely draining loam), an SPR value of **0.47** is proposed.



Growth Curve Factors for Hydrological Region 10	
1 year	0.66
30 year	1.3
100 year	1.59

Figure 3: FSSR 14 Hydrological Map and Growth curve table

7.15 As mentioned above, the Qbar values represent a return period of 2.3 years. A regional growth factor can be applied to determine the peak runoff rate for other return periods including the 1 in 30 year and 1 in 100 year events. The growth factors are obtained from the tables in the Flood Studies Research FSSR 14 as shown below. The site is located in **Region 4**.

7.16 The table below summaries the existing Greenfield runoff rates for the permeable area of the site generated by the site for a range of storm return periods using the IH124 method.

Table 4: Existing Development Greenfield Runoff – IH124 Method

Site Area	Qbar (l/s)	Peak Runoff 1 in 1 year (l/s)	Peak Runoff 1 in 30 years (l/s)	Peak Runoff 1 in 100 year (l/s)	Peak Runoff 1 in 100 year + 30%CC (l/s)
0.083ha	0.72	0.62	1.27	1.51	1.96

7.17 The above is a measure of the greenfield runoff if the existing site was undeveloped. However it is developed as a car park, and instead the greenfield runoff is **Zero l/s**

Existing Development Impermeable Runoff

7.18 The peak runoff from the proposed impermeable area of 0.76 ha has been estimated using the Modified rationale Method.

$$Q = 2.78 \times C_v \times C_r \times i \times A$$

Where:

- Q is the peak runoff rate (l/s)
- Cv is the volumetric runoff coefficient = 1.3
- Cr is the routing coefficient = 0.75
- i is the average rainfall intensity = 50mm/hr
- A is the Site impermeable area = 0.083ha

Q = 11.1 l/s

7.19 On this basis, it is assumed that a maximum runoff of **11.1 l/s** is expected from the current site. This is discharged into the existing combined sewer.

Post-development Surface Water Runoff

7.20 The proposed development has some of the surface water runoff diverted into an existing drainage system which is attenuated and discharged into the Mearley Brook.

7.21 Calculated using the Modified Rationale Method and the IOH124 processes above, the discharge for the proposed development is as follows.

- Discharge into Mearley Brook
  - Impermeable Area = **0.039Ha,** Discharge = **5.28 l/s**
  - Permeable Area = **0.0 Ha**, Discharge = **0l/s**
  - Total additional discharge into Mearley Brook = **5.28 l/s**
- Discharge into Existing United Utilities Combined Sewer
  - Impermeable Area = **0.034Ha,** Discharge = **4.6 l/s**
  - Permeable Area = **0.01 Ha**, Discharge = **0.11l/s**
  - Total additional discharge into Existing United Utilities Combined Sewer = **4.77 l/s**
- TOTAL combined runoff = **10.06 l/s**

7.22 Due to the increase in permeable area, there is a net reduction of surface water runoff from the site of **1.04 l/s**.

7.23 There is a reduction of surface water runoff into the combined sewer of **5.82 l/s**.

7.24 This is shown on drawing 17247-SK01 in Appendix A.

7.25 Given that the drainage for the store will be accommodated within the existing drainage system, then the remaining surface water to be accommodated is **4.77 l/s**.

Proposed Restricted Discharge Rates

7.26 Given that the proposed car park reduces the discharge into the public sewer by 58% and the existing car park does not have any kind of discharge rate restriction, it is not proposed to implement further discharge rate restriction for the proposed car park. This is to enable the existing drainage connection to be re-used.

Methods of Surface Water Management

7.27 As set out in Part H of the Building Regulations, there are three methods that have been reviewed for the management and discharge of surface water for the site which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed:

- Discharge via infiltration;
- Discharge via watercourse;
- Discharge via public sewerage system.

Discharge via Infiltration

7.28 At the time of writing, no infiltration tests have been undertaken within the site. It is recommended that this should be further investigated at design stage and if feasible, incorporated into the final drainage proposals for the site. It is believed that the existing soil is impermeable and it is unlikely that infiltration will be

Discharge to a Watercourse

7.29 The extension to the store is proposed to be drained into the existing drainage network which discharges into Mearley Brook. This existing network has flow controls and attenuation. This network is shown below in Figure 2 below. This is taken from the previous FRA for the store in Appendix F.

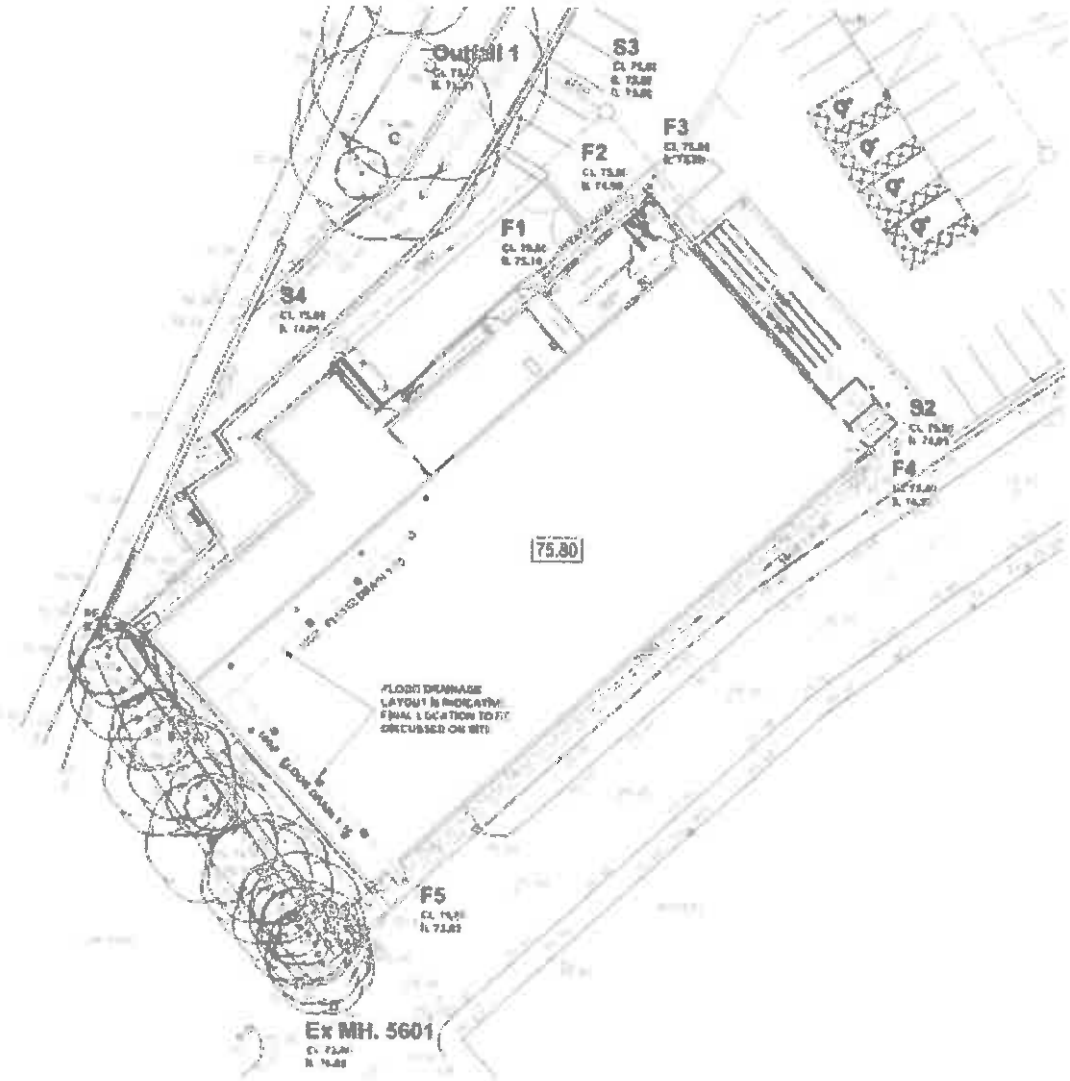


Figure 2 - Existing store drainage network

Discharge to a Public Sewer

7.30 The redeveloped car park is proposed to be drained into the existing combined sewer. This drainage system will utilise the existing manhole located in the existing access junction. The proposed network is shown in Figure 3 below.

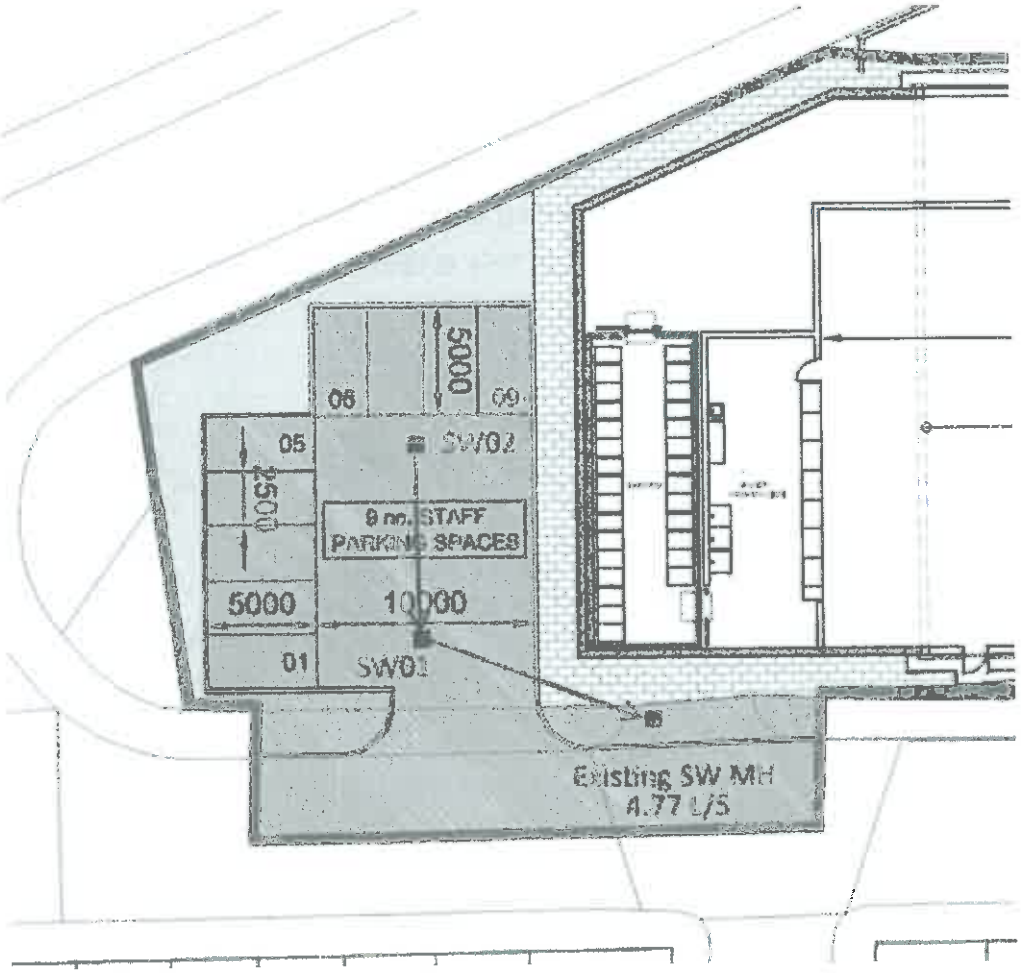


Figure 3 - Outline Drainage Strategy

Outline Surface Water Drainage Strategy

7.31 The general principle of the surface water drainage strategy for this site is to collect the runoff from the car park and convey this into the existing sewer.

7.32 Figure 3 above shows the existing manhole and the proposed routing into the redeveloped car park. Due to the size of the car park (9 spaces), PPG3 Use and design of oil separators in surface water drainage systems, suggests that oil and spillage interception is not required. However, there will be scope for the interception of spillages through the use of sumps in gullies and catchpits within the proposed drainage network.

8.0 FOUL WATER MANGEMENT

8.1 The proposed store expansion will utilise the existing system servicing the store. The proposed extension will include the addition of a back-of-house area for storage and a bakery and the redistribution of the internal drainage systems.

8.2 At this stage it is anticipated that foul water can discharge without any restriction into the existing system.

9.0 MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK

Flood Risk Management Measures

9.1 The proposed drainage system is an improvement over the existing car park's drainage system as runoff from the car park will be reduced as some of the existing car parking area will be landscaped.

9.2 Finished site levels will be engineered to provide positive drainage where required and prevent ponding.

9.3 Gradients of the hardstanding areas, where possible, will be designed to fall away from buildings such that any overland flow resulting from extreme events would be channelled away from entrances. The nominal gradient across the site is 1 in 50 in accordance with Lidl Construction Standards.

9.4 From the mapping in Appendix D, access and egress routes from the car park and the site are accessible

Residual Risks

9.5 As with any drainage system, blockages within the surface water system have potential to cause flooding or disruption. It is important that any drainage systems not being offered for adoption to either the Water Company or the Local Authority has an appropriate maintenance regime scheduled which would be advised to prospective property owners where appropriate.

9.6 Any overland flows generated by the proposed development must be directed away from any adjacent existing properties surrounding the site and towards the highway network where it can follow natural flow paths.

9.7 On this site, the existing site falls towards Mearley Brook to the north, and away from the adoptable highway and existing store.

10.0 SUMMARY

10.1 The proposed development comprises of an extension to an existing Lidl food store and the construction of a new car park and associated infrastructure. A copy of the site plan can be found in Appendix B. The permeable / impermeable drainage areas of the existing and proposed site are in Appendix A.

10.2 The site is in an area identified as having a 'high' probability of fluvial flooding on the Environment Agency Flood Map and is located in Flood Zone 3. The site has a "low" probability of pluvial flooding. This is shown in the plans in Appendix D.

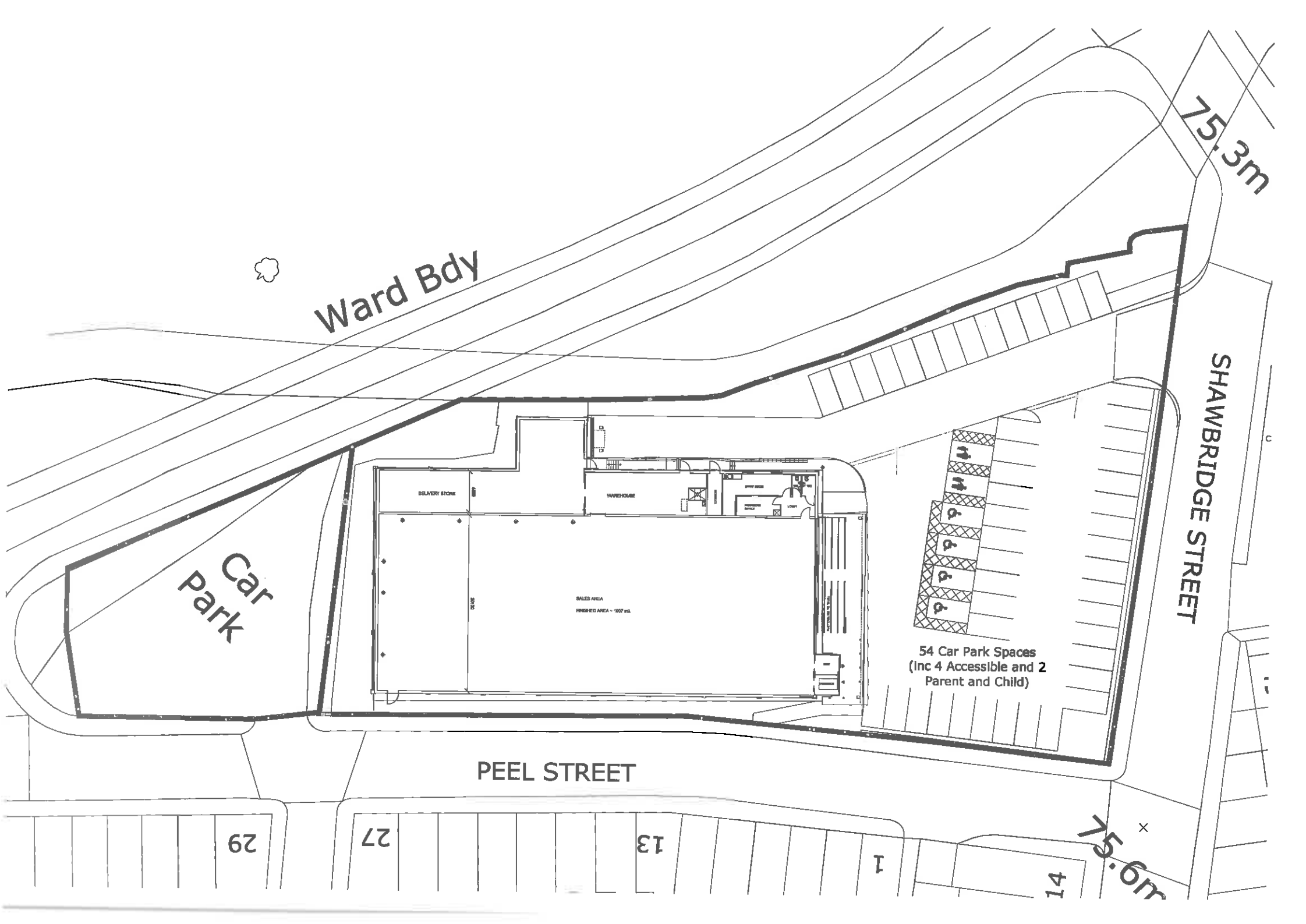
10.3 The Flood Risk Assessment (FRA) has reviewed all sources of flood risk to both the proposed development and to existing adjacent developments as a result of the proposals, including fluvial, tidal, pluvial, groundwater, sewers and flooding from artificial sources.

10.4 The primary option for surface water disposal is via the combined sewer and the existing drainage networks. This is shown in Figure 3 above.

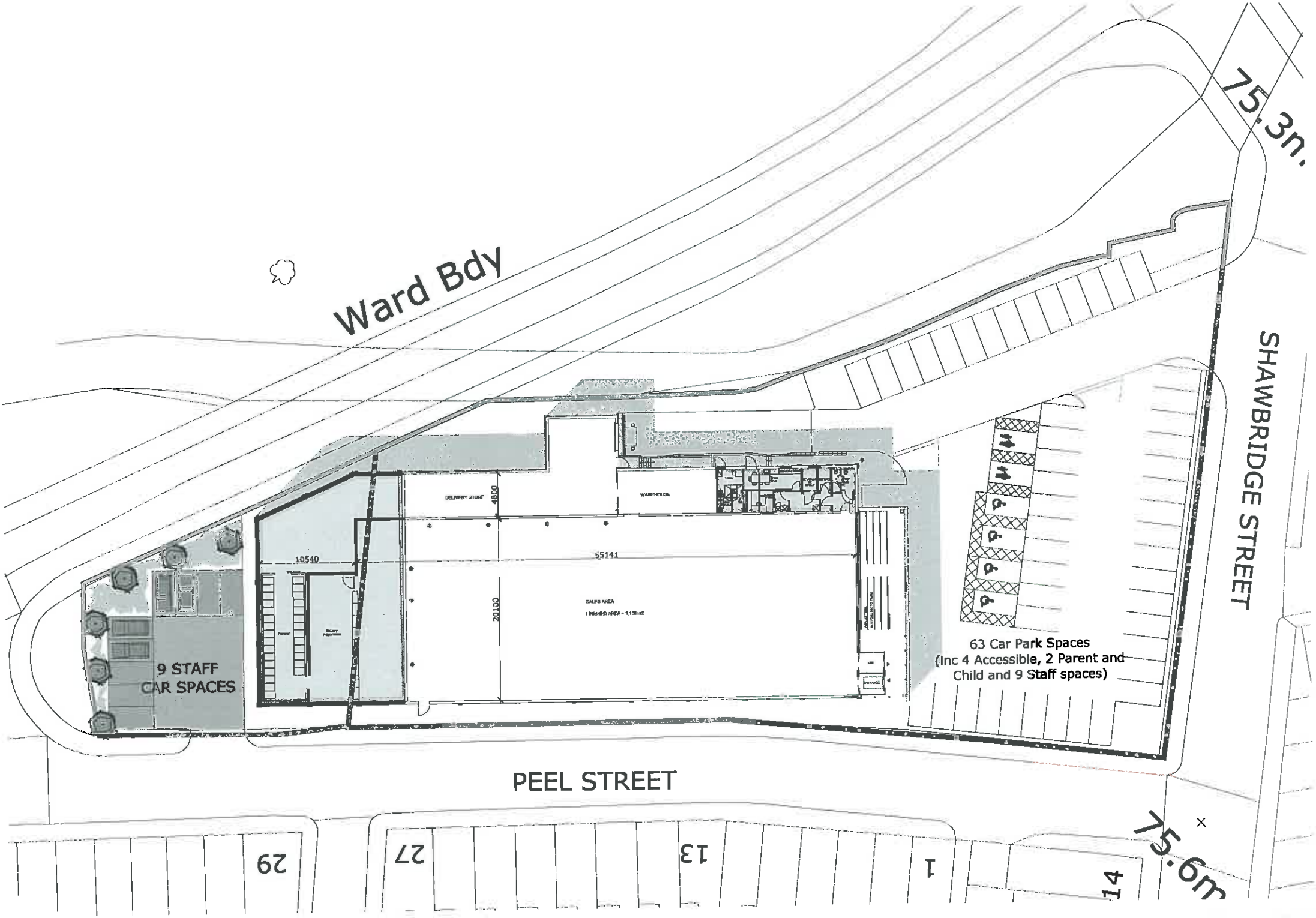
10.5 The development is accessible for emergency access and egress during times of extreme flooding as no flooding is evident on any of the access routes.

10.6 The Flood Risk Assessment is considered to be commensurate with the development proposals and in summary, the development can be considered appropriate for Flood Zone 3 in accordance with the NPPF.

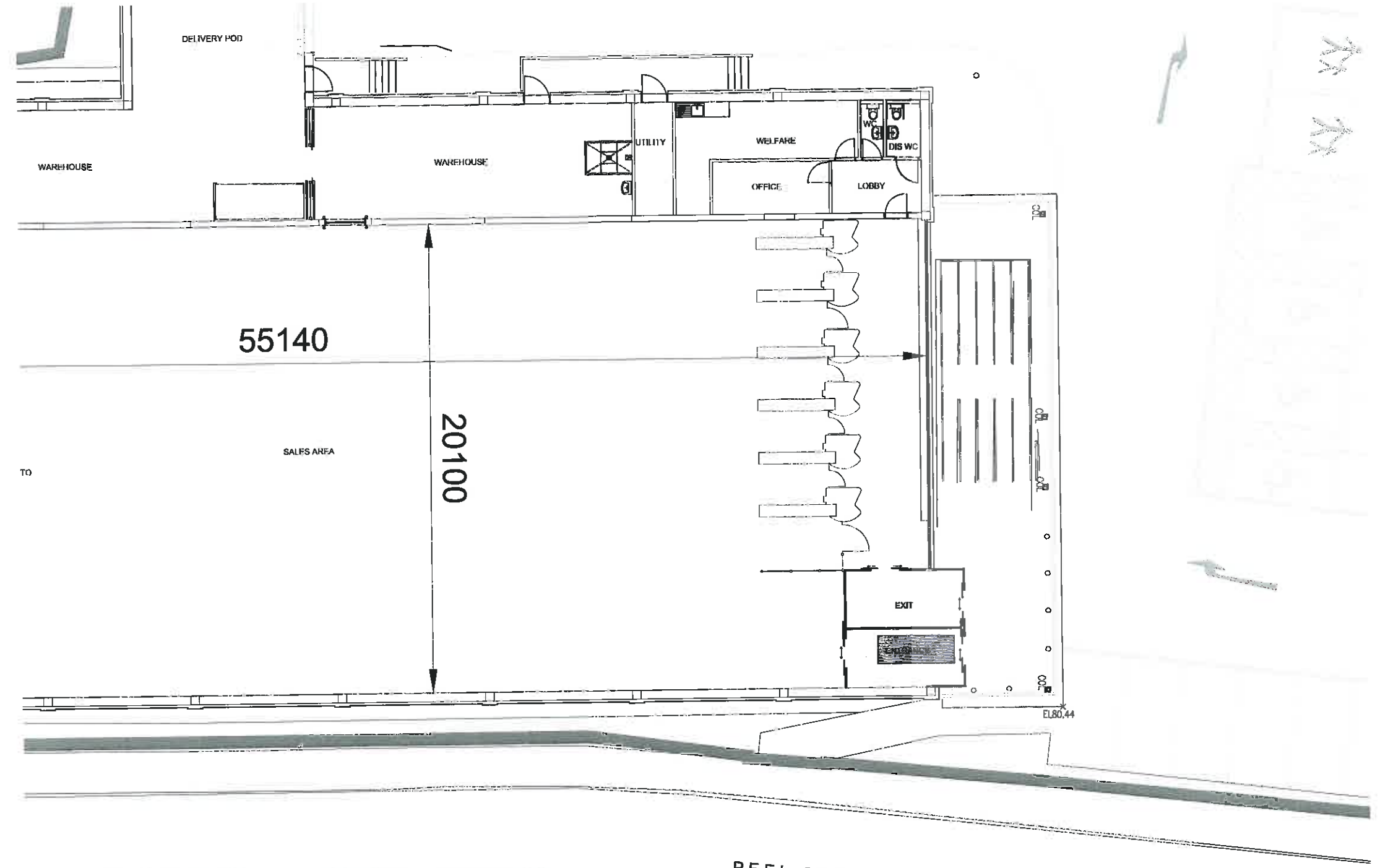
APPENDIX A


Ward Bdy
75.3m
SHAWBRIDGE STREET
Car Park
DELIVERY STORE
WAREHOUSE
SALES AREA
54 Car Park Spaces
(Inc 4 Accessible and 2 Parent and Child)
PEEL STREET
29
27
13
1
14
75.6m

APPENDIX B


Ward Bdy
75.3m
SHAWBRIDGE STREET
DELIVERY STORE
4800
WAREHOUSE
10540
55141
20130
SALES AREA
9 STAFF
CAR SPACES
63 Car Park Spaces
(Inc 4 Accessible, 2 Parent and
Child and 9 Staff spaces)
PEEL STREET
75.6m
29
27
13
1
14

5000
2500
01
05
06
09
10000
8 no. STAFF PARKING SPACES
5000
55140
20100
PEEL STREET
PEEL STREET
Longfield Cottages
MEARLEY BROOK
SHAWBRIDGE STREET
TCB
75.6m
DERE
21
29
27
13
1
14
22
28
26
24
3
1
2
6
8
49
51
59
65
67


DELIVERY POD
WAREHOUSE
WAREHOUSE
UTILITY
WELFARE
WC
DIS WC
OFFICE
LOBBY
55140
20100
SALES AREA
TO
EXIT
EL80.44
PEEL STREET
PEEL STREET

APPENDIX C

United Utilites Water Limited

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

Telephone 0370 751 0101

Property.searches@uuplc.co.uk

Your Ref: 17247
Our Ref: 1302102
Date: 21/6/2017

S C P Design

19 York Street

Manchester
M2 3BA

FAO: **Lucy Crann**

Dear Sirs

Location: **33 SHAW BRIDGE STREET CLITHEROE BB7 1LZ**

I acknowledge with thanks your request dated 19/06/17 for information on the location of our services.

Please find enclosed plans showing the approximate position of our apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

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.

I trust the above meets with you requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please telephone us on 0370 7510101.

Yours Faithfully,

Karen McCormack
Property Searches Manager

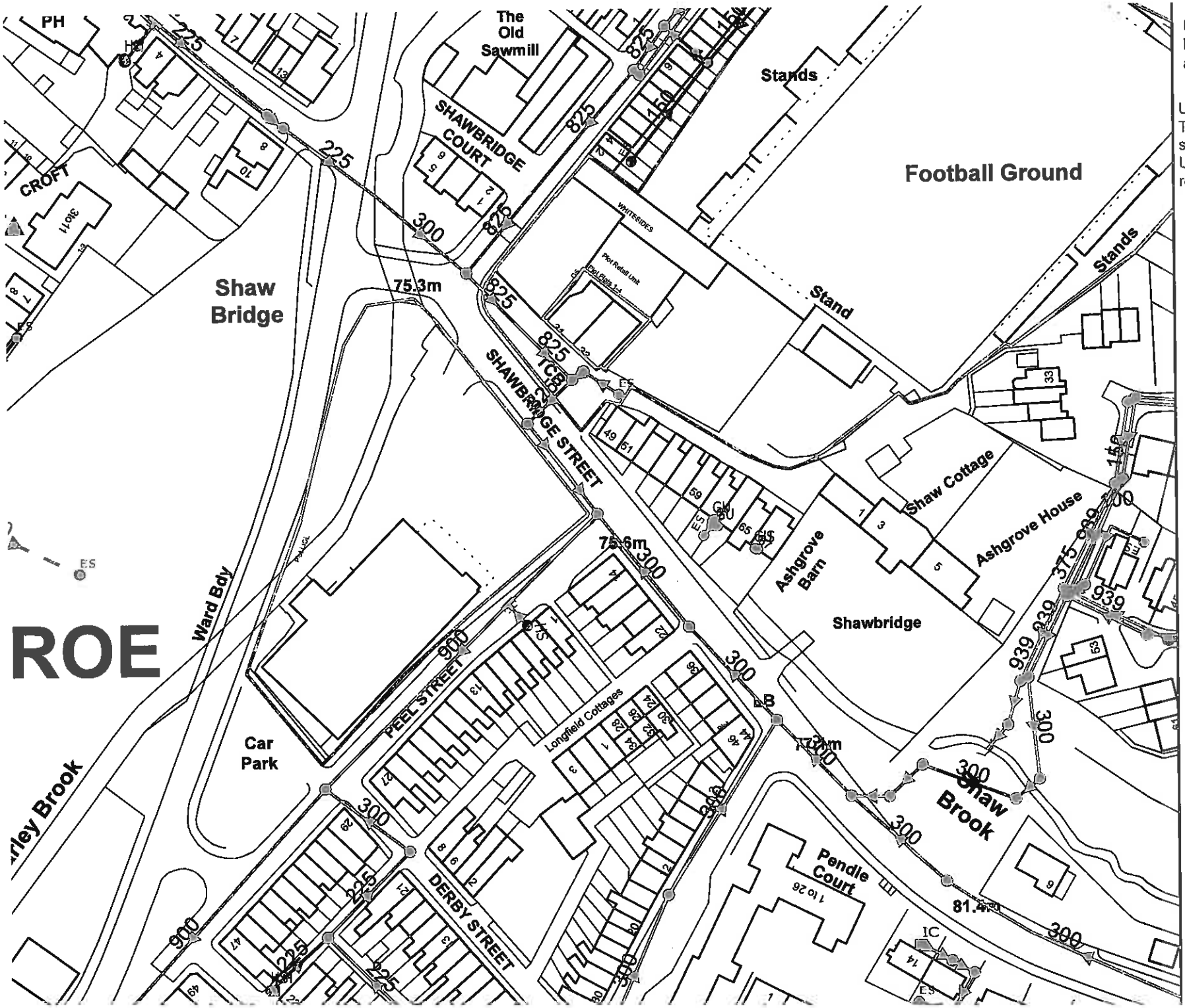
United Utilities Water Limited
Registered in England & Wales No. 2366678
Registered Office: Haweswater House,
Lingley Mere Business Park, Lingley Green Avenue,
Great Sankey, Warrington, WA5 3LP

TERMS AND CONDITIONS - WASTERWATER & WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self-construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
2. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
3. In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only and given in accordance with the best information available. The nature of the relevant system and/or its actual position may be different from that shown on the plan and UUWL is not liable for any damage caused by incorrect information provided save as stated in section 199 of the Water Industry Act 1991. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
4. The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
5. The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
8. If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
9. This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



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33 Shaw b
Clitl
BB7

Printed By: Property Se

DO NO

Approximate

United Utilities

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

Manhole
Manhole, Side Entry
MainSewer, Public
MainSewer, Private
MainSewer, S104
Rising Main, Public
Rising Main, Private
Rising Main, S104
Highway Drain, Private

Overflow
Sludge Main, Public
Sludge Main, Private
Sludge Main, S104

Abandoned Pipe
MainSewer
Rising Main
Highway Drain
Sludge Main

Foul Surface Combined
Septic Tank
Vent Column
Network Storage Tank
Orifice Plate
Vortex Chamber
Penstock Chamber
Blind Manhole

Foul Surface Combined
WW Site Termination
Air Valve
Cascade
Non Return Valve
Extent of Survey
Flow Meter
Gulley
Hatch Box
Head of System
Hydrobrake / Vortex
Inlet
Inspection Chamber
Bifurcation
Catchpit
WW Pumping Station

Foul Surface Combined
Sludge Pumping Station
Sewer Overflow
T Junction/Saddle
LampHole
Oilinterceptor
PenStock
Pump
RoddingEye
Soakaway
Summit
Valve
Valve Chamber
Washout Chamber
DropShaft
WW Treatment Works

Foul Surface Combined Overflow
Screen Chamber
Discharge Point
Outfall
Control Kiosk
Unspecified

Legend

MANHOLE FUNCTION		SEWER SHAPE			
FO	Foul	CI	Circular	TR	Trapezoidal
SW	Surface Water	EG	Egg	AR	Arch
CO	Combined	OV	Oval	BA	Barrel
OV	Overflow	PT	Flat Top	HO	Horseshoe
		RE	Rectangular	UN	Unspecified
		SQ	Square		

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	Masonry, Coursed
CC	Concrete Box Culverted	MA	Masonry, Random
PSC	Plastic / Steel	RP	Reinforced Plastic
GR	Glass Reinforced	CI	Cast Iron
GRP	Glass Reinforced	SI	Spun Iron
PVC	Polyvinyl Chloride	ST	Steel
PE	Polyethylene	U	Unspecified

CLEAN WATER SYMBOLOGY

PIPE WORK

Live Proposed

Trunk Main - PressurisedMain
Raw Water Aqueduct - PressurisedMain
Raw Water Aqueduct - GravityMain
LDTM Raw Water Distribution - PressurisedMain
LDTM Raw Water Distribution - GravityMain
LDTM Treated Water Distribution - PressurisedMain
LDTM Treated Water Distribution - GravityMain
Private Pipe - LateralLine
Distribution Main - PressurisedMain
Comms Pipe - LateralLine
Concessionary Service - LateralLine

ABANDONED PIPE

Trunk Main
Raw Water Aqueduct
LDTM Raw Water Distribution
LDTM Treated Water Distribution
Private Pipe
Distribution Main
Comms Pipe
Concessionary Service

NODES/FURNITURES

Live Proposed

End Cap
CC Valve
AC Valve
Air Valve
Sluice Valve
Non Return Valve
Pressure Management Valve
Change of Characterstic
Anode
Chlorination Point
De Chlorination Point
Bore Hole
Inlet Point
Bulk Supply Point
Fire Hydrant
Hydrant

Live Proposed

Private Fire Hydrant
Pump
Site Termination
Service Start
Service End
Process Meter
Stop Tap
Monitor Location
Strainer Point
Access Point
Hatch Box
IP Point
Route Marker
Sampling Station
Logger Box

PROPERTY TYPES

Live Proposed

Condition Report
Pipe Bridges
Tunnels (non carrier)
Pumping Station
Water Treatment Works
Private Treatment Works

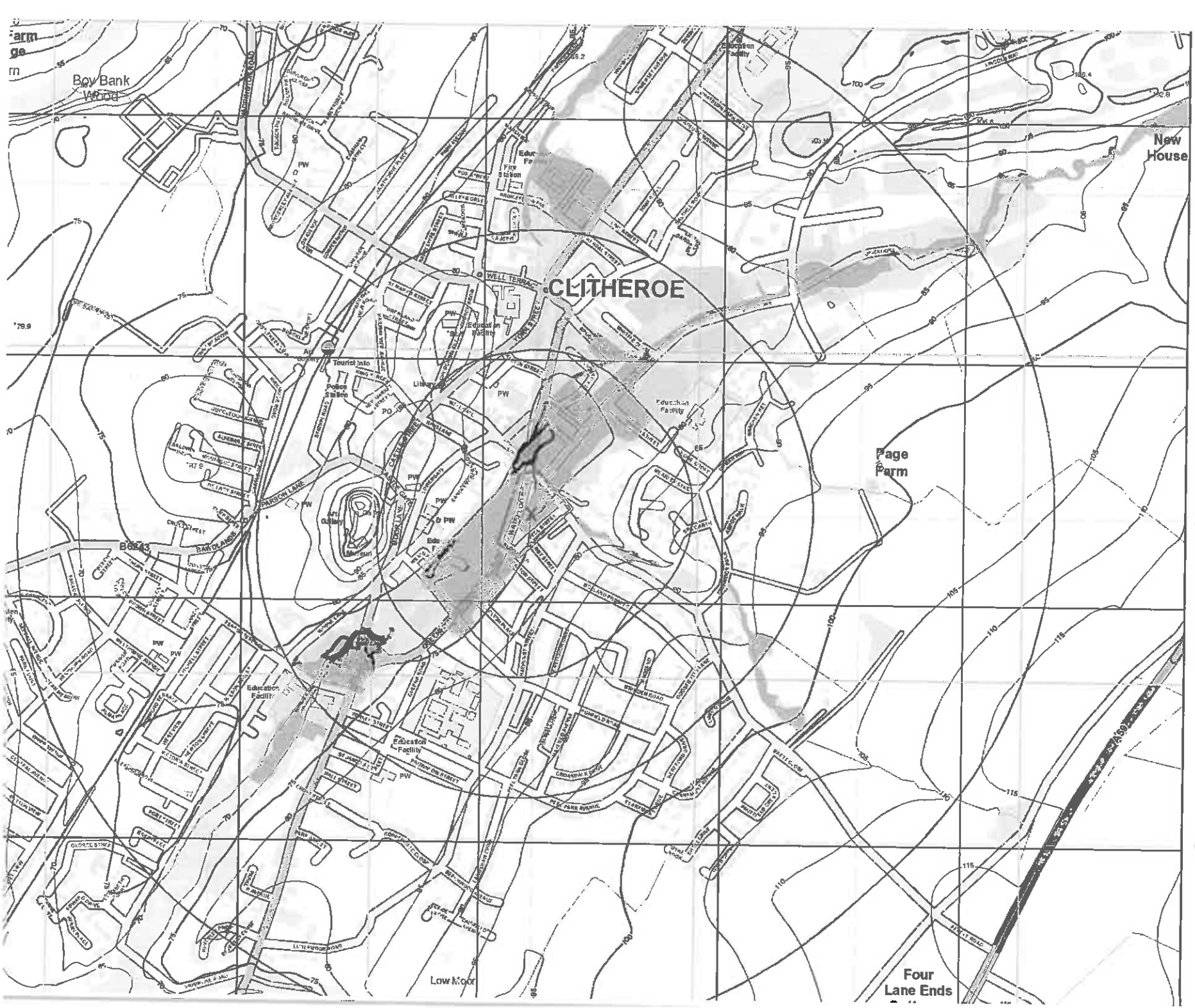
Live Proposed

Valve House
Water Tower
Service Reservoir
Supply Reservoir
Abstraction Point
Domestic meter
Commercial meter
Telemetry Outstation

Legend

MATERIAL TYPES		LINING TYPES	
AC	ASBESTOS CEMENT	CL	CEMENT LINING
CI	CAST IRON	TB	TAR OR BITUMEN
CU	COPPER	ERL	EPOXY RESIN
CO	CONCRETE		
DI	DUCTILE IRON	INSERTION TYPES	
GI	GALVANISED IRON		
GR	GREY IRON	OD	ONE DRAWN
OT	OTHERS	DR	DIRECTIONAL DRILLING
PB	LEAD	MO	MOLING
PV	uPVC	PI	PIPELINE
SI	SPUN IRON	SL	SLIP LINED
ST	STEEL		
UN	UNKNOWN		
PE	POLYETHYLENE		

APPENDIX D



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Flood Data

- Extreme Flooding from Ri
- Flooding from Rivers or S
- Area Benefiting from Floo
- Flood Water Storage Are
- Flood Defence

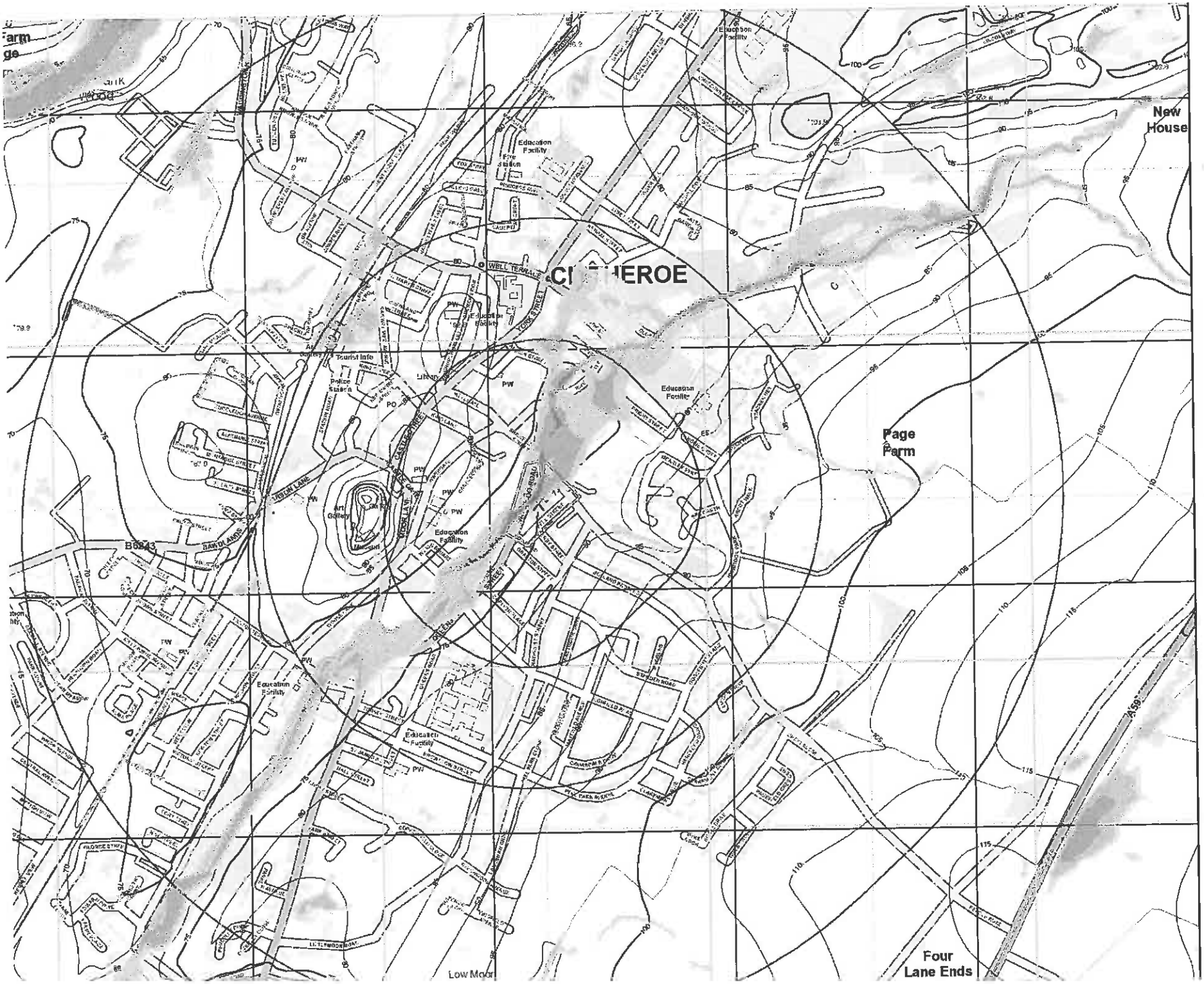
Contours (height in metr

- Standard Contour
- Master Contour
- Spot Height

EA/NRW Flood D

Order Details

Order Number:
Customer Ref:
National Grid Reference
Slice:
Site Area (Ha):
Search Buffer (m):



General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Modelled Flood De

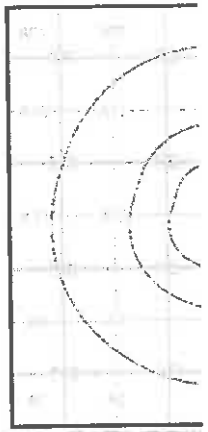
Pluvial Depth Fl

- 0.1m
- 0.1m - 0.3m
- 0.3m - 1m
- >1m

Contours (height in metre

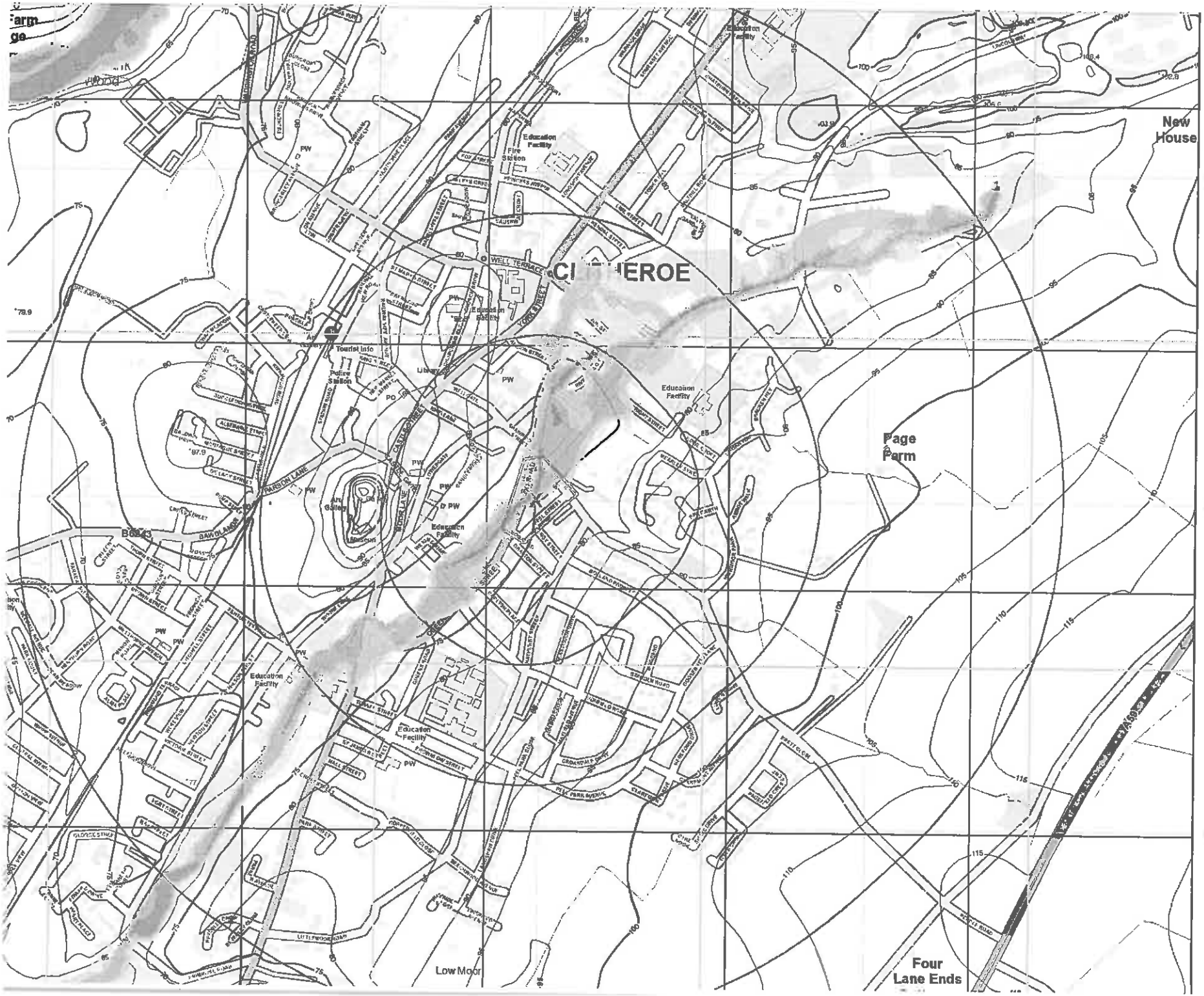
- Standard Contour
- Master Contour
- Spot Height

JBA 75 Year Retur Slice A



Order Details

Order Number:
Customer Ref:
National Grid Reference
Slice:
Site Area (Ha):
Search Buffer (m):



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Modelled Flood De

Fluvial Depth C

- 0.01m - 0.05m
- 0.05m - 0.1m
- 0.1m - 0.3m
- 0.3m - 1m
- >1m

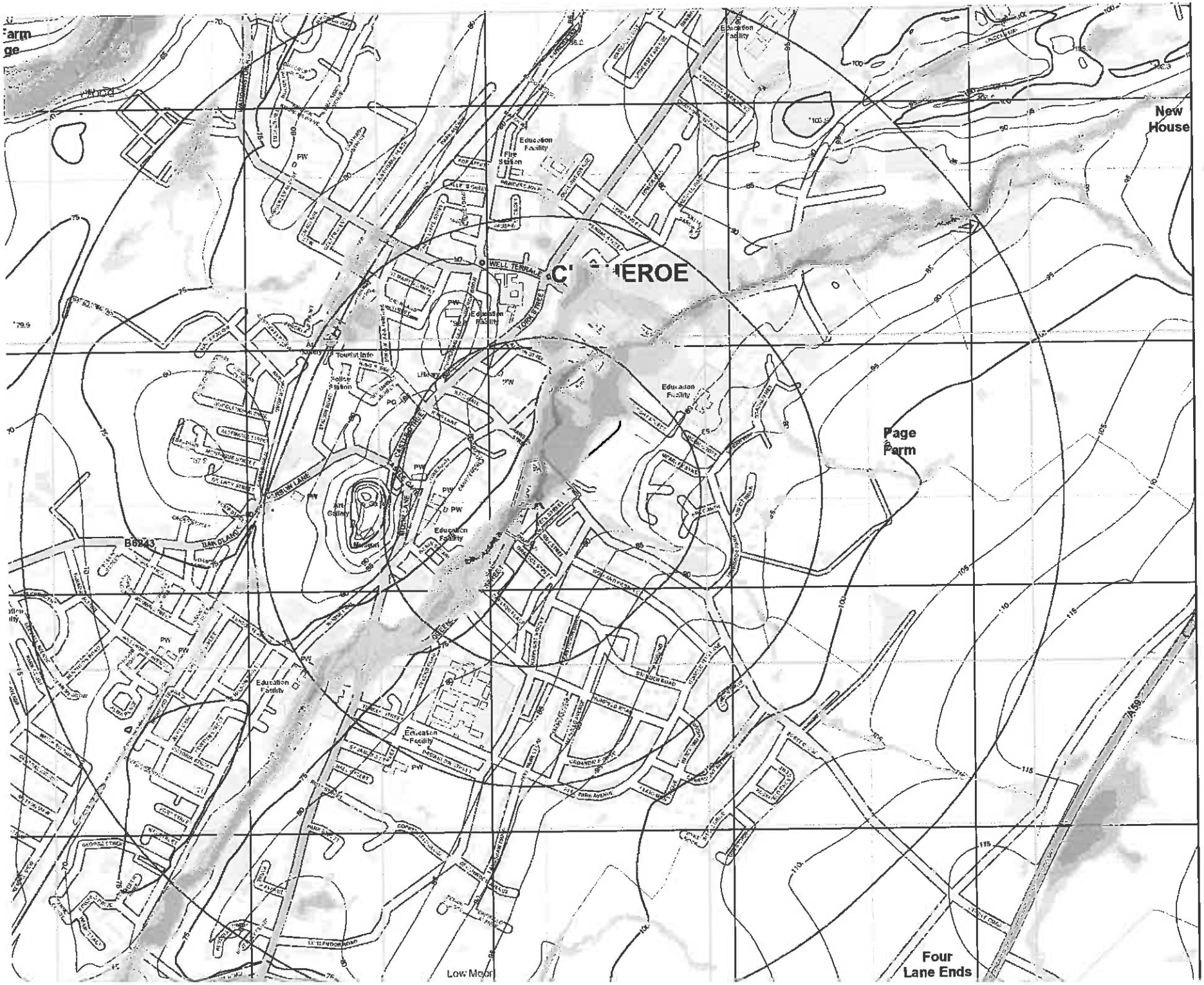
Contours (height in metr

- Standard Contour
- Master Contour
- Spot Height

JBA 100 Year Retu Slice A

Order Details

Order Number:
Customer Ref:
National Grid Reference
Slice:
Site Area (Ha):
Search Buffer (m):



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Modelled Flood De

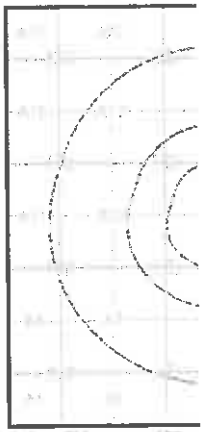
Pluvial Depth Fl

- 0.1m
- 0.1m - 0.3m
- 0.3m - 1m
- >1m

Contours (height in metre

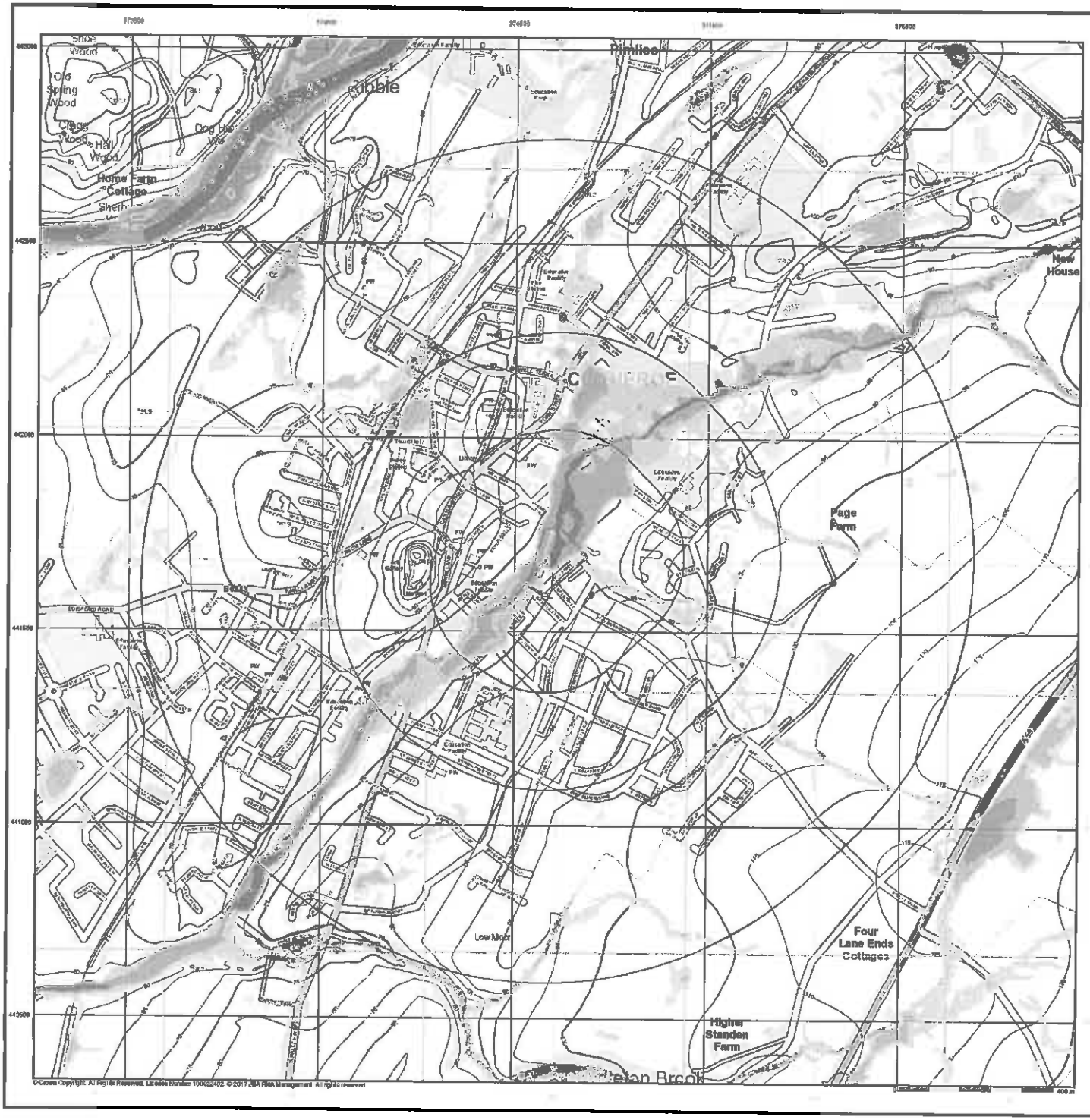
- Standard Contour
- Master Contour
- Spot Height

JBA 200 Year Retu Slice A



Order Details

Order Number:
Customer Ref:
National Grid Reference
Slice:
Site Area (Ha):
Search Buffer (m):



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LANDMARK INFORMATION GROUP

JBA 1000 Year Return Flood Map (Undefended) (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Modelled Flood Depth

Pluvial Depth	Fluvial Depth	Coastal Depth
0.1m	0.01m - 0.05m	0.01m - 0.05m
0.1m - 0.3m	0.05m - 0.1m	0.05m - 0.1m
0.3m - 1m	0.1m - 0.3m	0.1m - 0.3m
>1m	0.3m - 1m	0.3m - 1m
	>1m	>1m

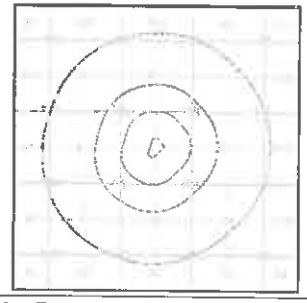
Contours (height in metres)

Standard Contour — Mean Low Water

Master Contour — Mean High Water

Spot Height

JBA 1000 Year Return Flood Map (Undefended) - Slice A



Order Details

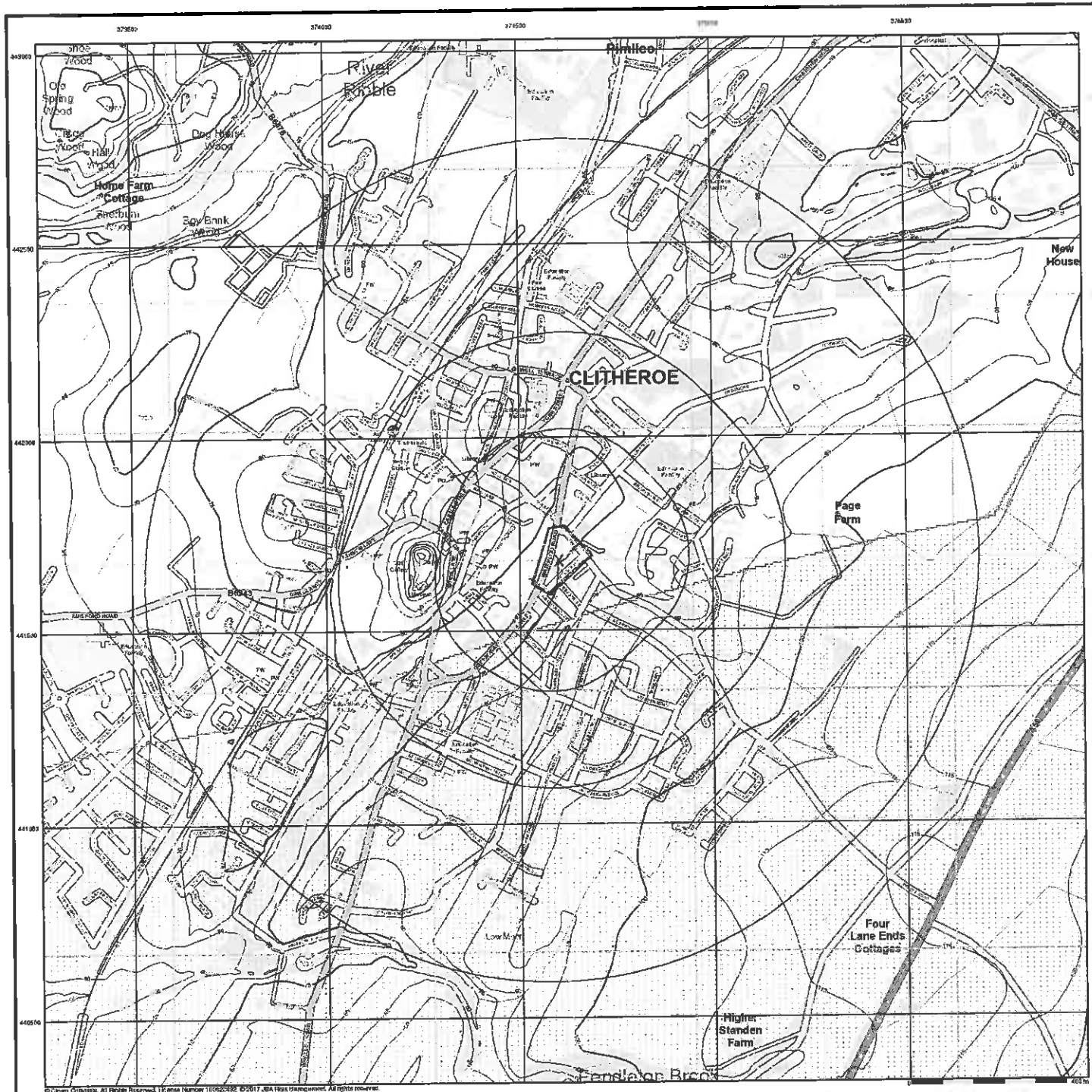
Order Number:	128939473_1_1
Customer Ref:	17247 - LC
National Grid Reference:	374600, 441680
Slice:	A
Site Area (Ha):	1.53
Search Buffer (m):	1000

Site Details

Lidl UK GMBh, Shawbridge Street, CLITHEROE, BB7 1LZ

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck

LANDMARK INFORMATION GROUP

JBA Canal Failure Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

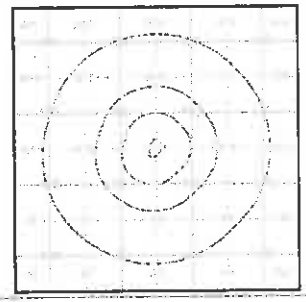
Flood Data

- Canal Failure
- Coverage

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- MLW Mean Low Water
- MHW Mean High Water

JBA Canal Failure Flood Map - Slice A



Order Details

Order Number:	128939473_1_1
Customer Ref:	17247 - LC
National Grid Reference:	374600, 441680
Slice:	A
Site Area (Ha):	1.53
Search Buffer (m):	1000

Site Details

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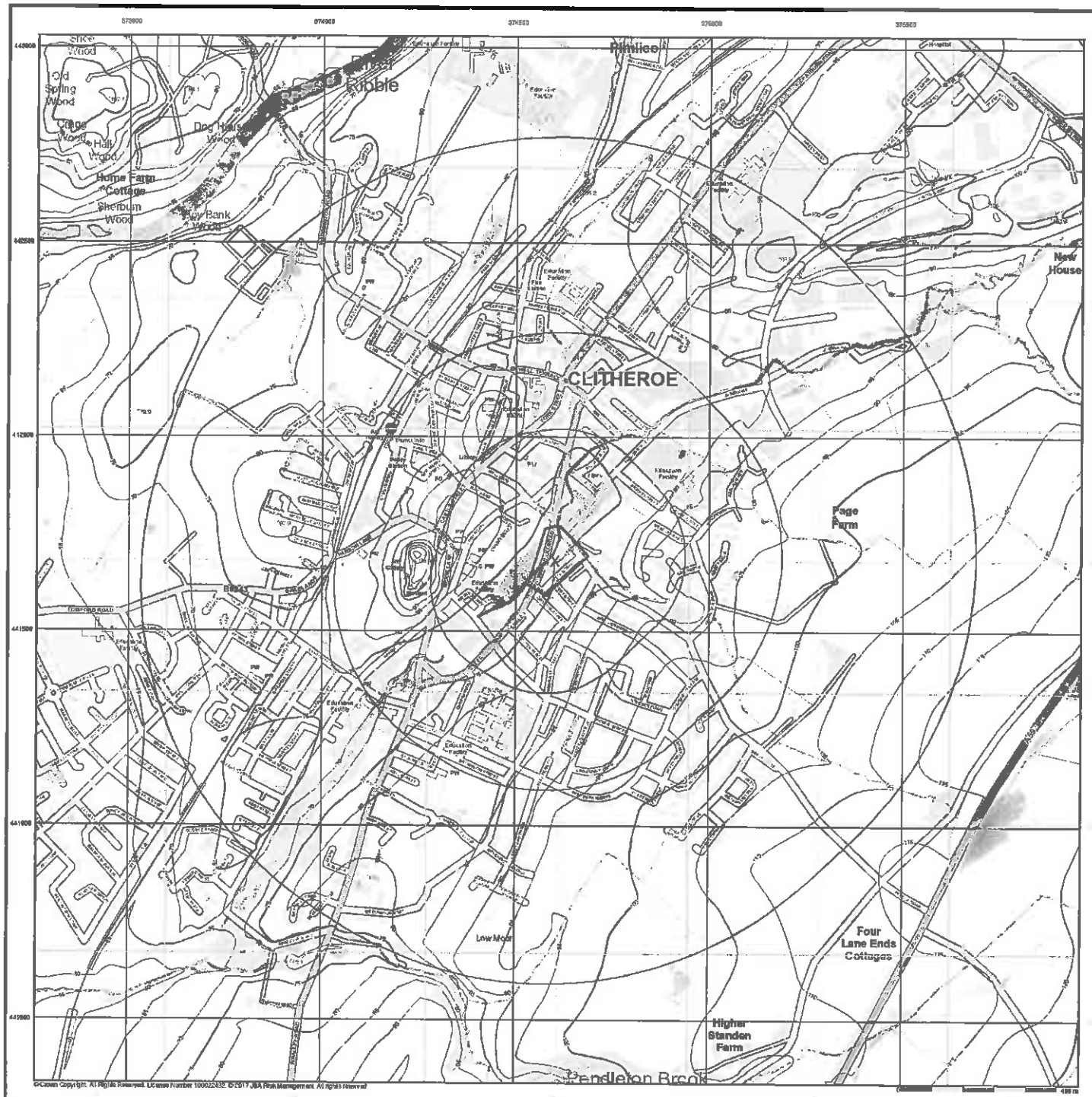


Envirocheck®

LANDMARK INFORMATION GROUP

EA/NRW Surface Water 30 Year Return Depth Map (1:10,000)

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

Surface Water Depth

- 0 - 0.15m
- 0.15 - 0.30m
- 0.30 - 0.60m
- 0.60 - 0.90m
- 0.90 - 1.20m
- > 1.20m

Contours (height in metres)

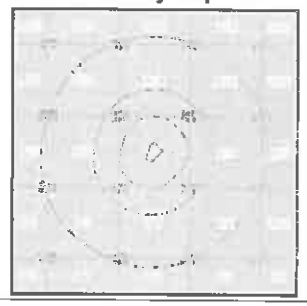
Standard Contour | Master Contour | Spot Height | MLW Mean Low Water | MHW Mean High Water

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



Order Details

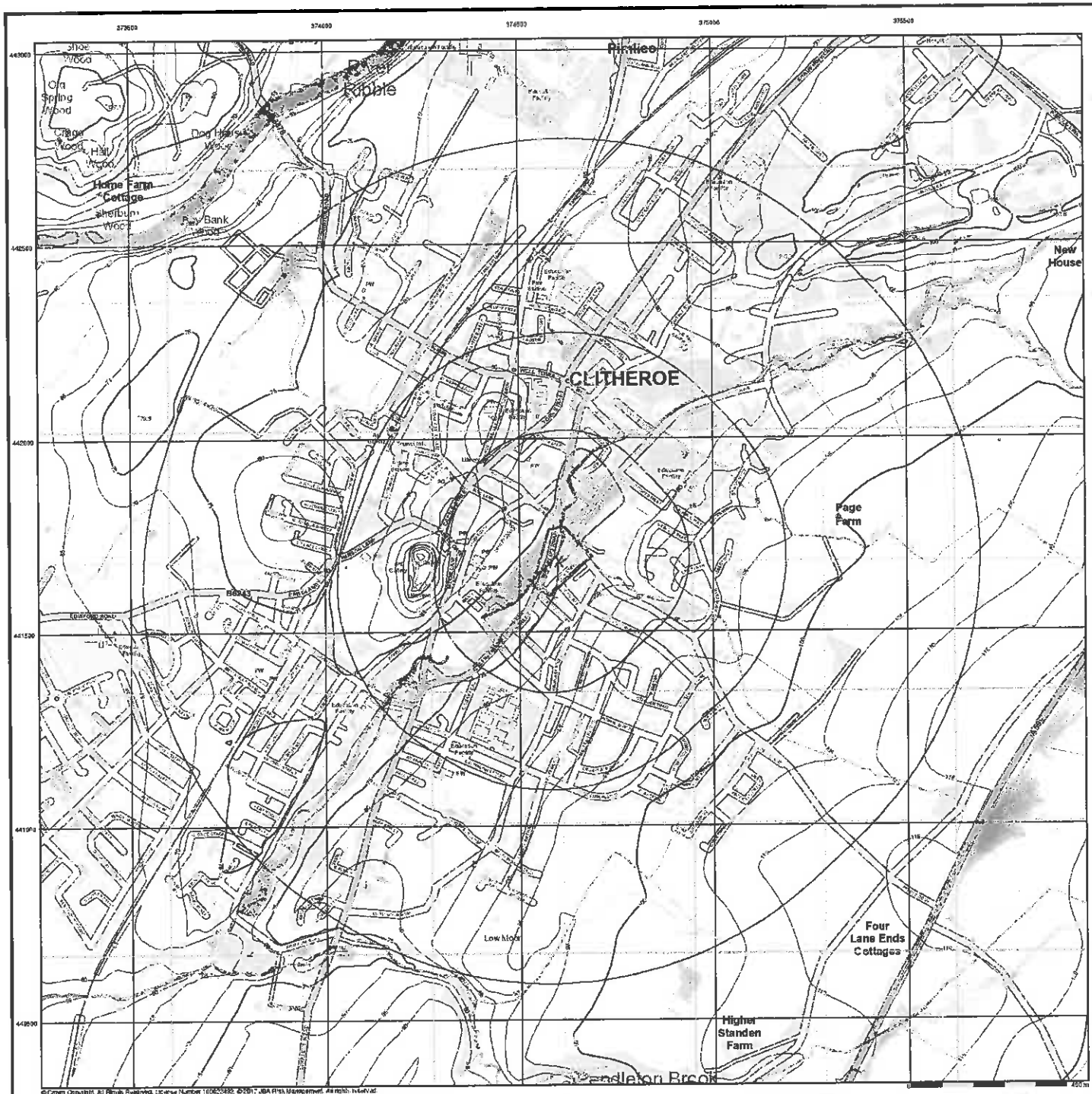
Order Number:	126939473_1_1
Customer Ref:	17247 - LC
National Grid Reference:	374600, 441680
Slice:	A
Site Area (Ha):	1.53
Search Buffer (m):	1000

Site Details

Lidl UK GMBh, Shawbridge Street, CLITHEROE, BB7 1LZ

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck

LANDMARK INFORMATION GROUP

EA/NRW Surface Water 100 Year Return Depth Map

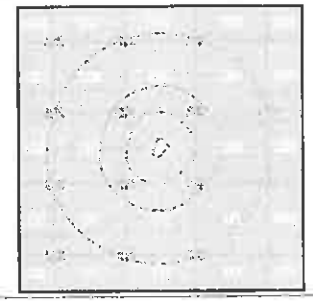
General
Specified Site | Specified Buffer(s) | Bearing Reference Point

Surface Water Depth
- 0 - 0.15m
- 0.15 - 0.30m
- 0.30 - 0.60m
- 0.60 - 0.90m
- 0.90 - 1.20m
- >1.20m

Contours (height in metres)
Standard Contour | Master Contour | Spot Height
=MLW= Mean Low Water
=MHW= Mean High Water

Suitability
See the suitability map below
- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



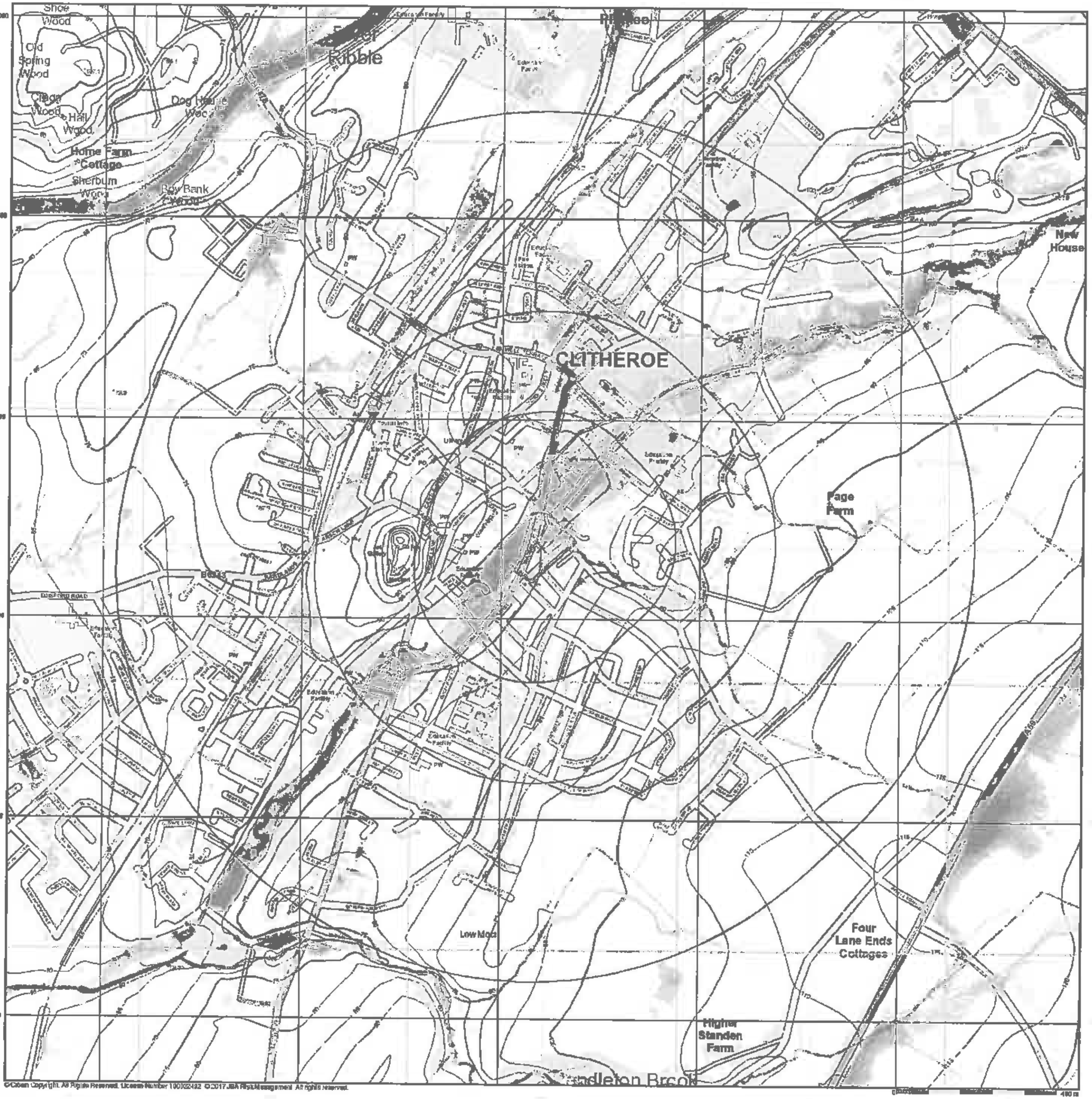
Order Details

Order Number:	128939473_1_1
Customer Ref:	17247 - LC
National Grid Reference:	374600, 441680
Slice:	A
Site Area (Ha):	1.53
Search Buffer (m):	1000

Site Details

Lidl UK GMBh, Shawbridge Street, CLITHEROE, BB7 1LZ

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP

EA/NRW Surface Water 1000 Year Return Depth Map (1:10,000)

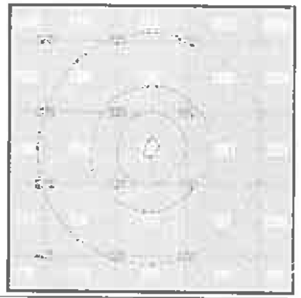
General
Specified Site · Specified Buffer(s) · X Bearing Reference Point

Surface Water Depth
- 0 - 0.15m
- 0.15 - 0.30m
- 0.30 - 0.60m
- 0.60 - 0.90m
- 0.90 - 1.20m
- > 1.20m

Contours (height in metres)
- Standard Contour
- Master Contour
- Spot Height
- MLW Mean Low Water
- MHW Mean High Water

Suitability
See the suitability map below
- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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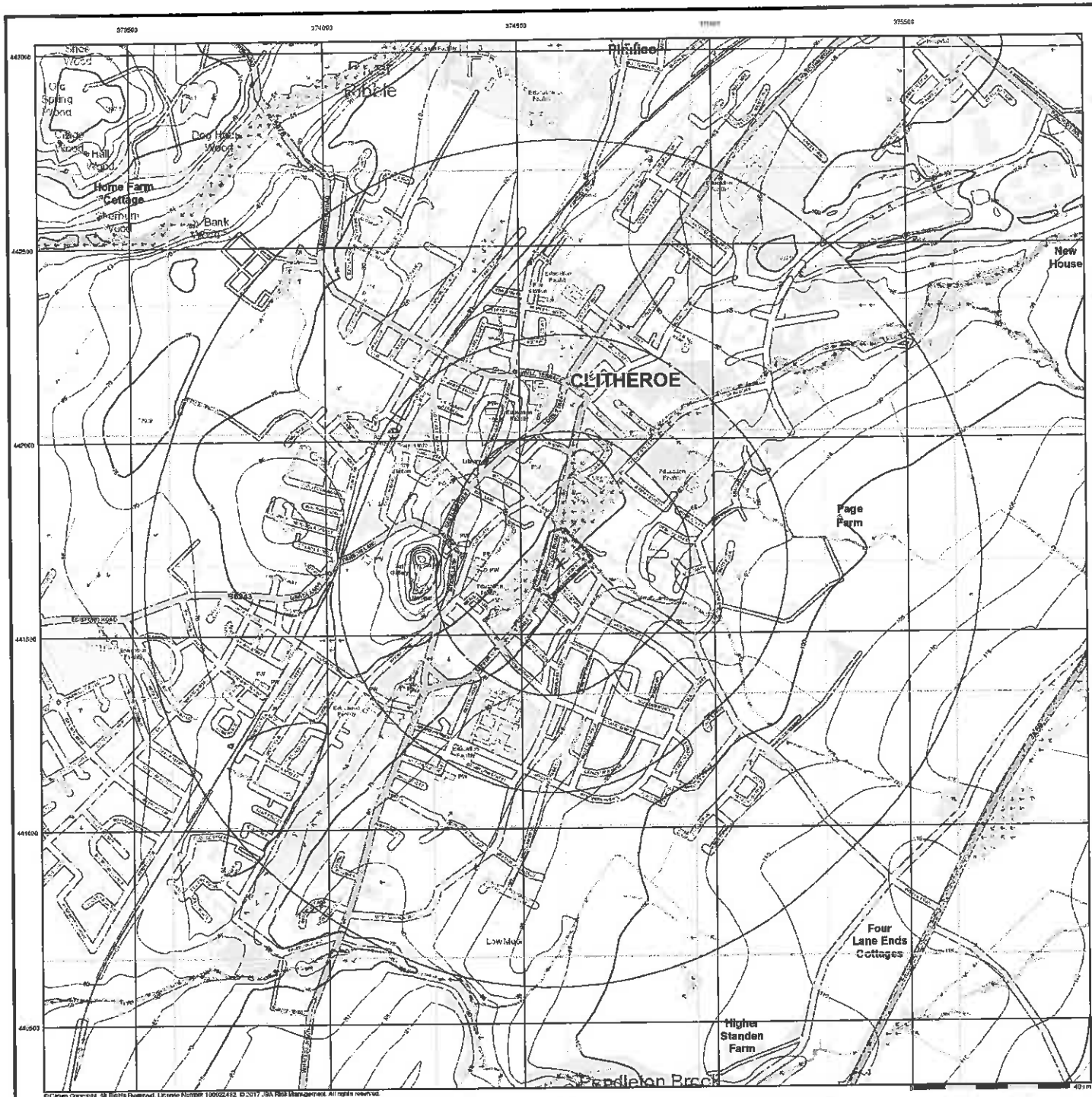

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LANDMARK INFORMATION GROUP

EA/NRW Surface Water 30 Year Return Velocity and Flow Direction Map (1:10,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point

Surface Water Velocity and Direction

- 0.00 - 0.25m/s
- 0.25 - 0.50m/s
- 0.50 - 1.00m/s
- 1.00 - 2.00m/s
- > 2.00m/s

Flow Direction at maximum velocity

Contours (height in metres)

Standard Contour | Mean Low Water

Master Contour | Mean High Water

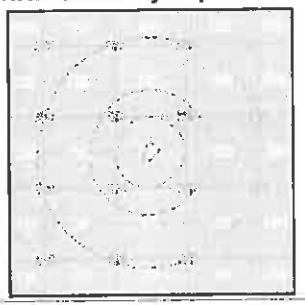
Spot Height

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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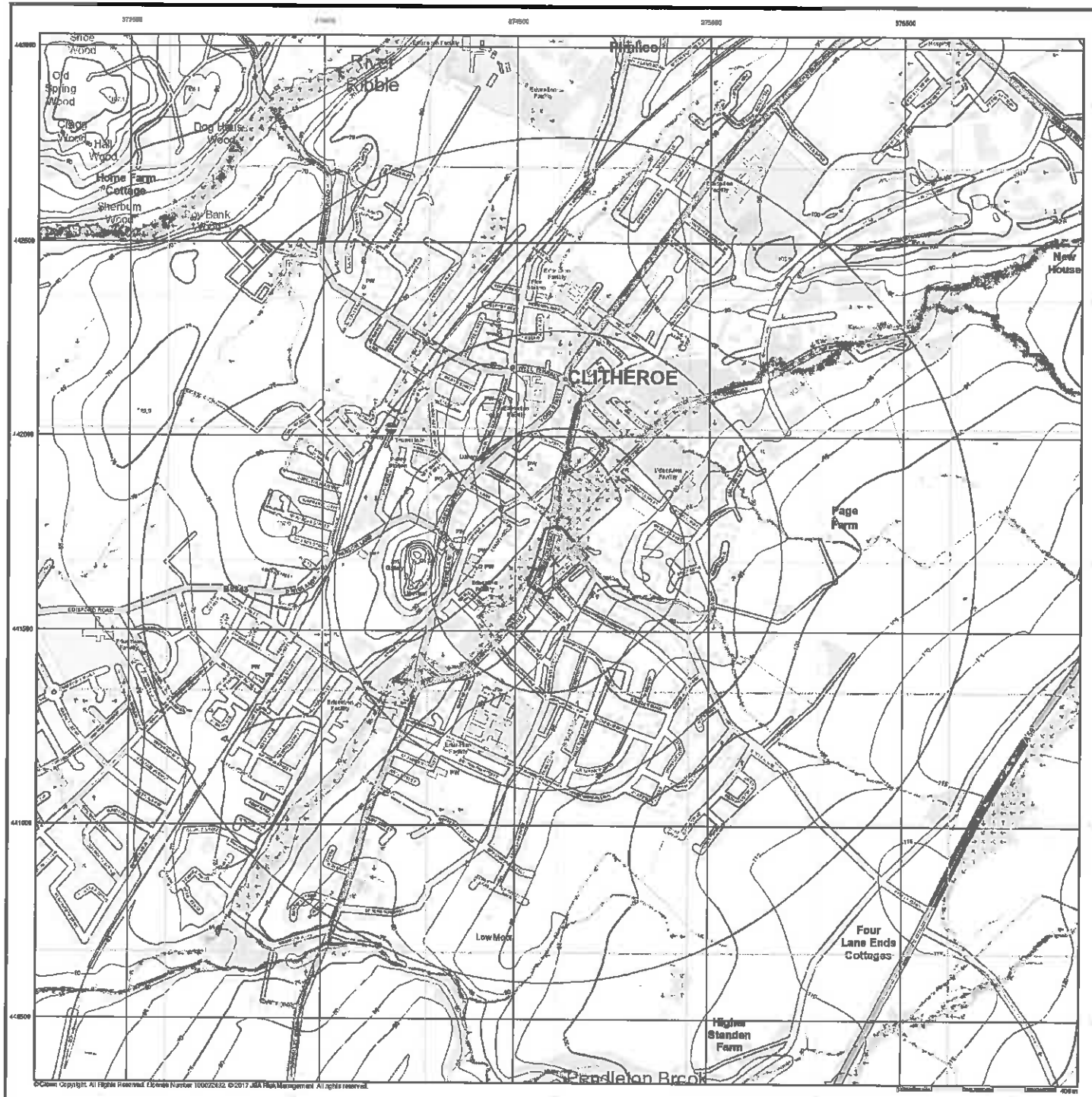


Envirocheck

LANDMARK INFORMATION GROUP

EA/NRW Surface Water 100 Year Return Velocity and Flow Direction Map (1:10,000)

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

Surface Water Velocity and Direction

- 0.00 - 0.25m/s
- 0.25 - 0.50m/s
- 0.50 - 1.00m/s
- 1.00 - 2.00m/s
- > 2.00m/s

↑ Flow Direction at maximum velocity

Contours (height in metres)

Standard Contour | Master Contour | Spot Height

MLW Mean Low Water

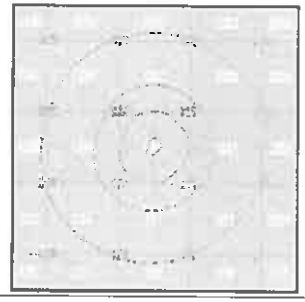
MHW Mean High Water

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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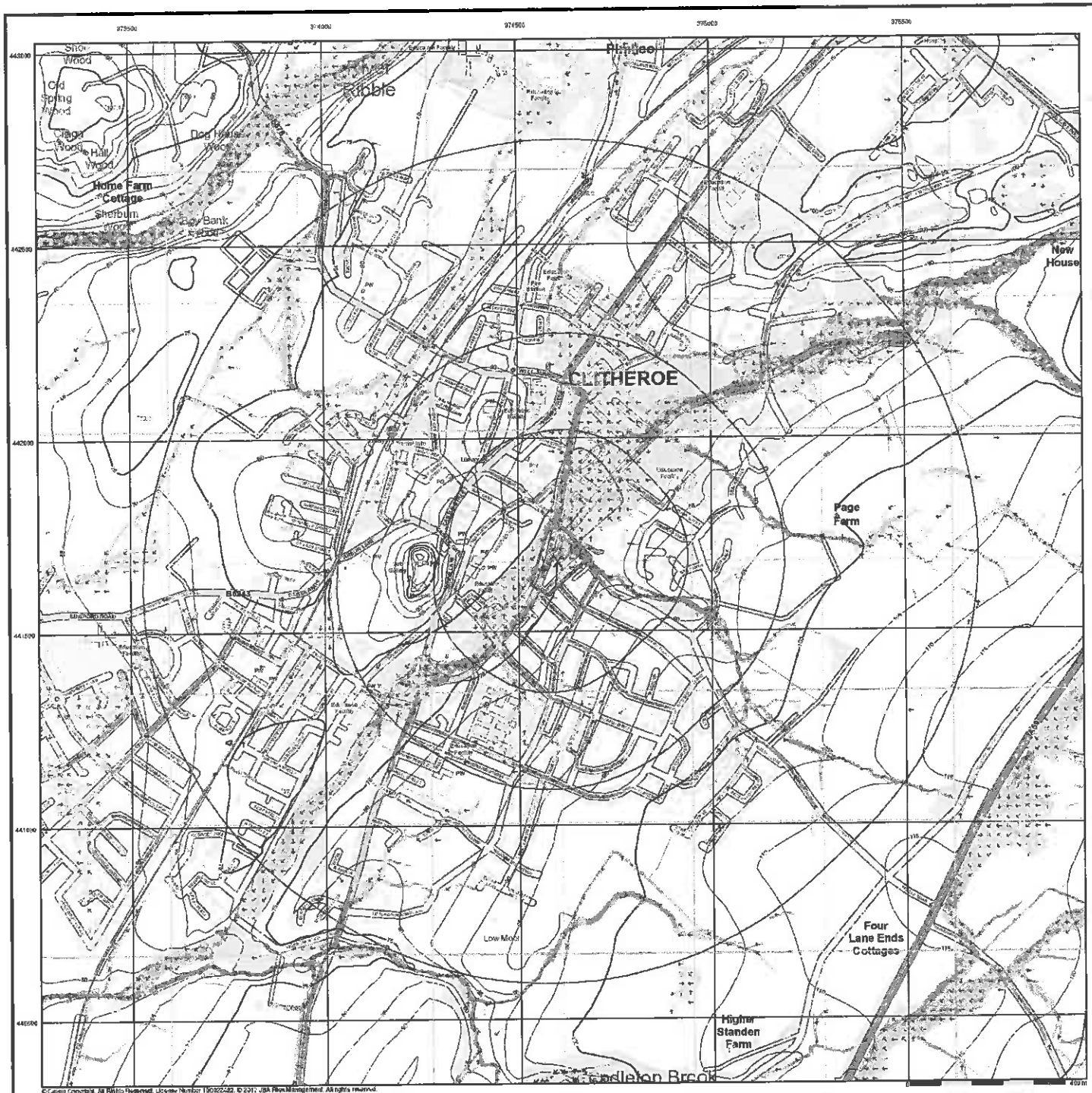

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LANDMARK INFORMATION GROUP

EA/NRW Surface Water 1000 Year Return Velocity and Flow Direction Map (1:10,000)

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

Surface Water Velocity and Direction

- 0.00 - 0.25m/s
- 0.25 - 0.50m/s
- 0.50 - 1.00m/s
- 1.00 - 2.00m/s
- > 2.00m/s

↑ Flow Direction at maximum velocity

Contours (Height in metres)

Standard Contour | Master Contour | Spot Height

MLW Mean Low Water

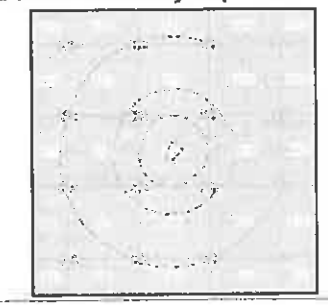
MHW Mean High Water

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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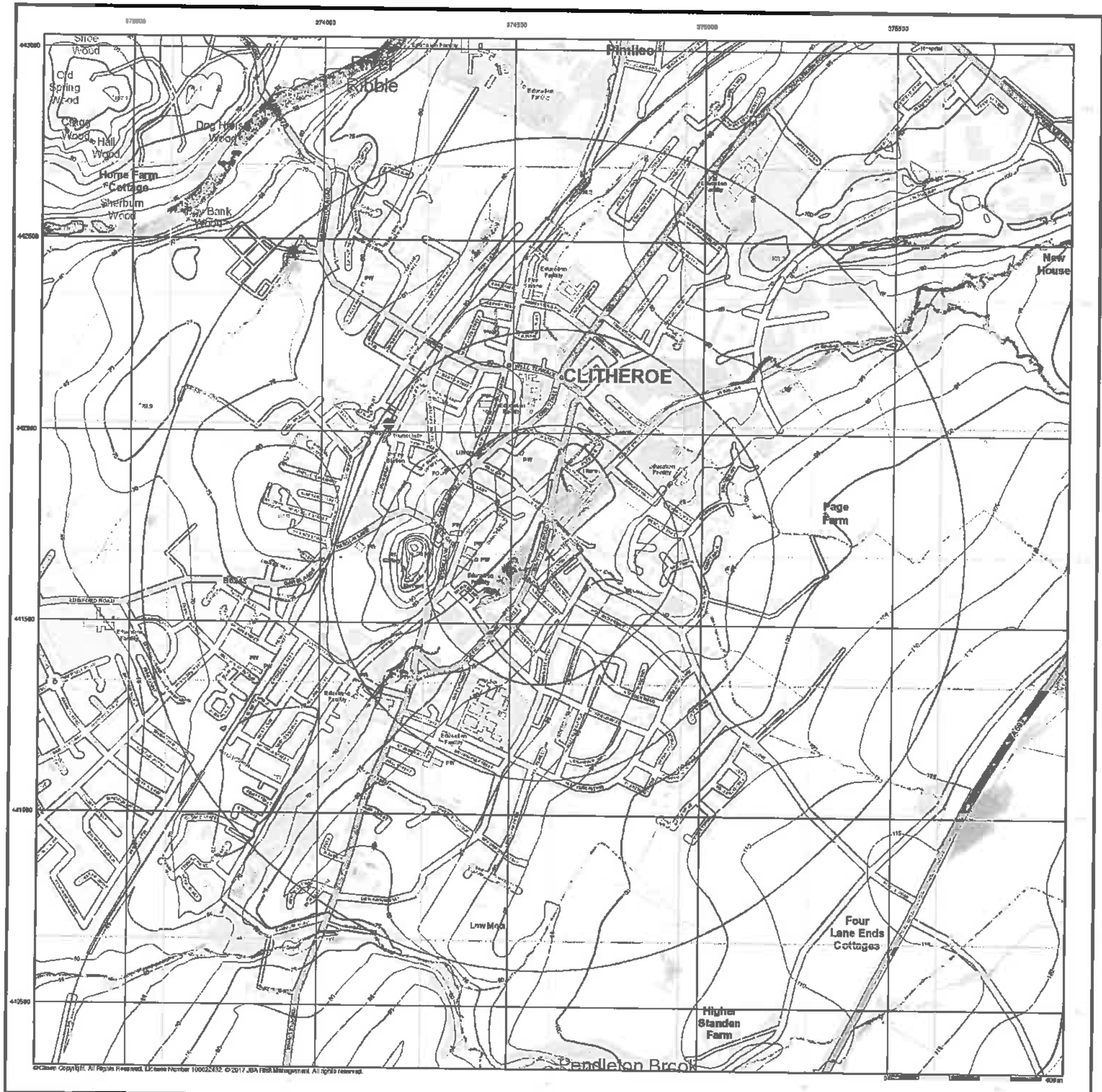

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LANDMARK INFORMATION GROUP

EA/NRW Surface Water 30 Year Return Hazard Rating Map (1:10,000)

General

Specified Site — Specified Buffer(s) — X Bearing Reference Point

Surface Water Hazard Rating

- Low (0.5 – 0.75)
- Moderate (0.75 – 1.25)
- Significant (1.25 – 2.0)
- Extreme (>2.0)

Contours (height in metres)

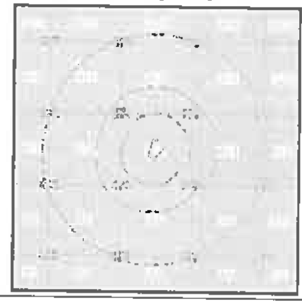
- Standard Contour
- Master Contour
- Spot Height
- MLW — Mean Low Water
- MHW — Mean High Water

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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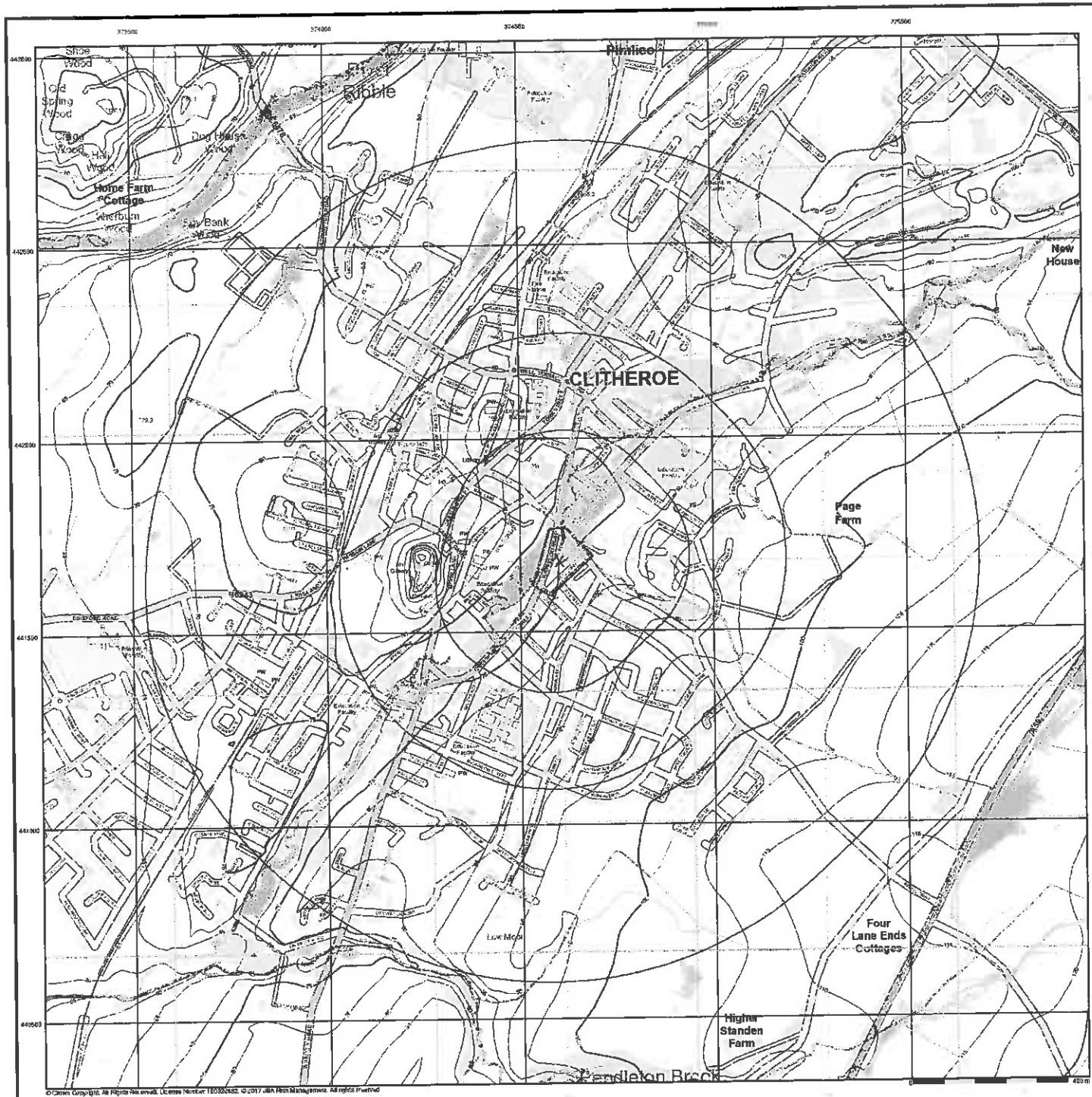

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LANDMARK INFORMATION GROUP

EA/NRW Surface Water 100 Year Return Hazard Rating Map (1:10,000)

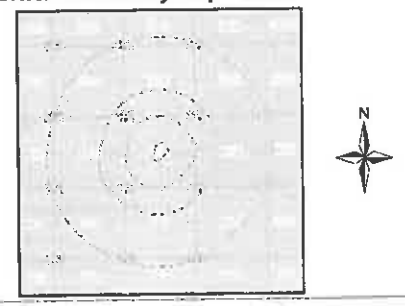
General
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Surface Water Hazard Rating
- Low (0.5 - 0.75)
- Moderate (0.75 - 1.25)
- Significant (1.25 - 2.0)
- Extreme (>2.0)

Contours (height in metres)
Standard Contour | Master Contour | Spot Height | MLW Mean Low Water | MHW Mean High Water

Suitability
See the suitability map below
- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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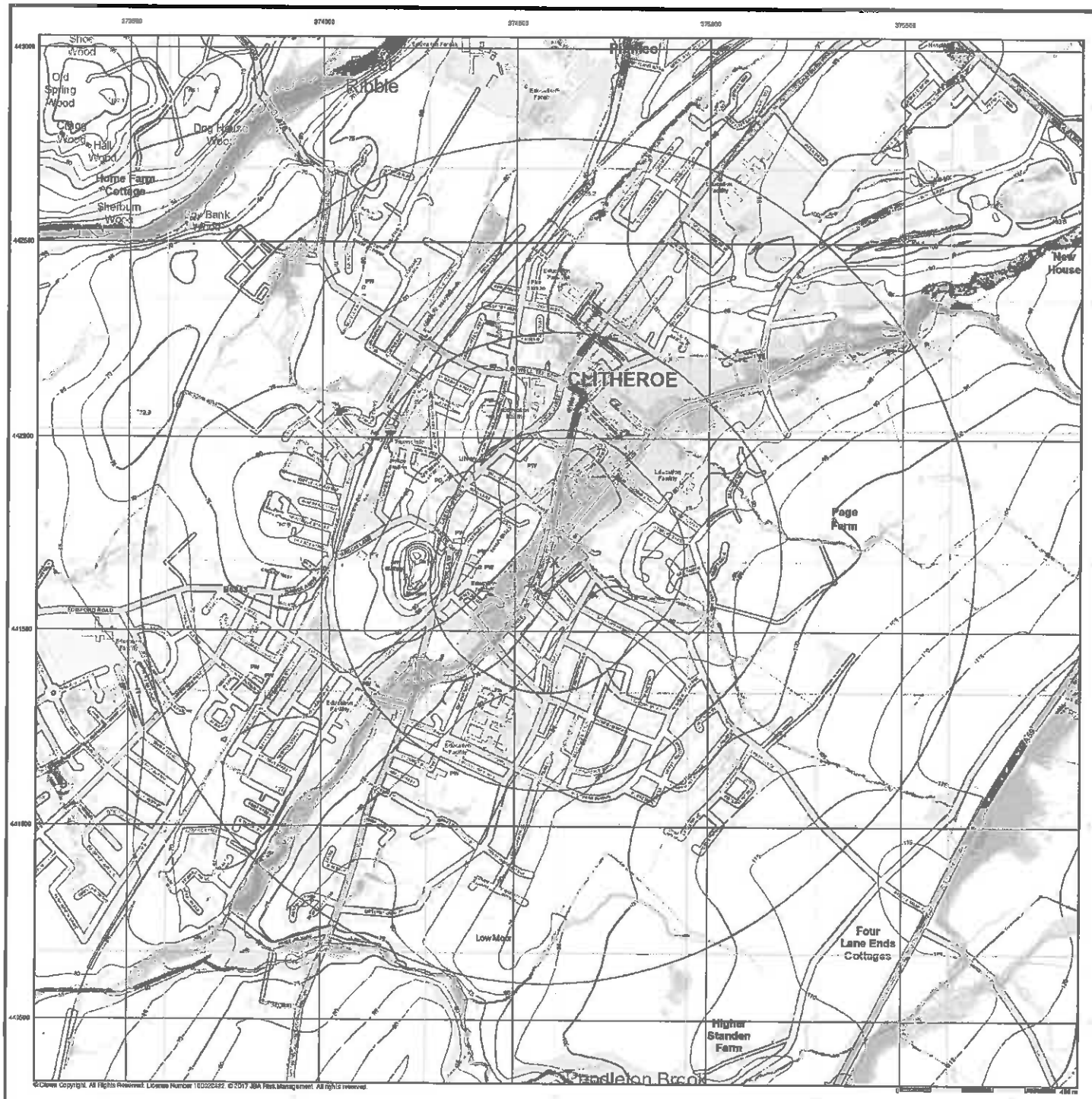

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LANDMARK INFORMATION GROUP

EA/NRW Surface Water 1000 Year Return Hazard Rating Map (1:10,000)

General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

Surface Water Hazard Rating

- Low (0.6 – 0.75)
- Moderate (0.75 – 1.25)
- Significant (1.25 – 2.0)
- Extreme (>2.0)

Contours (height in metres)

Standard Contour | Master Contour | Spot Height

MLW = Mean Low Water

MHW = Mean High Water

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
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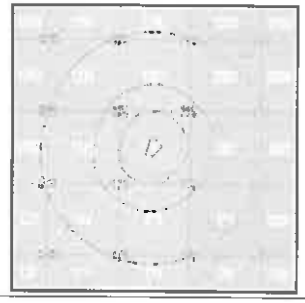
- Property

EA/NRW Suitability Map - Slice A



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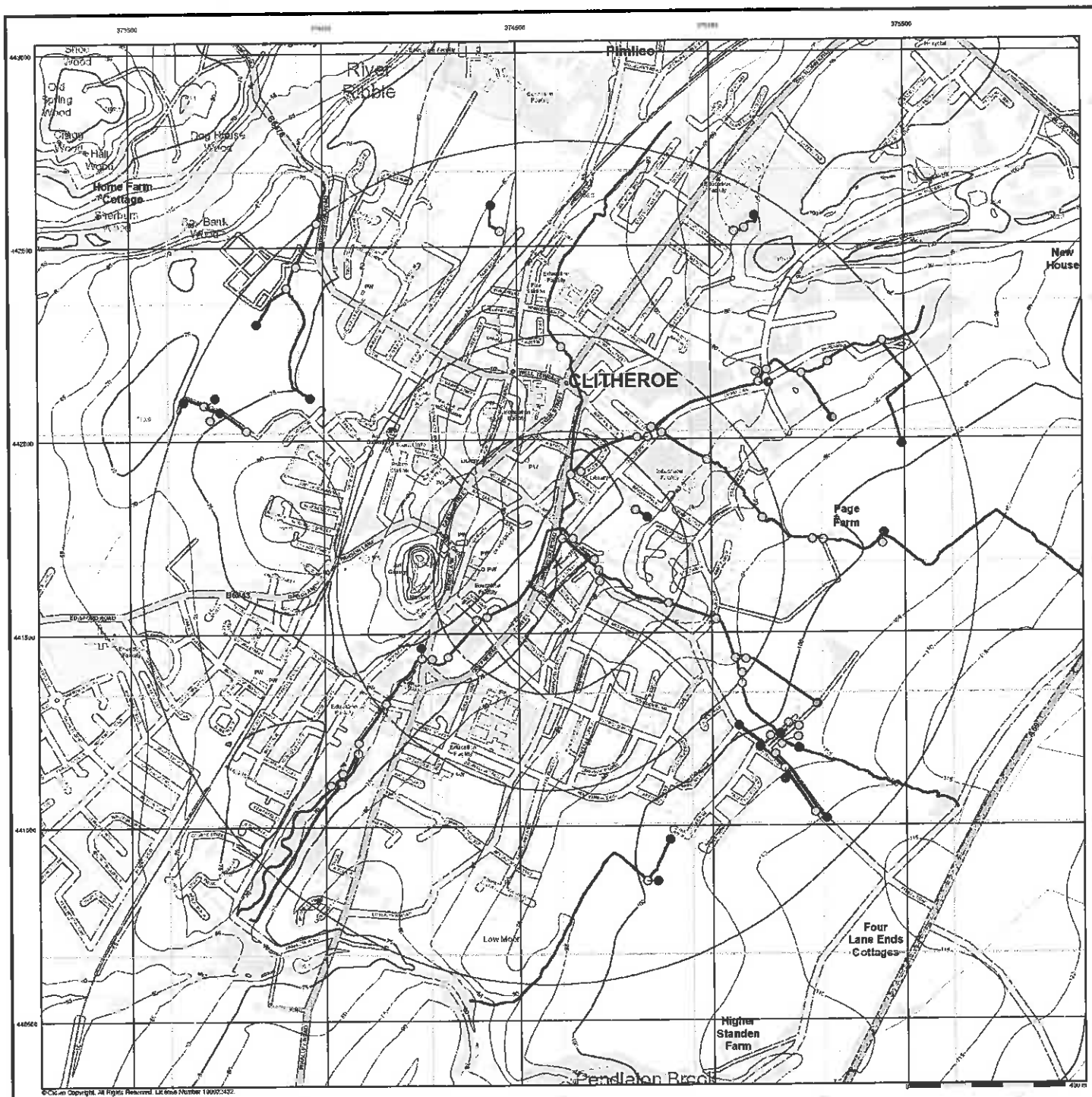

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LANDMARK INFORMATION GROUP

OS Water Network Lines Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

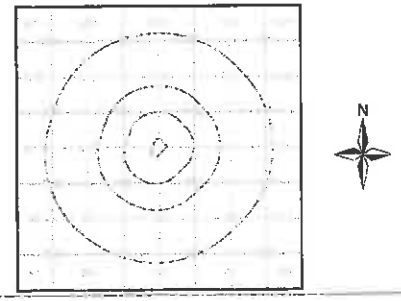
OS Water Network Data

- Canal
- Drain
- Reservoir
- Other
- Foreshore
- Lake
- Marsh
- Transfer
- Tidal River
- Lock Or Flight Of Locks
- Inland River
- Sea
- Junction
- Source
- Outlet
- Other
- Pseudo

Contours (height in meters)

- Standard Contour
- Mean Low Water
- Master Contour
- Mean High Water
- Spot Height

OS Water Network Map - Slice A



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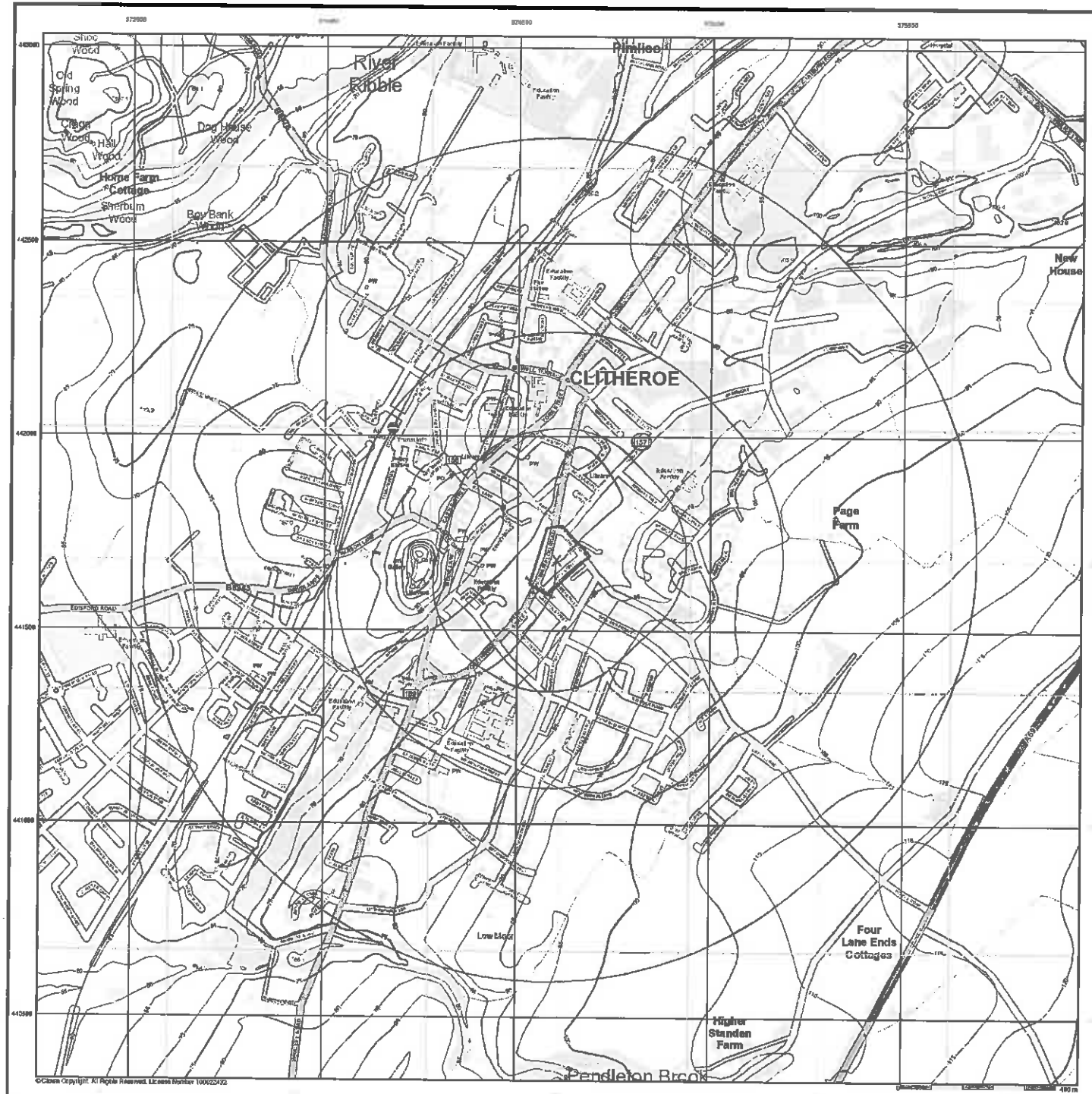

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LANDMARK INFORMATION GROUP

EA/NRW Historic Flood Map (1:10,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID

Historic Flood Events Data

- Channel Capacity Exceeded (no raised defences)
- Groundwater/High Water Table
- Local Drainage/Surface Water
- Mechanical Failure
- Obstruction/Blockage - Bridge
- Obstruction/Blockage - Channel
- Obstruction/Blockage - Culvert
- Obstruction/Blockage - Debris Screen
- Operational Failure/ Breach of Defence
- Other
- Overtopping of Defences
- Unknown

Historical Flood Liabilities

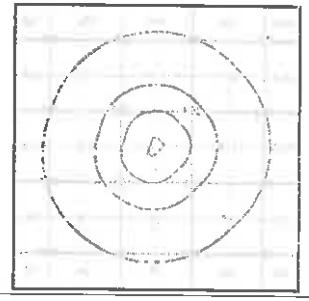
Contours (height in metres)

Standard Contour — MLW — Mean Low Water

Master Contour — MHW — Mean High Water

Spot Height

EA/NRW Historic Flood Map - Slice A



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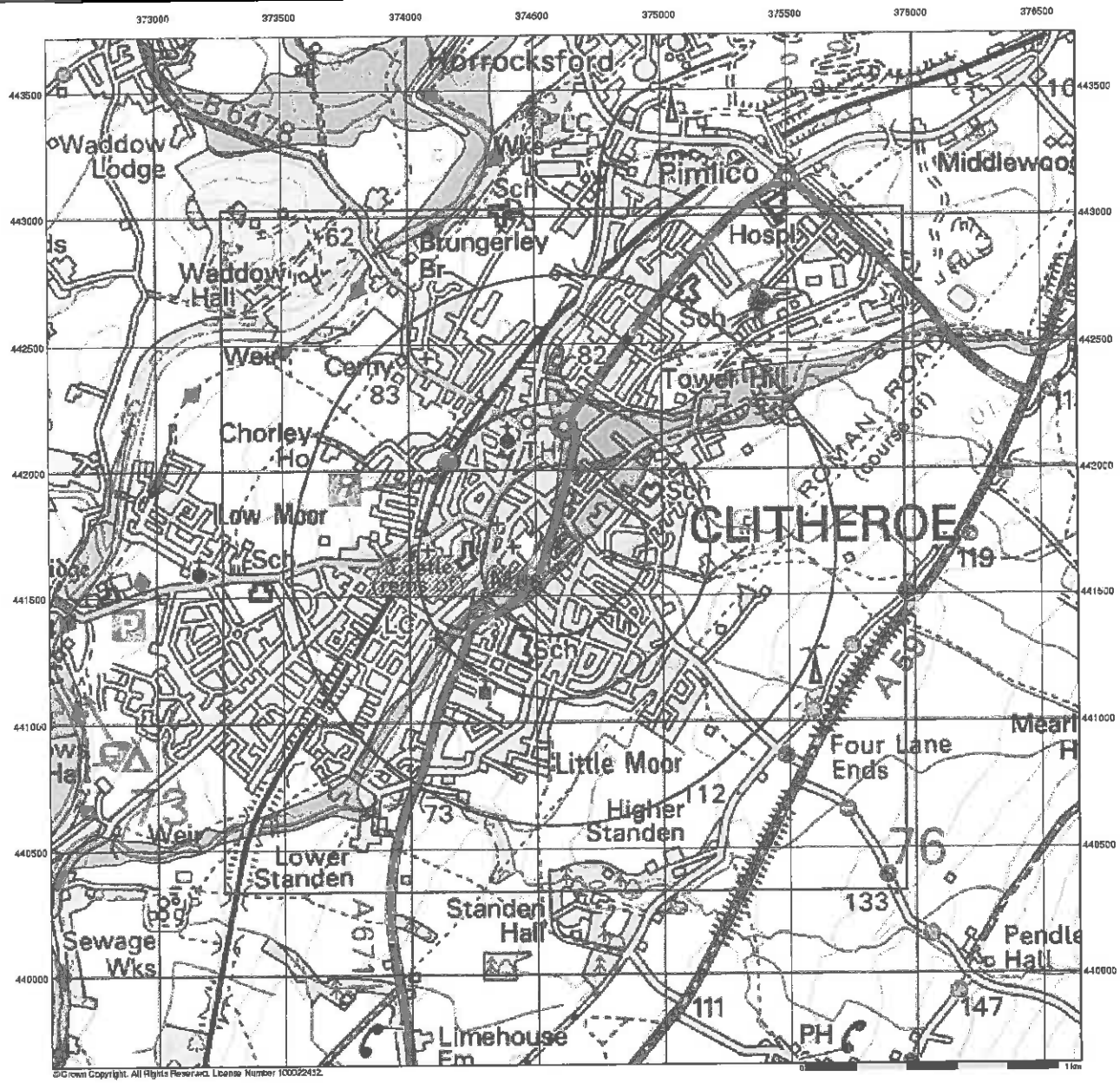

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LANDMARK INFORMATION GROUP

BGS Flood Data (1:50,000)

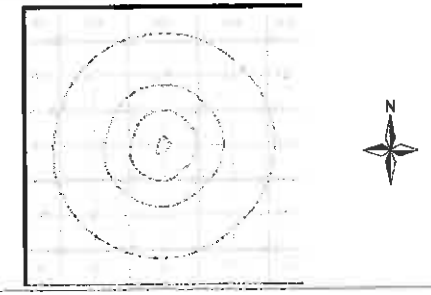
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

BGS Geological Indicators of Flooding

- Coastal
- Inland
- Bodies of Water

BGS Flood Data Map - Slice A



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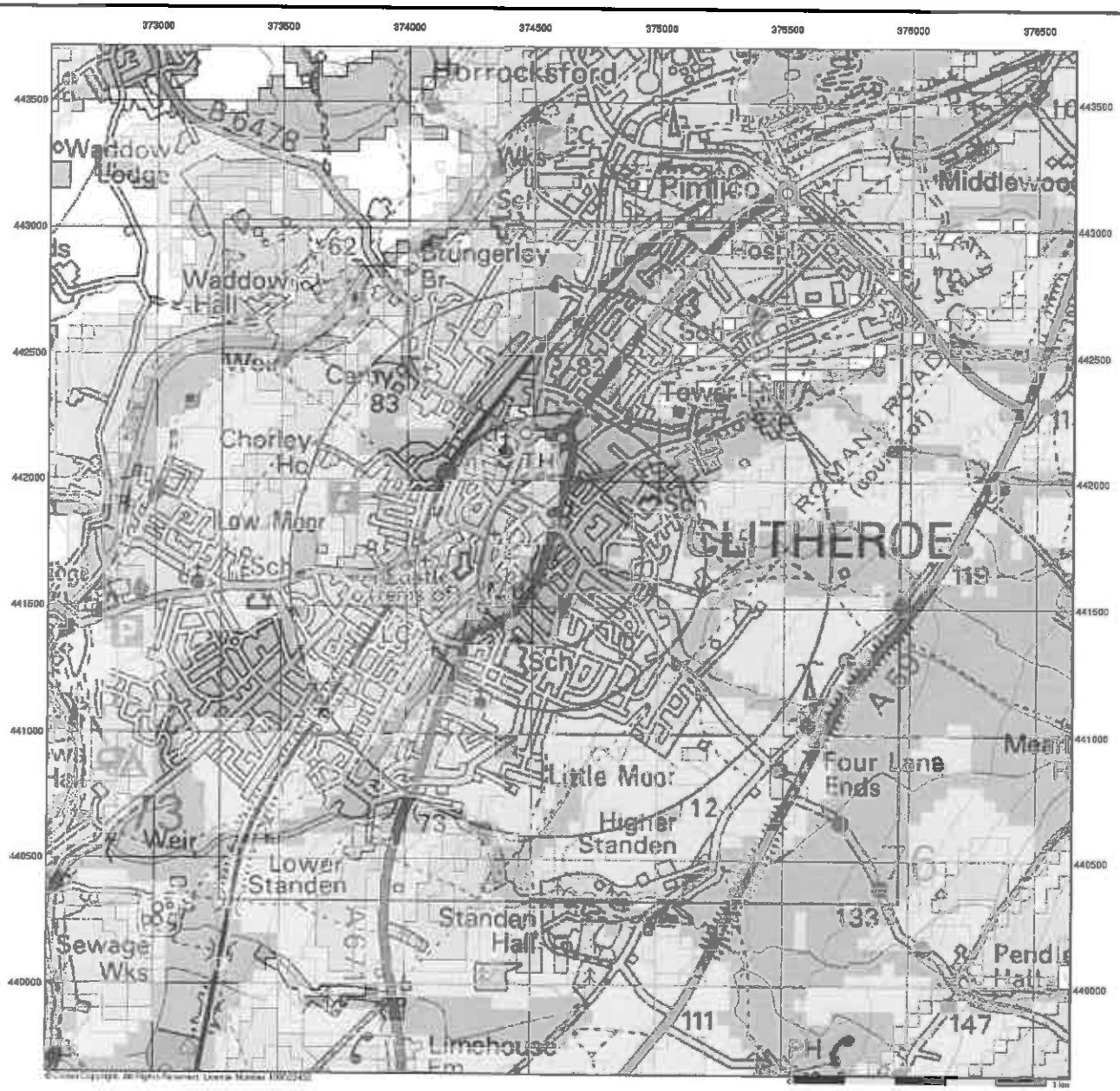

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LANDMARK INFORMATION GROUP

BGS Flood Data (1:50,000)

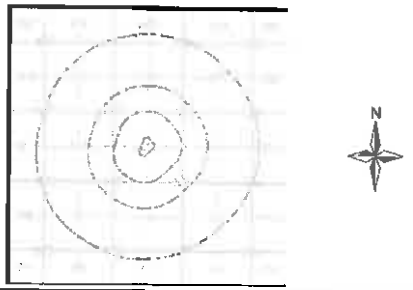
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

BGS Groundwater Flooding Susceptibility

- Potential for Groundwater Flooding to Occur at Surface
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Limited Potential for Groundwater Flooding to Occur

BGS Flood Data Map - Slice A



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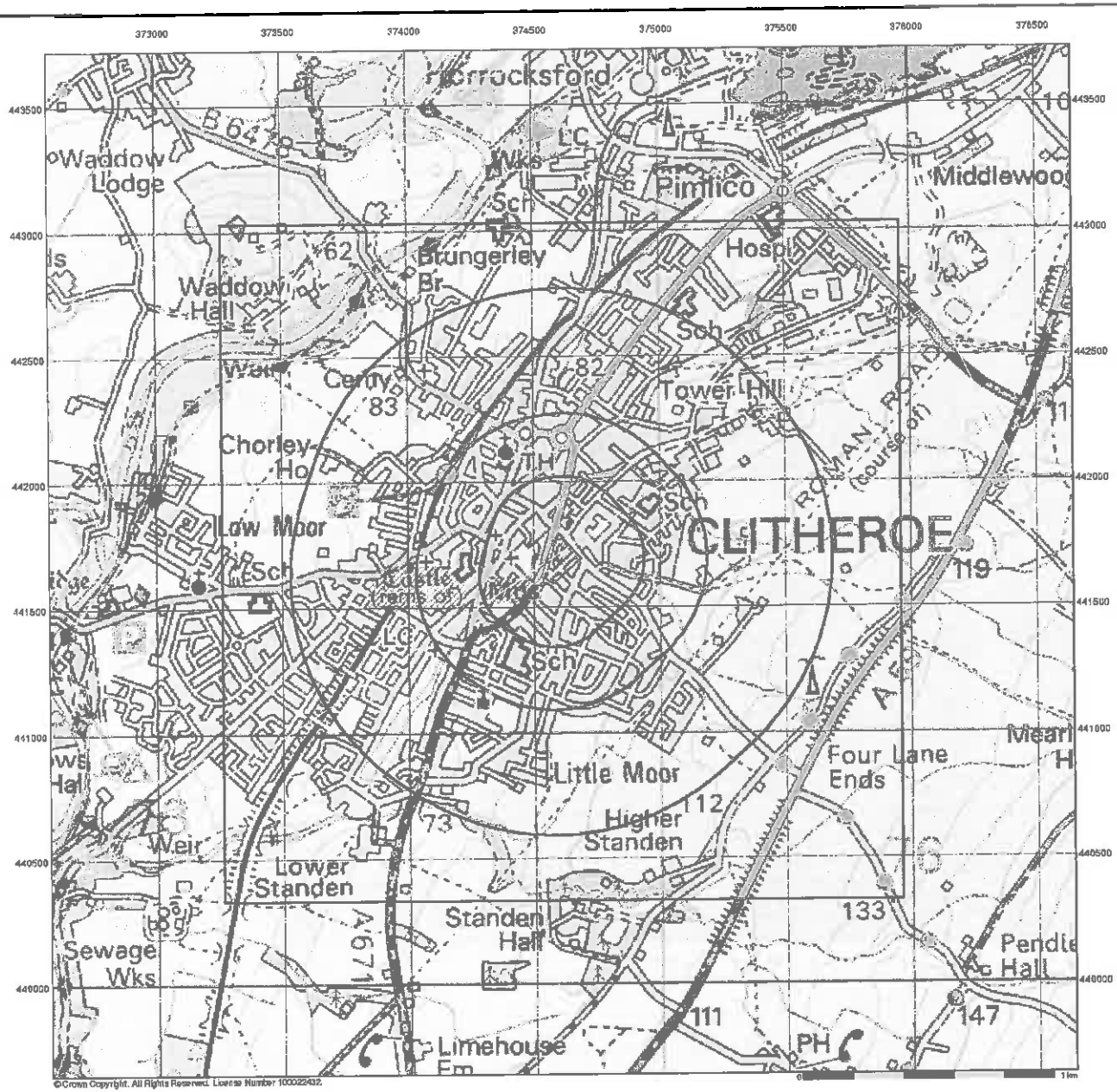

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LANDMARK INFORMATION GROUP

GeoSmart Information Groundwater Flood Map (1:50,000)

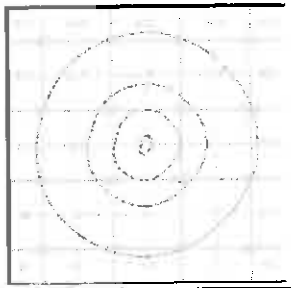
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

GeoSmart Information Groundwater Flooding Risk

- High Risk
- Moderate Risk
- Low Risk
- Negligible Risk

GeoSmart Information Groundwater Flood Map - Slice A



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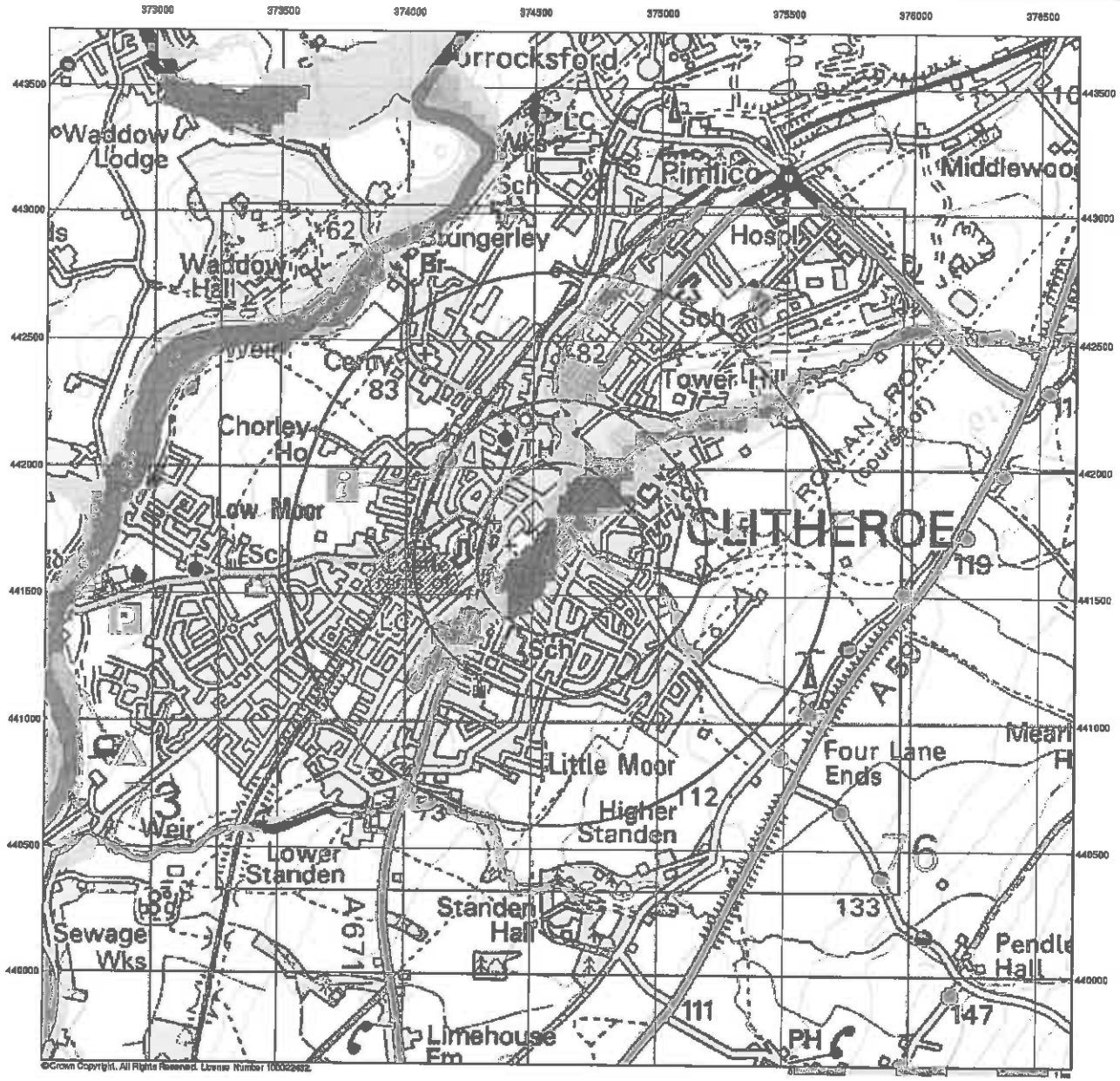

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EA/NRW RoFRS Data (1:50,000)

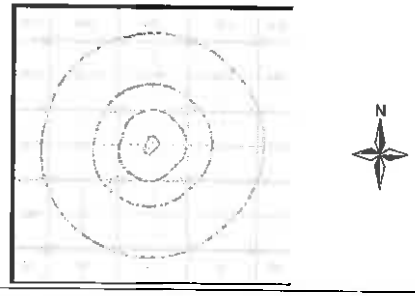
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Risk of Flooding from Rivers and Sea (RoFRS)

- High Risk
- Medium Risk
- Low Risk
- Very Low Risk

EA/NRW RoFRS Data Map - Slice A



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APPENDIX E

Greenfield Estimation of Peak Flow Rate of Runoff
Based on Report 124 of The Institute Of Hydrology
(For catchments less than 200 ha)

		Date	**06-Jul-17**
Client	**Lidl**	**Job No.**	**17247**
Site	**Lidl Clitheroe**	**Sub No.**	

Prepared By **SR** **Checked By**

Site Characteristics

Hydrological Region	10	
SOIL type (From Wallingford Vol 3 Maps)	4	
Area (A)	0.083	ha
SAAR (From Wallingford Vol 3 Maps)	636	mm

Method of Greenfield Analysis

Soil Runoff Coefficient (SPR) 0.47

$$Q_{BAR} = (1.08\left(\frac{A}{100}\right)^{0.89} SAAR^{1.17} SPR^{2.17})$$

Q_{BAR} **0.72 l/s**

Mean Peak (Q_{BAR}/A) **8.73 l/s/ha**

1 year peak discharge	Q_{BAR}/Ax0.85	Q_{1yr}	7.42 l/s/ha
		or	0.62 l/s
30 year peak discharge	Q_{BAR}/AxGC$_{30}$	Q_{30yr}	15.27 l/s/ha
		or	1.27 l/s
100 year peak discharge	Q_{BAR}/AxGC$_{100}$	Q_{100yr}	18.15 l/s/ha
		or	1.51 l/s

APPENDIX F

APPENDIX B:

Site Photos (24th November 2009)

	**Photo 01** View of looking from site entrance up to Shawbridge Street.
	**Photo 02** Existing Site Entrance.
	**Photo 03** View from site entrance along Western Boundary.
	**Photo 04** View from existing site entrance looking west along Peel Street.

	**Photo 05** View from midpoint of southern boundary looking west along Peel Street.
	**Photo 06** View from midpoint of southern boundary looking east along Peel Street to junction with Shawbridge street.
	**Photo 08** View from junction of Peel street and Shawbridge Street looking north along eastern boundary.
	**Photo 09** View from north east corner of site looking south down Shawbridge street.

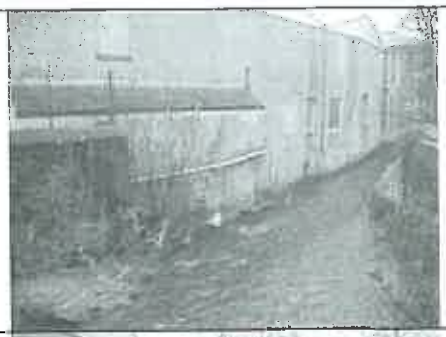
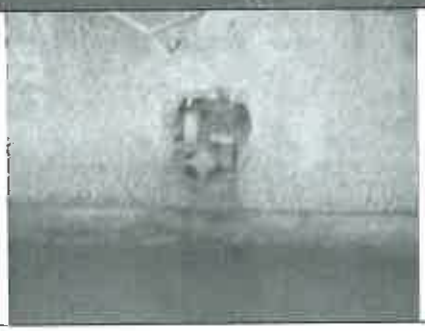
	**Photo 14** General view of Mearley Brook downstream of Shawbridge Street bridge.
	**Photo 15** General view of Mearley Brook downstream of Shawbridge Street bridge. Northern boundary of site.
	**Photo 19** General view of Shawbridge Street Bridge. View looking upstream.
	**Photo 23** 1 of 3 Existing surface water outfalls from site.
	**Photo 26** 2 of 3 Existing surface water outfalls from site.

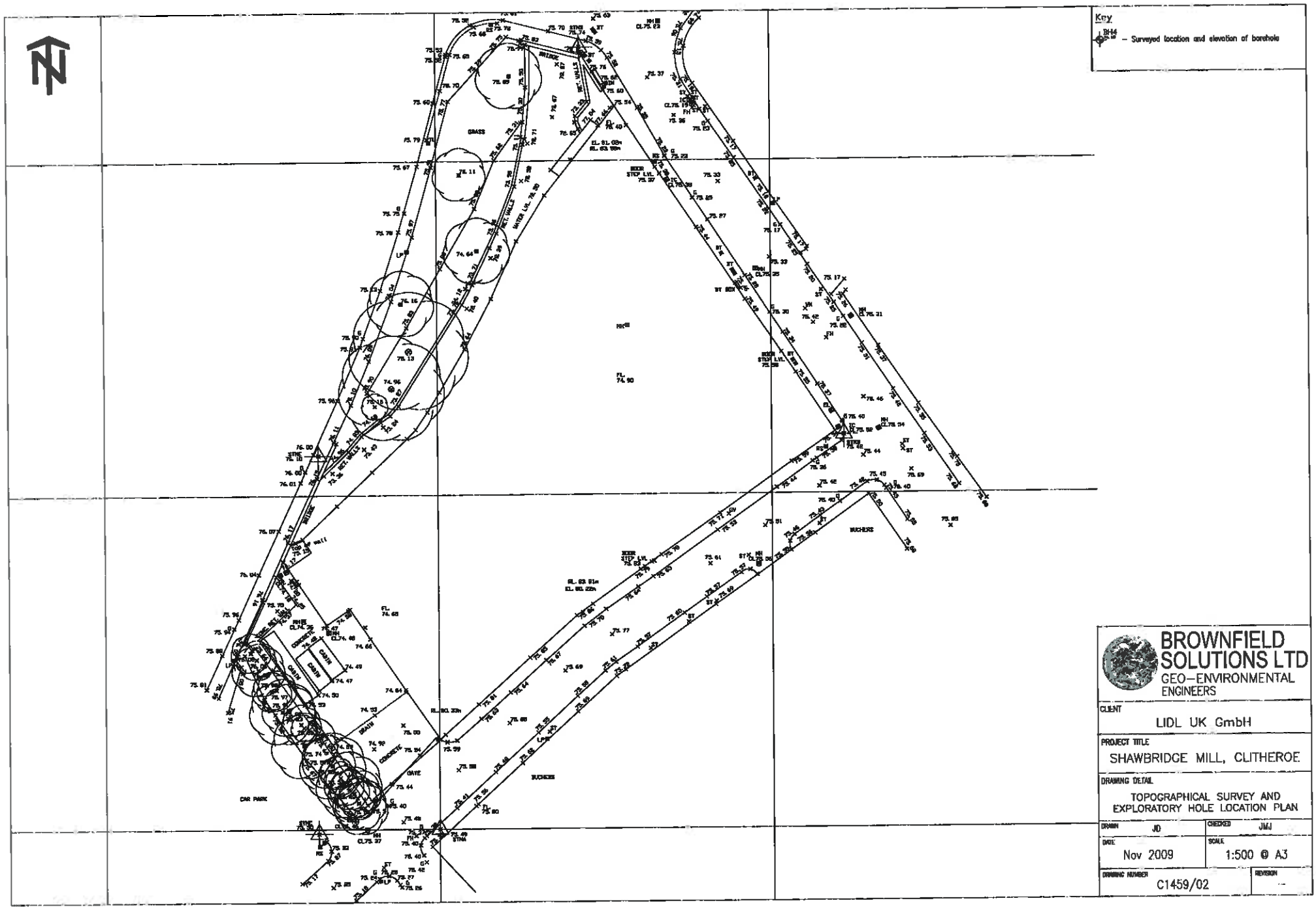
	**Photo 28** 3 of 3 Existing surface water outfalls from site.
	**Photo 29** View of Mearley Brook downstream as it passes under Peel Street Bridge.
	**Photo 32** View of Mearley Brook downstream as it exits from under Peel Street Bridge.
	**Photo 34** View upstream of Mearley Brook from Peel Street Bridge. View shows northern boundary of site.
	**Photo 35** Downstream view of Mearley Brook passing under Shawbridge Street bridge.

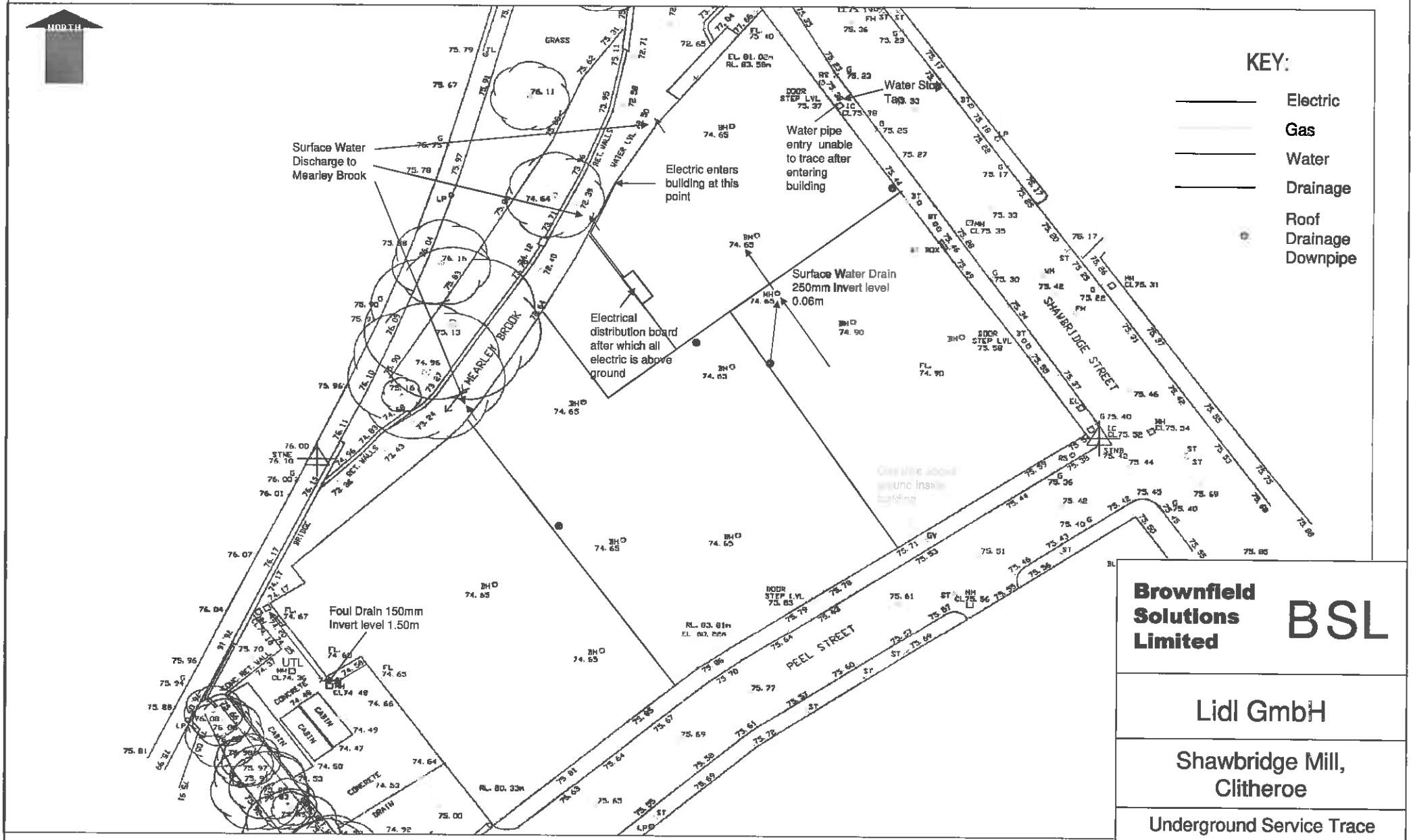
	**Photo 39** General view of Mearley Brook upstream of site as it passes under Waterloo Bridge.
	**Photo 41** View looking upstream of Mearley Brook from Waterloo Bridge.

APPENDIX C:

Topographical Survey - Brownfield Solutions Ltd dwg no. C1459/02.

Underground Service Trace - Brownfield Solutions dwg no. C1459/03.


Key
BH4 – Surveyed location and elevation of borehole
BROWNFIELD SOLUTIONS LTD
GEO–ENVIRONMENTAL ENGINEERS
CLIENT
LIDL UK GmbH
PROJECT TITLE
SHAWBRIDGE MILL, CLITHEROE
DRAWING DETAIL
TOPOGRAPHICAL SURVEY AND EXPLORATORY HOLE LOCATION PLAN
DRAWN JD
CHECKED JMJ
DATE Nov 2009
SCALE 1:500 @ A3
DRAWING NUMBER C1459/02
REVISION –



Brownfield Solutions Limited BSL

Lidl GmbH

Shawbridge Mill, Clitheroe

Underground Service Trace

DWG No. C1459/03

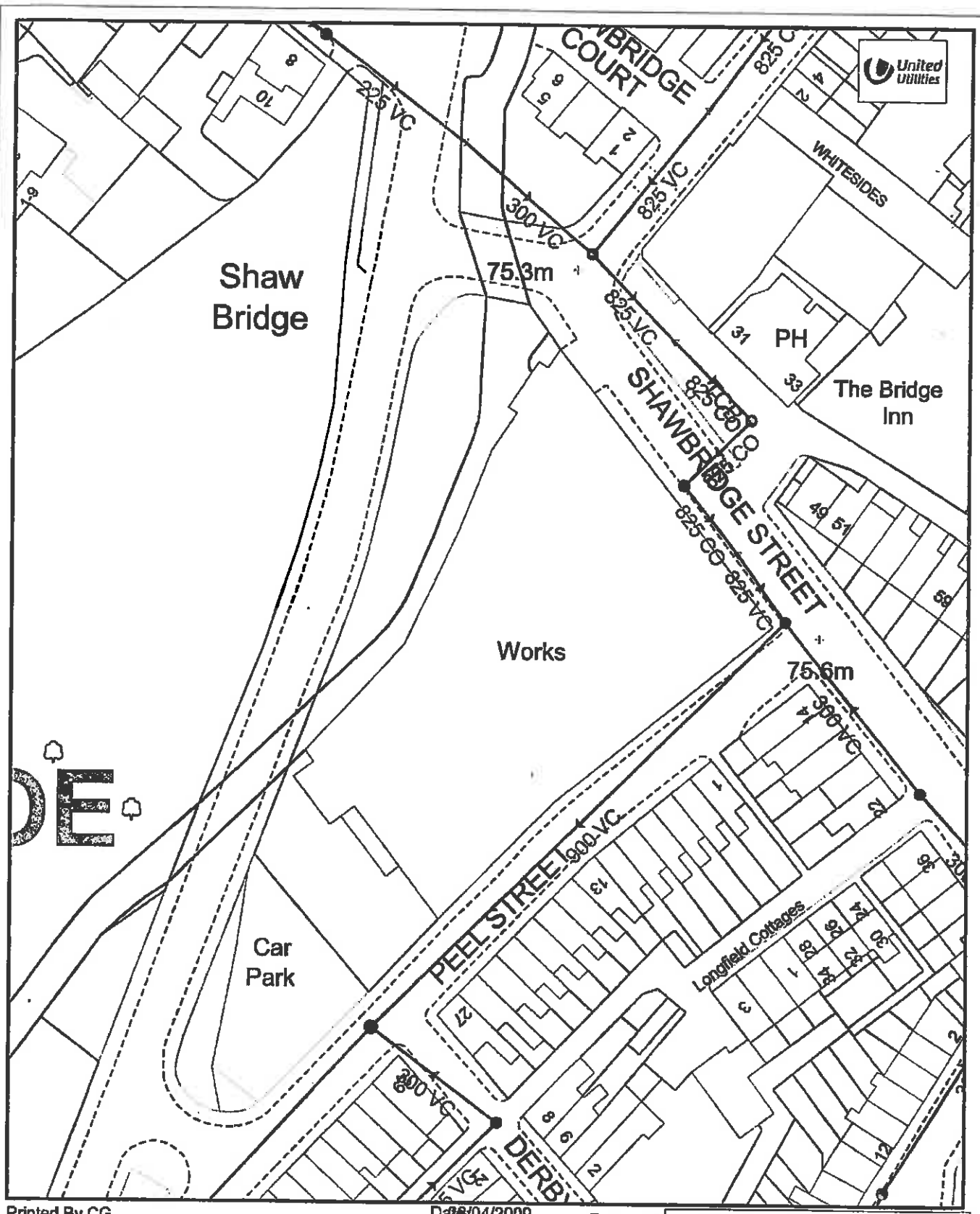
Scale: NTS

Drawn By: JMJ	Checked By: AJH

APPENDIX D:

United Utilities Sewer Record Plans

United Utilities Water Main Record Plans



Printed By CG Date 28/04/2009

Extract From Map of Public Sewers

Shawbridge Mill, Shawbridge Street, Clitheroe.

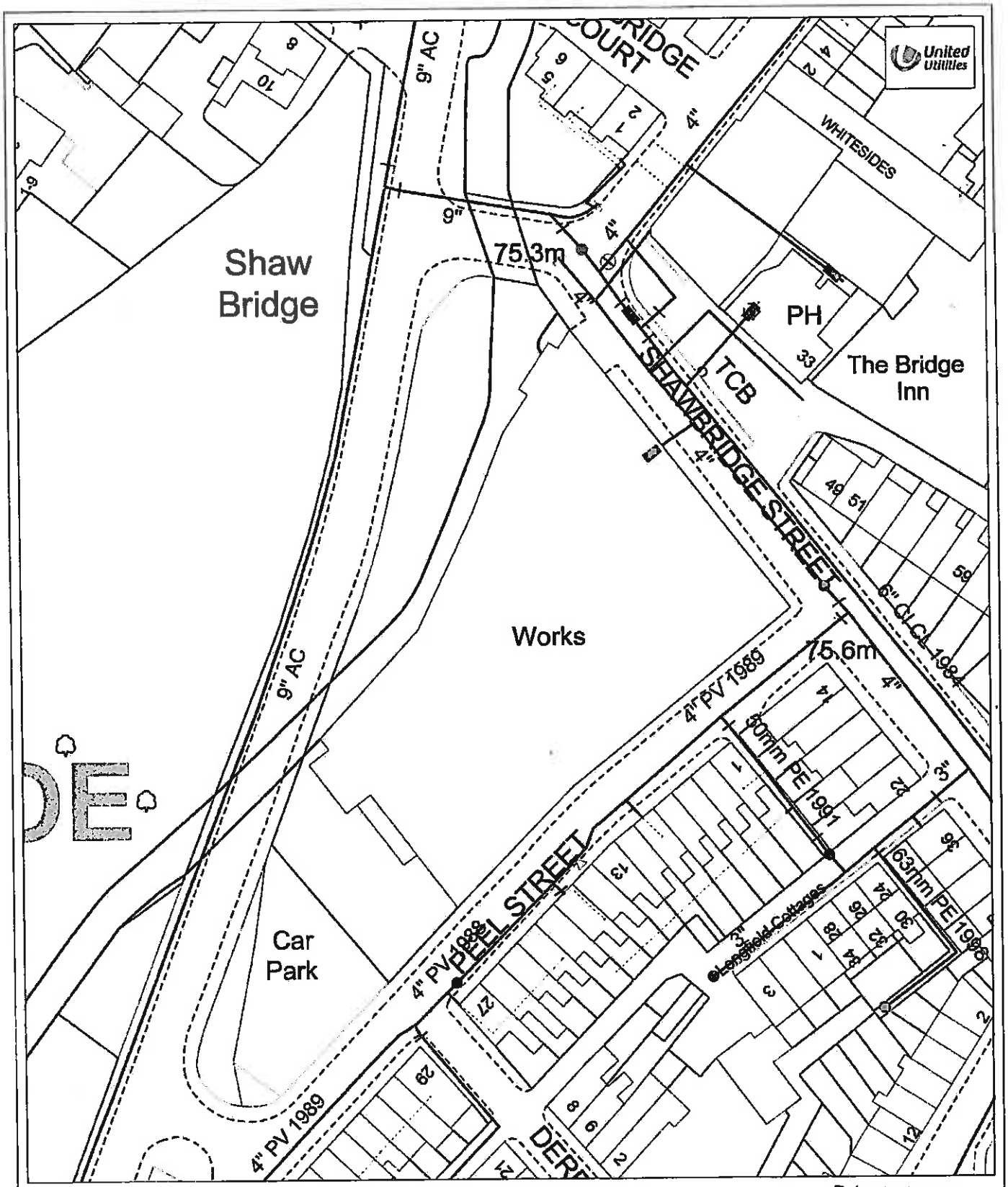
Legend

- Abandoned Sewer
- Public Sewer
- Highway Drain
- Private Sewer
- Pumping Main
- Section 104 Sewer

Refer to colour guide for content of pipe

Red or Brown - Foul Sewers Blue - Surface Water Sewers

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 will not accept any liability for any damage caused by the actual positions being different from those shown.



Printed by CG

Date 28/04/2009

Extract From Map of Water Mains

Shawbridge Mill, Shawbridge Street, Clitheroe.

Blue - Distribution Mains Red or Mauve - Trunk Mains Dark Green - Non Potable Mains Light Green - Proposed Mains

----x-----x-----x-----x-----Disused Mains (These may still be live)

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 service pipes may be shown by a blue broken line. United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown

APPENDIX E:

Correspondence from Environment Agency

Mark Dowd

From: NW North Preston. Information Requests [nwnorthpreston@environment-agency.gov.uk]
Sent: 17 December 2009 12:46
To: Mark Dowd
Subject: PRR 11618 - Clitheroe Flood Levels

Dear Mark

Clitheroe Flood Levels

Thank you for your recent enquiry.

Please find attached the flood levels as requested.

This information is subject to the attached terms and conditions.

Should you require any further information please do not hesitate to contact me on 01772 714247 or by e-mail.

Yours sincerely

Alicia Cottam
Information Officer
Business Planning & Performance Team
Tel: 01772 714247
nwnorthpreston@environment-agency.gov.uk

creating a better place

Environment Agency

Mr Edward Whalley and Mr Giles Berry
Lidl UK Gmbh/City Park
Blackheath Lane
Manor Park
Runcorn
WA7 1SE

Our ref: CE/2010/103298/02-L01
Your ref:

Date: 26 February 2010

Dear Mr Whalley and Mr Berry

DEMOLITION OF EXISTING BUILDINGS AND ERECTION OF A NEIGHBOURHOOD FOOD RETAIL UNIT WITH ASSOCIATED CAR PARKING - AMENDED FRA RECEIVED
SHAWBRIDGE MILL, SHAWBRIDGE STREET, CLITHEROE

The Environment Agency has recently been consulted on the above proposal. Please find enclosed a copy of our response to the local planning authority. If you have any queries about our response, please do not hesitate to contact us.

Yours sincerely

G Jackson

Gemma Jackson
Planning Liaison Officer

Direct dial 01772 714269
Direct fax 01772 697032
Direct e-mail gemma.jackson@environment-agency.gov.uk

Ribble Valley Borough Council
Development Control
Council Offices Church Walk
Clitheroe
Lancashire
BB7 2RA

Our ref: CE/2010/103298/02-L01
Your ref: 3/2009/1071

Date: 26 February 2010

Dear Sir/Madam

DEMOLITION OF EXISTING BUILDINGS AND ERECTION OF A NEIGHBOURHOOD FOOD RETAIL UNIT WITH ASSOCIATED CAR PARKING - AMENDED FRA RECEIVED
SHAWBRIDGE MILL, SHAWBRIDGE STREET, CLITHEROE

I refer to the above, and our previous response dated 14 January 2010 objecting to the proposed development.

We have received the following amended flood risk assessment, a copy of which was received on 17 February 2010:

- PPS25 Flood Risk Assessment, Shawbridge Street, Clitheroe, ELLUC Projects Ltd., referenced MGD-LIDL.151209.FRA.D2 and dated December 2009.

We have reviewed the flood risk assessment as submitted and we are now satisfied that all sources of flooding have been identified and assessed in relation to the proposed development. We therefore **withdraw our objection** to the proposed development but recommend that any subsequent planning approval is conditioned as follows:-

CONDITION Ground floor levels shall be set at 75.95 metres above Ordnance Datum (AOD).

REASON To reduce the danger to intended occupants of the building(s) from potential flooding.

CONDITION No development approved by this permission shall be commenced until a scheme for the erection of a flood wall, along the length of Mearley Brook within the site, which is capable of retaining floodwaters has been submitted to and approved by the Local Planning Authority. The scheme shall be constructed

developer must contact Colin Worswick on 01772 714259 to discuss our access requirements and apply for Consent.

SUPPLEMENTARY INFORMATIVES

The application as submitted was also accompanied by the following report:

- Initial Bat Survey of Factory Buildings, Shawbridge Street, Clitheroe, Martin Prescott Environmental Services, dated 13 January 2009.

We agree with the recommendations of the above report which should be undertaken to ensure no harm is caused to bats during the redevelopment of the site. We recommend that future surveys should also take into account the opposite bank of the watercourse where the retaining wall is to be replaced.

A copy of this letter has also been sent to the applicant/agent.

Yours faithfully

Gemma Jackson
Planning Liaison Officer

Direct dial 01772 714269
Direct fax 01772 697032
Direct e-mail gemma.jackson@environment-agency.gov.uk

cc Lidl UK Gmbh/City Park

End

ELLUC Projects

ELLUC Projects Ltd

- Consultancy
- Project Management
- Site Regeneration

PPS25 FLOOD RISK ASSESSMENT

SHAWBRIDGE STREET
CLITHEROE

Client:

Lidl UK GmbH
Blackheath Lane
Manor Park
Runcorn
Cheshire
WA7 1SE

ELLUC Projects Ltd
Development House
22 Froghall Lane
Warrington
Cheshire
WA2 7JR

Tel: 01925 444500
Fax: 01925 444569

Email: info@ellucprojects.co.uk
Web: www.ellucprojects.co.uk

MGD-LIDL.151209.FRA.D2

Document History and Status

Revision	Date	Purpose/Status	Author	File Ref	Check	Review
D1	15.12.09	Client comment	Mark Dowd	D1	Louis McLoughlin	Louis McLoughlin
D2	20.01.2010	EA comments	Mark Dowd	D2	Louis McLoughlin	Louis McLoughlin

Document Details

Last saved	20/01/2010 10:42
Path	MGD-LIDL.151209.FRA.D2
Author	Mark Dowd
Project Number	128
Project Name	Shawbridge Street, Clitheroe

Contents

Appendices

ABBREVIATIONS

Term	Meaning / Definition
AEP	Annual Exceedence Probability
BGL	Below ground level
BGS	British Geological Society
CFMP	Catchment Flood Management Plan
CIRIA	Construction Industry Research and Information Association
CoP	Code of Practice
EA	Environment Agency
EFO	Extreme Flood Outline (Boundary of floodplain associated with a flood event with a probability of occurrence of 0.1%, 1 in 1000 years)
FDA	Flood Defence Agency (e.g. Environment Agency)
FERS	Flood Event Recording System
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FW	Foul Water
GPZ	Groundwater Protection Zone
LDD	Local Development Document
LDF	Local Development Framework
LHA	Local Highway Authority
LPA	Local Planning Authority
m AOD	Metres above Ordnance Datum
MAF	Mean Annual Flood
NGR	National Grid Reference
OS	Ordnance Survey
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
SFRA	Strategic Flood Risk Assessment

SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SW	Surface Water
UU	United Utilities PLC
WCML	West Coast Main Line railway
WFD	Water Framework Directive

1.0 INTRODUCTION

1.1. Lidl UK GmbH are proposing to redevelop an existing warehouse site in Clitheroe for commercial purposes. The site is located off Shawbridge Street/Peel Street to the south of Clitheroe town centre and extends to approx. 0.39 hectares (0.96 acres) in area.

1.2. The site is currently in use as a warehouse unit for the storage of household goods for sale.

1.3. The site is located immediately adjacent to Mearley Brook with Shawcross Brook located approx 100 yards to the south east of the site along Shawbridge Street. Shawcross Brook then runs in culvert under Shawbridge Street, along the eastern boundary of the site, and outfalls into Mearley Brook under Shawbridge Street bridge.

1.4. Both are classified as main river under the EA's jurisdiction.

1.5. Elluc Projects Limited were commissioned by Lidl UK GmbH to prepare a formal Flood Risk Assessment in support of a Detailed Planning Application for the proposed redevelopment of the site.

1.6. The Environment Agency have been consulted during the production of this FRA.

2.0 PLANNING POLICY

NATIONAL PLANNING POLICY

2.1. Planning Policy Statement 25 (PPS 25) 'Development and Flood Risk' [1] clearly identifies flood risk as a specific material consideration in the Planning Process and in the allocation and release of sites for development or re-development.

2.2. PPS 25 builds on its predecessor (PPG 25) and seeks to further strengthen the co-ordination between land-use planning and development planning and the operational delivery of flood and coastal defence strategy. PPS 25 encourages Local Planning Authorities to use their existing powers to guide, regulate and control development in relation to flooding and flood risk. The Statement expects Local Authorities to adopt a risk-based approach at all levels of Planning by applying the 'Source - Pathway - Receptor' model to planning for development in flood-susceptible areas, through the application of the Sequential Test detailed in Annex D, Table D.1, a copy of which is attached in Appendix A.

2.3. The Water Resources Act 1991 [Section 105] also requires the Environment Agency to exercise a general supervision over all flood defence matters, including flood plains and washlands which accommodate waters during periods of flood. In discharging their functions, the Agency from time to time carries out comprehensive surveys and flood studies, largely of 'main rivers' within its jurisdiction.

2.4. A Section 105 Study involves the Agency topographically surveying the subject watercourse (or parts of it) and obtaining details of the flow mechanics within the watercourse. This data then enables them to generate a comprehensive hydraulic computer model for the watercourse. From this hydraulic model the EA are able to define the approximate extent of fluvial floodplain associated with the 1 in 100

[1] Planning Policy Statement 25 'Development and Flood Risk', published in Dec. 2006 by DCLG

year (1% annual probability) flooding event or the extent of tidal floodplain associated with the 1 in 200 year (0.5% annual probability) flooding event.

2.5. The extents of the modelled floodplain are then provided to Local Planning Authorities, to enable them to make more informed decisions when considering proposed development in flood-susceptible areas. If development is proposed in a flood-susceptible area, or in an area where there is a history of flooding, the EA, as a statutory consultee in the Planning Process, will generally recommend that the risk of flooding be formally assessed, in accordance with PPS 25, and that a Flood Risk Assessment report be produced to support the Planning Application. The broader modelled flood extents are also indicated on the EA's Flood Zone Maps, available through their website [2].

LOCAL PLANNING POLICY

River Ribble Catchment Flood Management Plan (CFMP)

2.6. The site is located within the River Ribble catchment area. The EA have produced the 'River Ribble Catchment Flood Management Plan' [3]. The CFMP has been reviewed as part of this FRA and relevant extracts are attached in Appendix A.

2.7. CFMP's are not specifically required by the Water Framework Directive [4] and are prepared voluntarily by the EA (under Government sponsorship). A CFMP is a high-level strategic plan for an area which aims to develop policies to manage flood risk over the next 50 to 100 years. These policies take into account the likely impacts of climate change and the effects of land-use and land management, and identify a range of benefits which contribute towards sustainable development. The CFMP's policies establish whether action should be taken to increase, decrease or maintain the current level of flood risk.

[2] www.environment-agency.gov.uk
[3] 'River Ribble Catchment Flood Management Plan' Final Report (January 2009)
[4] www.defra.gov.uk/environment/water/wfd/index.htm

2.8. The River Ribble CFMP contains little specific information relating to the Mearley Brook and Shawcross Brook catchment areas, but does indicate that in Policy Unit 1.4: Clitheroe – the EA's policy is to "*take further action to reduce flood risk*" [5]

2.9. The River Ribble CFMP describes policy 1.4 as: "*This very small policy unit (4km2) is entirely urban, but set within a much larger rural catchment with considerable landscape, cultural and environmental interests. About 260 properties are at risk of flooding (1% AEP event), at a cost of £38M worth of damage, with a further 230 properties at risk in 100 years with a 'do nothing' scenario. In addition, 3 schools and 1 hospital are currently at risk in a 1% event, which is not forecast to increase in the future. Flood risk management activities in the town include the maintenance of screens on the inlet and outlet of culverted watercourses, general maintenance of banks of open watercourses, and the provision of formal flood warnings to the Clitheroe and Low Moor areas. Further action is needed to reduce the predicted effects of climate change and further urban development in and around Clitheroe. Culverted stretches of Mearley Brook pose a high flood risk to the town, and work is required to reduce this risk. Whilst the projected damages in this unit are not as high as other policy units where P5 is proposed, this level of damage in such a small area indicates the action is needed to reduce the flood risk and therefore a proactive P5 policy is recommended, rather than any policy which would provide a lower level of flood risk management now and into the future. Being a wholly urban policy unit means that, by implications, opportunities for a policy P6 policy are extremely limited, although there is potential for flood storage upstream of the town. Work in this policy unit is likely to get priority on a national scale, with work programmed in Clitheroe to address flood risk. Implementing flood resilience measures within existing and future properties may also help to reduce flood risk.*".

2.10. The EA's summary and vision for the Policy Unit is as follows:

[5] 'River Ribble CFMP Final Report (January 2009)

2.11. *This very small urban policy unit (4km2) includes the main town of Clitheroe (pop. 14,000) within the Upper Ribble and Hodder catchment. For a flood with a 1% chance, there are about 260 residential properties (rising to 490 in 100 yrs), at risk of flooding and overall economic damages would be approximately £38M. The main sources of flooding here are from the watercourses and from undercapacity/blockage of culverts. The Low Moor area of Clitheroe is at risk of flooding from the River Ribble, whereas other parts of Clitheroe are at risk of flooding from Mearley Brook. In addition, within Clitheroe there are about 37 properties at risk during much smaller (e.g. 10% chance) flood events from Mearley Brook, which requires more urgent action.*

- *Flood risk in the town is high and will rise unacceptably if actions are not increased.*
- *Actions taken should not worsen flooding in built-up areas downstream of this policy unit*
- *A Strategic Flood Risk Assessment, produced by the Local Authorities, will steer development clear of existing and future floodplain and minimise flood risk to it.*
- *This area does not have a significant sewer flooding (DG5) problem, although actual theoretical risk of such flooding is unclear.*
- *This policy unit includes the Clitheroe and Low Moor flood warning areas.*

2.12. The EA have identified 8 key actions for implementation in Policy Unit 1.4 - 2 of which are classified as 'high priority' (with a timescale for completion ranging from 0-5 years), with 4 actions classified as 'medium priority' (with a timescale for completion classed as ongoing. The key actions are attached in Appendix A.

Strategic Flood Risk Assessment (SFRA)

2.13. Local Planning Authorities are required to produce Local Development Frameworks, which are a portfolio of Local Development Documents that collectively deliver the spatial planning strategy for the Authority area. The LDD's undergo a Sustainability Appraisal which assists Planning Authorities in ensuring their policies fulfill the principles of sustainability. Strategic Flood Risk Assessments are one of the documents to be used as the evidence base for planning decisions and are a component of the Sustainability Appraisal process. Therefore, SFRAs should be used in the review or production of LDD's.

2.14. To assist Local Planning Authorities in their strategic land-use planning, SFRA's should present sufficient information to enable Local Authorities to apply the Sequential Test to their proposed development sites: *"Decision-makers should use the SFRA to inform their knowledge of flooding, refine the information on the Flood Map and determine the variations in flood risk from all sources of flooding across and from their area. These should form the basis for preparing appropriate policies for flood risk management for these areas."* [6]

2.15. Ribble Valley B.C. [Phil Dagnall] have confirmed that a Strategic Flood Risk Assessment has been prepared but that the document is currently in draft form awaiting formal publication and as such, is not available for inspection. Publication of the final SFRA is anticipated towards the end of February 2010.

2.16. Once the SFRA is available, the Conclusions & Recommendations of this Assessment should be reviewed to ensure they accord with the overall strategies proposed in the SFRA.

[6] PPS 25, para E5.

FURTHER GUIDANCE

CIRIA Guidance

2.17. The PPS 25 Practice Guide [7] and CIRIA publication 'C624 Development and Flood Risk - Guidance for the Construction Industry' [8], define three levels of FRA which can be undertaken:

Table 2.1 Levels / Scopes of Flood Risk Assessment

FRA Level	Description / Scope
Level 1	**Screening Study** to identify whether there are any flooding or surface water management issues related to a development site that may warrant further consideration. This should be based on readily available existing information, including the SFRA, Environment Agency Flood Map and Standing Advice. The Screening Study will ascertain whether a FRA is required.
Level 2	**Scoping Study** to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding or that the site may increase flood risk due to increased run-off. This Study should confirm the sources of flooding which may affect the site and should include the following: • an appraisal of the availability and adequacy of existing information; • a qualitative appraisal of the flood risk posed to the site, and potential impact of the development on flood risk elsewhere; • an appraisal of the scope of possible measures to reduce the flood risk to acceptable levels. The Scoping Study may identify that sufficient quantitative information is already available to complete a FRA appropriate to the scale and nature of the development.
Level 3	**Detailed Study** to be undertaken if the Level 2 FRA concludes that further quantitative analysis is required to assess flood risk issues related to the development site. The Study should include: • quantitative appraisal of the potential flood risk to the

[7] 'PPS 25 Development and Flood Risk: Practice Guide', published in June 2008 by DCLG
[8] CIRIA publication 'C624 Development and Flood Risk - Guidance for the Construction Industry', 2004

	development; • quantitative appraisal of the potential impact of development site on flood risk elsewhere; • quantitative demonstration of the effectiveness of any proposed mitigation measures.

2.18. It is considered that a Level 2 Scoping Study is appropriate at this stage and this Report has therefore been based on the requirements of a Level 2 Study.

3.0 REQUIREMENTS OF A FLOOD RISK ASSESSMENT

3.1. The EA's Flood Zone Maps, available on the EA's website, indicate that the site is located within Flood Zone 3. Flood Zone 3 indicates that the risk of flooding from fluvial or tidal sources is high. Current EA guidance indicates that Planning Applications for sites greater than 1.0 hectare in area must be accompanied by an FRA and that an FRA should contain:

- Information about the surface water disposal measures already in place and their state of maintenance;
- An assessment of the volume of surface water run-off likely to be generated from the proposed development;
- Information on how that surface water run-off will be disposed of (from the new development);
- Estimates of how climate change could affect the probability and intensity of flooding events in the future;
- Information about any other potential sources of flooding to the site – streams, ditches, sewers, groundwater, overland surface water flow or any combination of these.

3.2. The detail and complexity of a Flood Risk Assessment should reflect the level of risk to the proposed development. Annex E of PPS 25 lists the general requirements of a Flood Risk Assessment and provides that Flood Risk Assessments should:

- be proportionate to the risk and appropriate to the scale, nature and location of the development;
- consider the risk of flooding arising from the development in addition to the risk of flooding to the development;
- take the impacts of climate change into account;

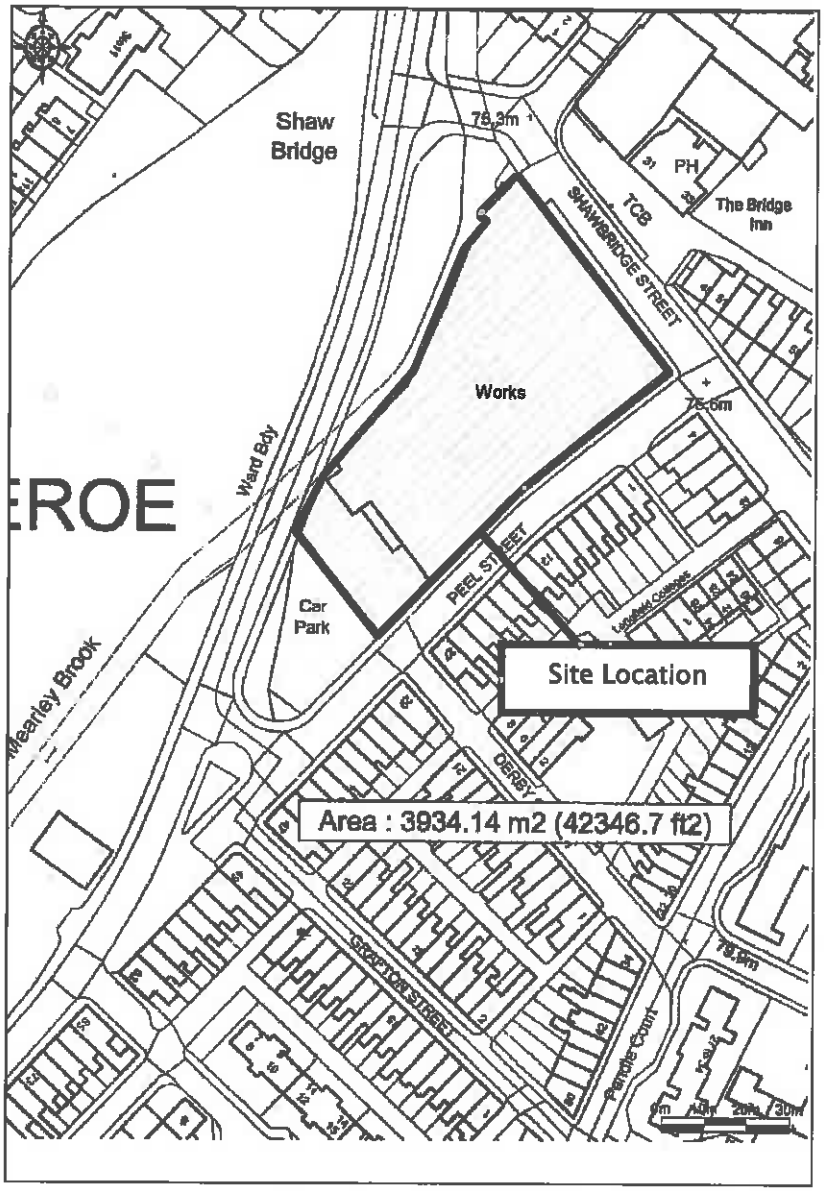
- be undertaken by competent people, as early as possible in the particular planning process, to avoid misplaced effort and raising landowner expectations where land is unsuitable for development;
- consider both the potential adverse and beneficial effects of flood risk management infrastructure including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure;
- consider the vulnerability of those that could occupy and use the development, taking account of the Sequential and Exception Tests and the vulnerability classification (see Annex D of PPS 25), including arrangements for safe access;
- consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as 'residual') risk (see Annex G of PPS 25) after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular development or land use;
- consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of development may affect drainage systems;
- be supported by appropriate data and information, including historical information on previous events

4.0 SITE CONTEXT

SITE LOCATION

4.1. The site is located off Shawbridge Street and Peel Street in Clitheroe ref. Figures 4.1 and Figure 4.2:

Figure 4.1 Site Location Plan



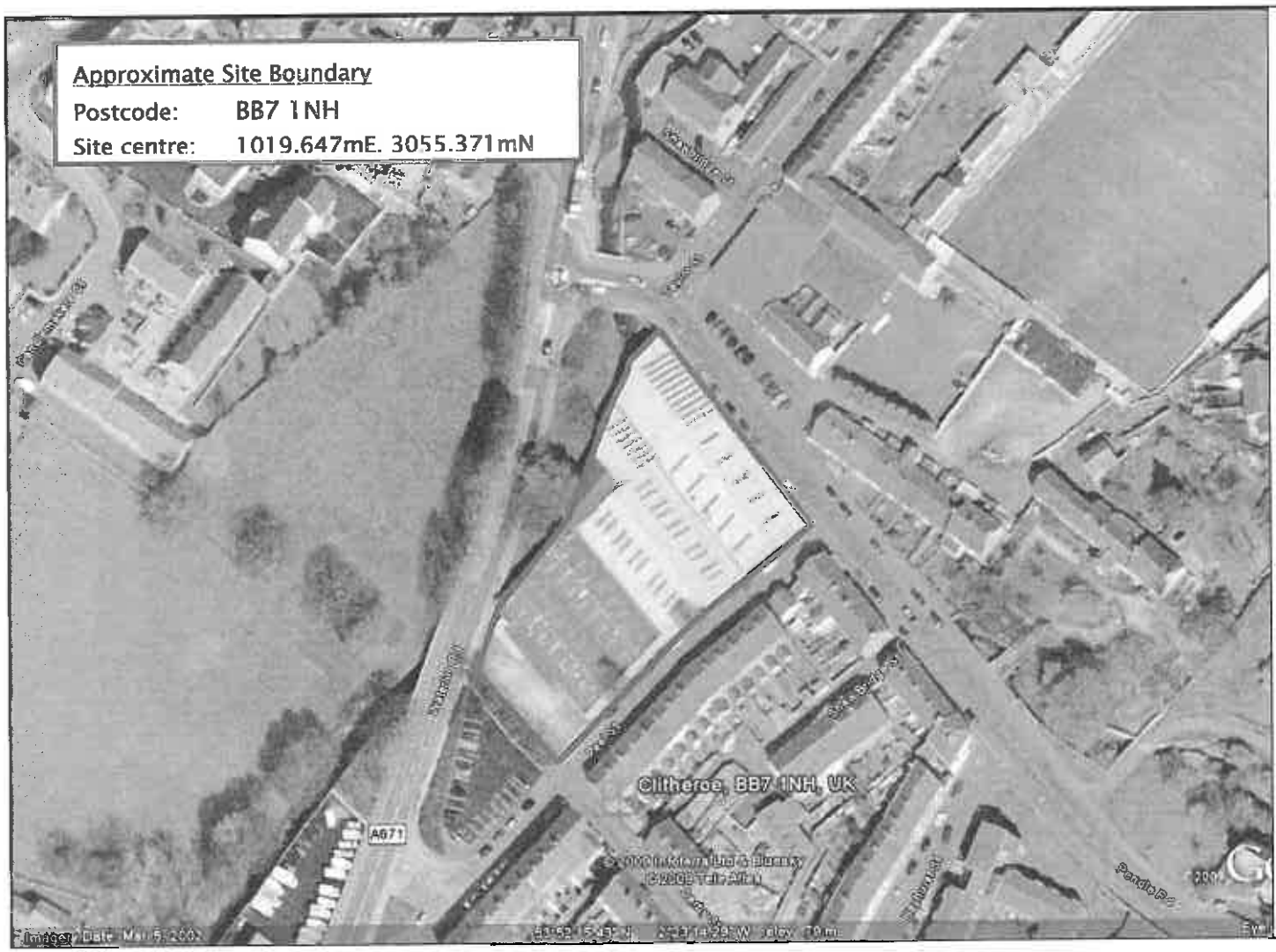


Figure 4.2: Aerial Image

Image provided courtesy of Google 2008 via Google Earth Pro. ©Google 2008

4.2. The site is centred at Ordnance Survey co-ordinates 1019.647mE, 3055.371mN and within Postcode BB7 1NH. The site area is approx. 0.39 hectares.

Existing Site Characterisation / Land-Use

4.3. A site visit was undertaken on Tuesday 24th November 2009 to walk the site and surrounding areas, establish the local topography and identify watercourses in the vicinity of the site and possible sources of flooding. A number of digital photographs were taken during the site visit and thumbnails of selected images are attached in Appendix B. All photo numbers referred to in the following text are contained in Appendix B.

4.4. The site and surrounding boundary conditions are shown on the Aerial Image in Figure 4.2.

4.5. To the north the site is bounded by Mearley Brook (ref. photos 14,15 & 34)

4.6. To the south the site is bounded by Peel Street and to the west by a public car park. Shawbridge Street forms the eastern boundary.

4.7. The site is approx. 90m in length (east-west orientation). The widest part of the site is approx. 60m across (north-south orientation) along the eastern boundary. The site then generally narrows towards the western boundary.

4.8. The site is currently occupied by a warehouse building and is 100% impermeable.

Existing Site Topography

4.9. A topographical survey of the site was undertaken by Brownfield Solutions Ltd. in November 2009 and is attached in Appendix C. The levels are related to Ordnance Survey datum.

4.10. Vehicular access to the site is via an entrance off Peel Street at a level of approx. 75.45m AOD (ref photos 1 & 2). The access falls to a level of approx. 74.50m AOD within delivery entrance of the warehouse (ref photos 2 & 3).

4.11. The site itself generally falls from the southern boundary with Peel Street down towards the northern boundary with Mearley Brook. The lowest part of the site is in the north western corner at a level of approx 74.20m AOD.

4.12. Site levels along the eastern boundary fall from approx. 75.55m AOD at the south eastern corner (at the junction of Peel Street and Shawbridge Street) to approx. 75.45m AOD at the mid point of the eastern boundary rising back up to a level of approx 75.60m AOD at the north eastern corner of the site (ref photos 8 & 9)

4.13. Site levels along the southern boundary rise from 75.45m AOD at the site entrance up to 75.86m AOD at the midpoint of the southern boundary before falling back down to a level of 75.55m in the south east corner (ref photos 4, 5 & 6)

4.14. Levels along the western boundary rise from a level of 75.50m AOD in the south west corner up to 76.08m AOD in the north west corner of the site.

EXISTING WATERCOURSES / WATER BODIES / DRAINS

4.15. Sewer record drawings provided by United Utilities show a 900mm diameter combined sewer in Peel Street and also an 825mm diameter combined sewer in Shawbridge Street.

4.16. Mearley Brook is immediately adjacent to the northern site boundary. The water level within the Canal was recorded as 72.50m AOD at the time of the topographical survey (November 2009). The impounded water level of the brook is therefore approximately 1.7m below the existing ground levels in the lowest area of the site.

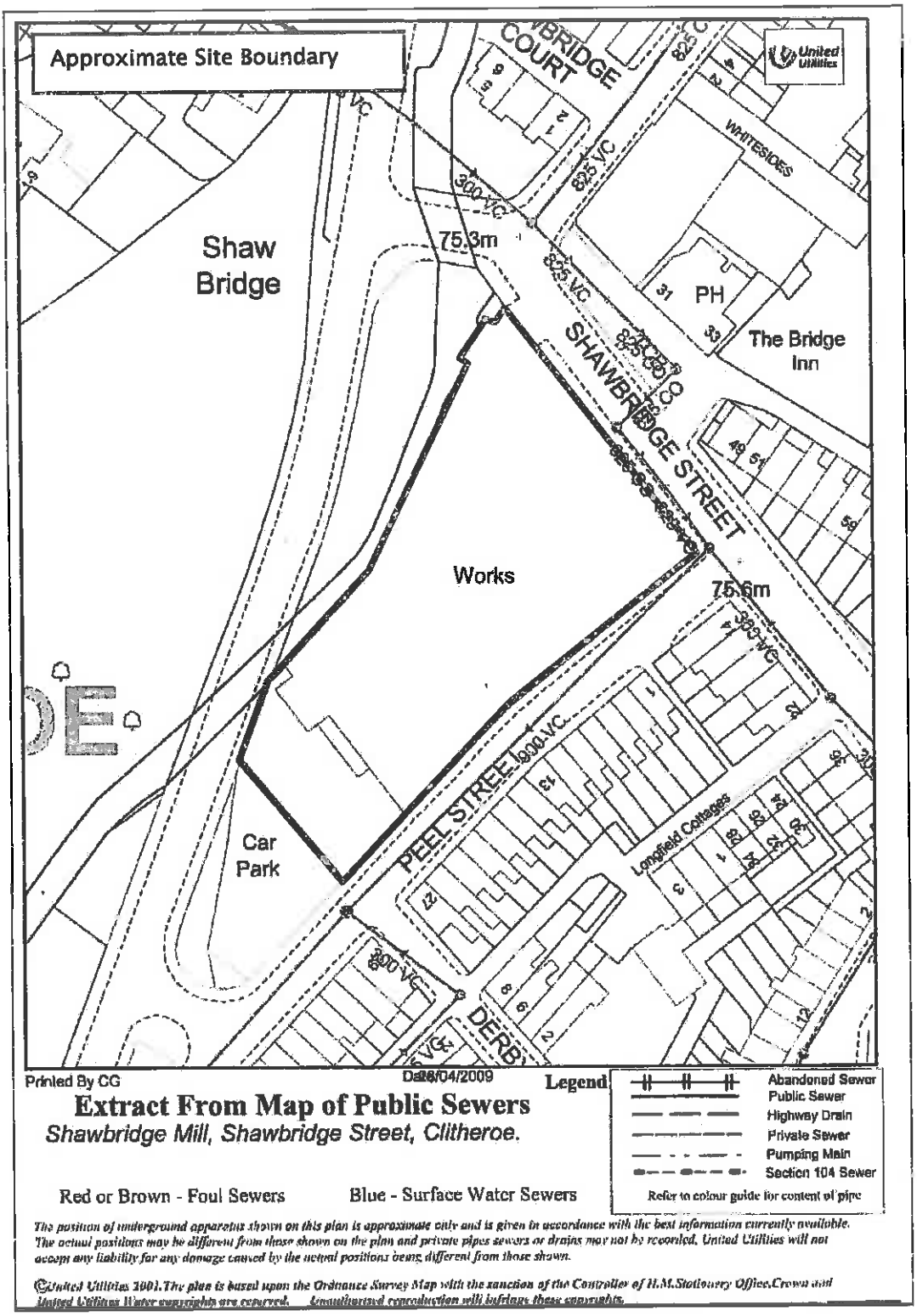
4.17. Shawcross Brook is located approximately 100 yards south east of the site along Shawbridge Street, before running in culvert under Shawbridge street and outfalling into Mearley Brook under Shawbridge Street bridge.

EXISTING DRAINAGE INFRASTRUCTURE

4.18. Brownfield solutions Ltd have identified an existing surface water drainage system within the site boundary which discharges via 3 no outfalls into Mearley Brook. A copy of Brownfield Solutions Ltd dwg no. C1459/03 is attached in Appendix C.

4.19. United Utilities (UU) have provided a copy of their sewer record plans showing the locations of public Adopted sewers in the vicinity of the site. Copies of these drawings are attached in Appendix D and an extract provided in Figure 4.5.

Figure 4.5 Extract from United Utilities Sewer Record Plans



4.20. The majority of the site is currently taken up by a large warehouse building with a small delivery yard accessed from Peel Street. The extent of the existing site catchment area is indicated on dwg. no. ELL/LIDL/128/004, attached in Appendix H.

4.21. There are three existing surface water discharge points from the site discharging into Mearley Brook (ref photos 23, 26 & 28).

EXISTING GROUND CONDITIONS

4.22. An intrusive ground investigation was undertaken by Brownfield Solutions Ltd. In November 2009 and is reported in the Brownfield solutions Ltd. Report 'Shawbridge Mill, Clitheroe - Geo-Environmental Assessment Report', November 2009, report number JMJ/C1471/1797.

4.23. The intrusive investigation comprised ten window sample boreholes (BH1 to BH10) drilled to depths of between 3.0m and 4.0m bgl using a tracked window sampling rig and liners (windowless) on the 26th and 27th September 2009.

4.24. The approximate locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, C1459/02 in Appendix F

4.25. The exploratory holes were positioned to establish general ground conditions on the site, and to target areas of specific interest such as the locations of the aboveground tanks and adjacent to the timber yard located to the east of the site.

4.26. The intrusive investigation encountered Made Ground at all locations comprising hardstanding overlying ash, clinker and occasional reworked sand and gravels with occasional areas of clay and brick fill was encountered at all locations to depths of between 0.3m and 1.40m bgl.

4.27. The natural strata underlying the Made Ground was generally found to be soft to firm occasionally organic and peaty sandy clay with occasional bands of gravel.

4.28. Medium dense sand and gravels were encountered in some of the boreholes predominantly in the north west of the site although thin bands were encountered in the south east.

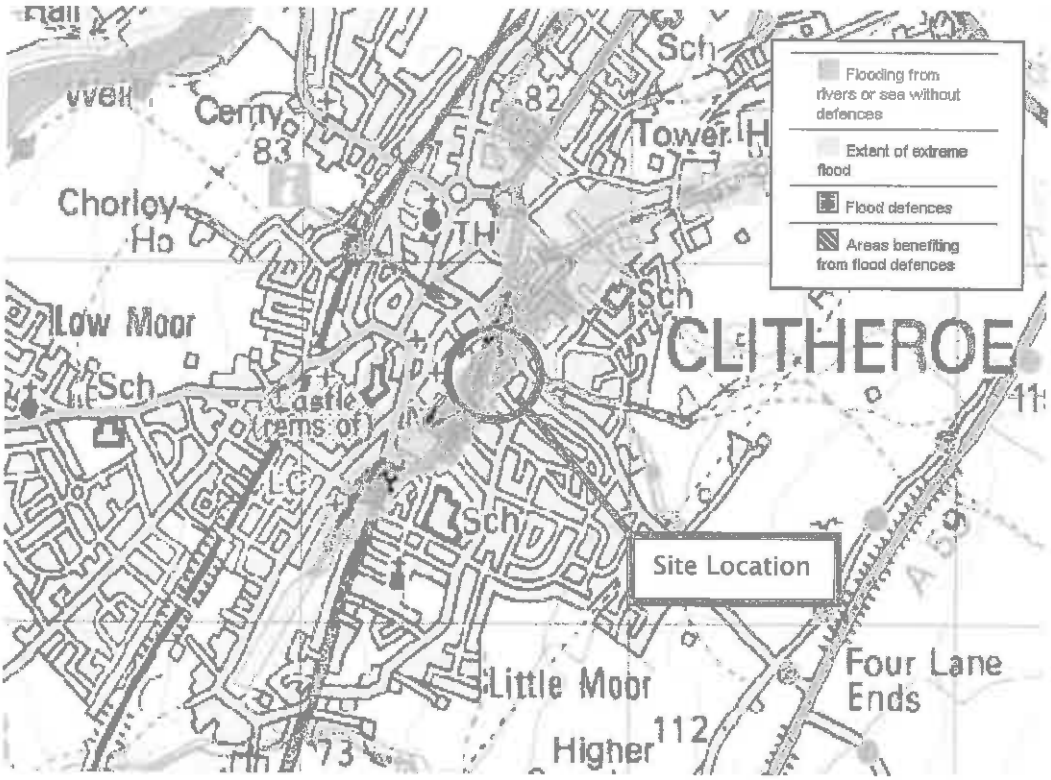
4.29. Boreholes 2 and 7 to 9 encountered medium dense occasionally clayey Sand and Gravel with occasional cobbles, between the depths of 0.50m and 2.00m in the south of the site (BH2), and in the north of the site between the depths of 2.10m and 3.00m in BH8, 1.60m and 2.00m BH7 and 0.30m to 1.50m in BH9. Thin beds of gravel were also encountered in the clay at BH3 and BH4.

4.30. The Brownfield Solutions Report indicates that groundwater was encountered at 1.50m in BH3 and 2.50m in BH6 during the drilling of the boreholes. All remaining holes were dry during the site work.

EXISTING FLOOD ALLEVIATION MEASURES & HYDRAULIC STRUCTURES

4.31. The Environment Agency Flood Zone Maps [9] shows no formal flood defences in the vicinity of the site, ref. Figure 4.6 below

Figure 4.6 EA Flood Zone Map (not to scale)



[9] www.environment-agency.gov.uk

4.32. During the Site visit a number of hydraulic structures were observed along the route of Mearley Brook in the vicinity of the site, all of which vary in type, construction and capacity. The following hydraulic structures were observed during the site visit:

- Shawbridge Street Bridge (ref. photos 19 &35);
- Peel Street Bridge (ref. photos 29 & 32)
- Waterloo Bridge (ref. Photos 39, 40 & 41)
- SW outfall immediately downstream of Peel Street Bridge (ref photo 33);

5.0 PROPOSED DEVELOPMENT

PROPOSED LAYOUT

5.1. The proposed layout is shown in Figure 5.1 and attached in Appendix F.

5.2. The proposed development comprises a commercial unit for Lidl UK GmbH.

PROPOSED LEVELS

5.3. Generally levels across the site are to be raised above existing as part of the redevelopment.

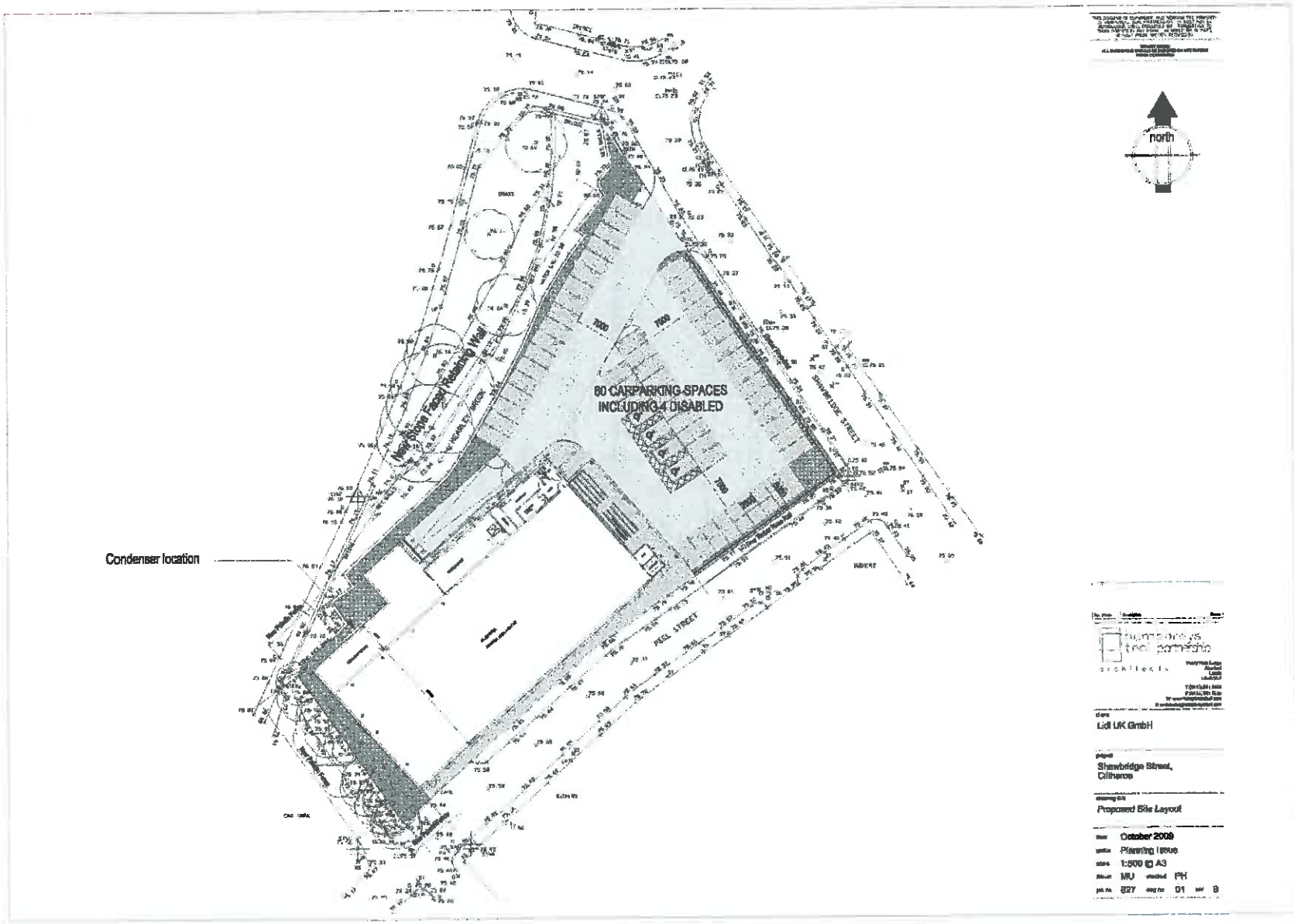
5.4. Levels at the site entrance are to tie into existing levels of 75.38m AOD. Levels will then rise up to the FFL of the proposed building 75.95m AOD.

5.5. Levels in the car park will fall away from the proposed building towards the car park entrance off Shawbridge Street.

5.6. Along the northern boundary with Mearley Brook a wall will be constructed to form the southern bank of Mearley Brook as existing. Top of wall levels are to be determined at detailed design stage.

5.7. Refer to Elluc Projects Ltd layout drg no ELL/LIDL/128/006 in Appendix H for details.

Figure 5.1 Proposed Development Layout



6.0 PROPOSED DRAINAGE

SURFACE WATER DRAINAGE OPTIONS

6.1. Redevelopment of the site will result in a decrease in the impermeable area on the Site of approximately 11%, resulting in a corresponding decrease in surface water run-off from these impermeable surfaces

6.2. The total impermeable area of approx 0.35 ha, following redevelopment of the site, would result in a total discharge of approx. 49 L/s (using the $3.61C_viA_i$ methodology outlined in The Wallingford Procedure [10] and CIRIA Report C697 - based upon a design rainfall intensity of 50mm/hr). This rate of 49 L/s is less than the current run-off rate of approx. 55 L/sec. Refer to drg no ELL/LIDL/128/004 attached in Appendix H for a comparison between existing and proposed impermeable areas.

6.3. During extreme rainfall events the design capacity of the drainage systems could be exceeded, resulting in flooding from manholes or gullies. Overland flow routes may therefore need to be incorporated into the design of the site to ensure that flooding of the supermarket does not occur in such a situation.

6.4. It is generally accepted that a degree of surface flooding can be permitted during extreme storm events, subject to specific surface areas being designated as flood-susceptible and subject to flooding of these areas posing little or no risk to human life and/or damage to property. Examples of surface areas which might be permitted to flood during extreme events are:

- Agricultural land;
- Recreational land (playing fields etc.);
- Landscaped areas;
- Car parks;
- Other non-inhabited, designated areas.

[10] The Wallingford Procedure - Volume 4 Modified Rational Method

6.5. In all cases where surface flooding might be permitted or designed in to a scheme, due diligence needs to be given to PPS 25 and the need to make potential users of such areas aware of their functionality and purpose, and the requirement to maintain safe egress and access at all times.

6.6. The Building Regulations Approved Document H (2002) outlines a hierarchy of potential methods of disposing of surface water from a site:

- A soakaway; or where that is not practicable
- A watercourse or river; or where that is not practicable,
- A sewer.

6.7. The viability of this hierarchy has been assessed below:

SOAKAWAY

6.8. Recent intrusive Ground Investigations have indicated that a number of Borehole locations encountered water at depths of between 1.5m and 2.5m depth.

6.9. On this basis, the future use of soakaways has been discounted at this stage.

WATERCOURSES / WATER BODIES

6.10. The site is bounded by Mearley Brook to the North with Shawcross Brook located approximately 100 yards to the south east of the site along Shawbridge Street. Shawcross Brook then runs in culvert under Shawbridge Street and outfalls into Mearley Brook under Shawbridge Street bridge.

6.11. Discharge of SW run-off to Mearley Brook is considered an option. The EA have been consulted during the production of this FRA and have accepted that discharge from the site into Mearley Brook is acceptable. Flow rates are to match the run off rates from the existing site or if possible at a reduced rate.

SEWERS

6.12. There are no existing surface water drainage sewers serving the site.

6.13. Sewer record drawings provided by United Utilities show a 900mm diameter combined sewer in Peel Street and also an 825mm diameter combined sewer in Shawbridge Street.

6.14. Enquiries have been issued to UU requesting further information on the Consented discharge from this sewer and whether this sewer has any available spare capacity to receive additional flows. No response had been received at the time of issue of this Report. It has therefore been assumed that the sewer has no available spare capacity and it has been discounted as a potential outfall for the site.

6.15. The discharge of SW run-off from the site to a sewer is not therefore considered an option.

SURFACE WATER DRAINAGE STRATEGY

6.16. Based on the options considered above and discussions with the Environment Agency, the SW drainage philosophy for the site has been agreed as follows:

- SW run-off from the entire site to be limited to existing run off rates during a 1% AEP (1 in 100 year) event including climate change; and discharged into the adjacent Mearley Brook.

6.17. The proposed development consists of approximately 0.135ha building area, with approx 0.215ha taken up by a service yard, access road and car park areas. The access roads and parking areas will be impermeable and constructed in tarmacadam.

6.18. Two surface water outfalls with unrestricted discharge are proposed from the development to Mearley Brook.

6.19. The roof run-off will be collected in perimeter rainwater pipes. These rainwater pipes will connect into a proposed piped gravity surface water system and

discharge directly into Mearley Brook via outfall no 1as indicated on Elluc Projects Ltd dwg no. ELL/LIDL/128/005.

6.20. The access road and car parking areas will be drained via gullies into a piped gravity surface water drainage system. The system will discharge via an oil interceptor into Mearley Brook via outfall no 2 as shown on Elluc Projects Ltd Dwg no. ELL/LIDL/128/005.

6.21. The flow rates will be calculated using the Modified Rational Method and the surface water network will be designed using Microdrainage flow simulation software to ensure the following:

- No surcharging of drainage network for Design Storm of 1 in 2 years.
- No flooding for Design Flood frequency of 1 in 30 years +20 % climate change.
- Any flooding contained within the site (within low risk areas) 1 in 100 years+30 % climate change.

6.22. A Preliminary drainage design for the SW drainage systems has been prepared and is shown in Appendix G of this Report. The preliminary design may be subject to review during detailed design stage.

FOUL WATER DRAINAGE STRATEGY

6.23. Foul drainage from the development will discharge into the existing public combined 900mm dia sewer in Peel Street.

6.24. A preliminary design for the FW drainage system has been prepared and is shown in Appendix H. The preliminary design may be subject to review during detailed design stage.

7.0 FLOOD HAZARDS & SOURCES OF FLOODING

POTENTIAL FLOOD HAZARDS

7.1. Prior to undertaking an FRA, the different types of flooding mechanisms which may affect the site need to be identified and then assessed to determine whether the development site is located within an area which is at risk of flooding from one or more of the applicable mechanisms.

7.2. CIRIA Report C624 [11], Table A2.1, lists a number of key factors that should be considered during a Level 1 FRA. This table can be used to summarise the findings of a Level 1 FRA study and to identify those flood hazards which may be applicable to the site in question. The boxes shaded grey indicate those sources of flooding which are unlikely to be identified for each question. If sufficient information is not available to identify the specific source of flooding, then all possible sources should be ticked. If a tick is placed below any flood hazard then a Level 2 FRA will be required to assess flood risk issues relating to that hazard in more detail.

7.3. Table 7.1 below identifies the flood hazards applicable to this site.

[11] CIRIA publication 'C624 Development and Flood Risk – Guidance for the Construction Industry'

Table 7.1 Flood Hazard Identification

Question	Flood Hazard						
	Fluvial	Sea	Estuaries	Groundwater	Overland flow	Artificial drainage systems	Infrastructure failure
Is the development site next to the sea or any watercourse shown on Ordnance Survey maps?	✓	×	×				
Is the development site, or part of the development site, identified as being at risk of flooding within available documentation?	✓	×	×	×	×	×	×
If a strategic flood risk assessment is available, is the development site, or part of the development site, identified as being at risk of flooding?	×	×	×	×	×	×	×
If a flood zone map is available, is the development site, or part of the development site, within a High Risk zone?	✓	×	×				
If a flood zone map is available, is the development site, or part of the development site, within a Low to Medium Risk zone?	×	×	×				
If a flood zone map is not available, is the development site, or part of the development site, situated on alluvium based on consideration of geological maps of the area?	×	×	×				
If there is an existing property on, or next to the site at the same level, is the property within a flood warning area?	×	×	×	×			
Are the LPA / FDA aware of any existing, historical or potential flooding problems that may affect the site?	×	×	×	×	×	×	×
Do the physical characteristics of the site suggest that it may be prone to flooding?	×	×	×	×	×	✓	✓
If a flood zone map is not available, is the development site, or part of the development site below 10m AOD AND does the FDA consider the development to be at risk of tidal flooding?		×	×				
Is the development located within a natural or artificial hollow, or at the base of a valley or at the bottom of a hill slope?				×	×		
Does examination of historical maps indicate any likelihood of flood risk at the site?	×	×	×	×	×		
Do the names of surrounding roads, areas or houses suggest the possibility of seasonal or historical flooding?	×	×	×	×	×		
Is the site likely to involve excavation / construction below existing ground levels (excluding foundations)?				×			
Is the land use upslope of the site such that the generation of overland flow may be encouraged, and can water from this area flow onto the site?					×		
Are there any artificial drainage systems on or next to the site, at the same level, or upslope of, the site?						✓	✓
Is the development site protected by an existing flood defence?	×	×	×			×	×
Is the development site protected by a flood control structure (eg flap valve, sluice gate, tidal barrier etc)	×	×	×			×	×

Is the development site located upstream of a culvert which may be prone to blockage?	x		x	x	x	x	x
Are water levels in a watercourse located in or next to a development site controlled by a pumping station?	x	x	x	x	x	x	x
Is the development site next to or downstream / down slope of a canal?						x	x
Is the development site downstream/ down slope of a reservoir or other significant water body?						x	x
FURTHER COMMENT ON FLOOD RISK WITHIN THIS FRA?	✓	x	x	x	x	✓	✓

SOURCES OF FLOODING

7.4. Therefore, it is considered that there are 3 potential sources of flooding to the site:

- Fluvial Flooding – from nearby Watercourses, Rivers, Drains etc.
- Surcharging of artificial drainage systems – flooding from existing or proposed drainage systems operating above their design capacity;
- Infrastructure failure – flooding as a result of failure of a flood defence, breach of a River / Canal bank etc.;

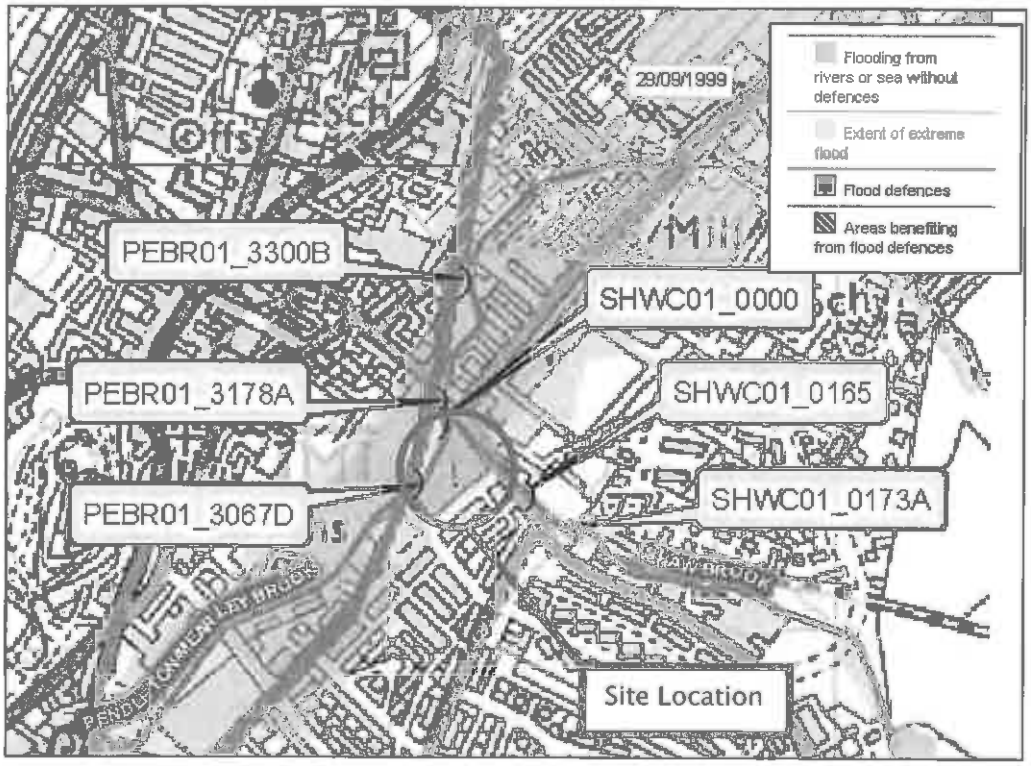
7.5. The risk of flooding from these various sources is assessed in the following Sections of this Report.

8.0 FLOOD RISK ASSESSMENT

FLUVIAL FLOODING

8.1. The Flood Zone Maps, which are available on the Environment Agency's website (ref. Section 2 of this Assessment), show the site to be within Flood Zone 3, denoted by dark blue shading, and therefore likely to be affected by fluvial flooding:

Figure 8.1 EA Flood Zone Map (not to scale)



8.2. The areas of darker blue shading indicate Flood Zone 3 – those areas likely to be affected by a major flood event that has a 1% (1 in 100) or greater chance of occurring each year.

8.3. There is no evidence to suggest that the site has been affected by fluvial flooding in the past.

8.4. Information provided by the EA, attached in Appendix E, indicates that the 1 in 100 year flood level of Mearley Brook at the point where the brook passes under

Shawbridge Street, is predicted to be 75.07m AOD [Upper] and the 1 in 100 year flood level upstream of where the brook passes under Peel Street (to the south of the proposed development), is predicted to be 74.97m AOD.

8.5. The EA have confirmed that these levels do not include an allowance for climate change effects, however after discussion with the EA (Colin Worswick) an additional 100mm is to be added to the above levels to allow for climate change, thus making the levels 75.17m AOD and 75.07m AOD respectively.

8.6. The 1 in 100 year flood levels for Shawcross Brook at the point where it becomes culverted is 77.95m AOD. At the point where the Shawbrook culvert enters Mearley Brook the flood levels is 75.05m AOD.

8.7. The EA have confirmed that these levels do not include an allowance for climate change effects. An additional 100mm is to be added to the above levels to allow for climate change, thus making the levels 78.15m AOD and 75.15m AOD respectively.

8.8. Existing site levels rise from the south to the north.

8.9. The lowest part of the existing site is in the north west corner along the boundary of Mearley Brook where levels are 74.20m AOD, however an existing wall forming the south bank of Mearley Brook has a top of wall level of 75.20m AOD.

8.10. The topographical survey shows that site boundary levels along Shawbridge Street and Peel Street vary from approx 75.38m AOD to 75.85m AOD

8.11. Based on the predicted flood level of 75.17m AOD for Mearley Brook and 75.15m AOD for Shawcross Brook at the location of Shawbridge Street bridge, flooding of the Site would not be expected during the 1 in 100 year flood level including climate change.

8.12. The 1 in 100 year flood level of Shawcross Brook at its point where it becomes culverted is 78.05m AOD including climate change. It has been assumed that this level is above the levels of Shawbridge Street and so overland flooding would be expected at this point.

8.13. Flood waters would flow from this point down Shawbridge Street to the low point of 75.23m AOD in the channel at the location of the proposed site entrance.

8.14. Whilst flood water may form within the junction at the proposed site entrance it would not enter the site beyond the junction radii as levels within the junction rise to 75.45m AOD with levels continuing to rise within the proposed site. The proposed site levels are higher than the levels on Shawbridge Street which continue to fall towards the junction with Taylor Street.

8.15. Based on these levels flood waters would be expected to flow down Shawbridge Street, past the proposed site entrance, and continue down Taylor Street. Refer to drawing ELL/LIDL/128/009 in Appendix H.

8.16. Flood waters would not be expected to enter Peel Street due to the fact that levels rise from its junction with Shawbridge Street.

8.17. Based on the above information, the risk of fluvial flooding of the site from adjacent Watercourses is considered to be low and on this basis any further assessment of fluvial flooding is not considered necessary.

SURCHARGING OF ARTIFICIAL DRAINAGE SYSTEMS

8.18. Enquiries have been issued to UU requesting information regarding any problems (reported events in the last 5 years) with the existing sewers in Shawbridge Street and Peel Street. No response had been received at the time of writing this Report. It has therefore been assumed that have been no reported events in the vicinity of the site.

8.19. The preliminary SW drainage systems, designed as part of this FRA [ref. Section 6], indicate that run-off from the site can be managed in a sustainable manner and discharged from the site at rates acceptable to the EA. The SW drainage system has been designed to wholly contain the 1 in 100 year event + climate change with no surface flooding.

8.20. The proposed layout provides over-land flood flow routes through the site and thus any surface flooding which occured during such an event would be directed away from the proposed building, thus mitigating the risk to life and property.

8.21. The risk of flooding from surcharging of artificial drainage systems is therefore considered to be low, and on this basis any further assessment of flooding via this mechanism is not considered necessary.

INFRASTRUCTURE FAILURE

8.22. The central CIRIA Report C624 defines 'infrastructure failure' as the structural, hydraulic, geotechnical, mechanical or operational failure of infrastructure which normally retains, transmits or controls the flow of water. This risk of flooding is usually associated with 3 main categories of infrastructure:

- failure of infrastructure designed to store or carry water (e.g. dam break, canal leak, water mains burst);
- failure of infrastructure designed to protect an area from flooding (e.g. flood defence breach, flap valve failure, penstock failure, pumping station failure);
- blockage of a pipe, bridge or culvert.

8.23. There are no dams, reservoirs or canals located upstream / upslope of the site.

8.24. The location of water mains in the vicinity of the site have been investigated as part of this report, however, the integrity of any water mains in the vicinity of the site has not been investigated.

8.25. United Utilities Sewer records show that water main infrastructure exists beneath Shawbridge Street and Peel Street. Failure of these water mains could result in leakage and consequently over-land flows. There is therefore a risk of over-land flows being generated as a result of an infrastructure failure in these water mains. Such failures occur very infrequently and there is little that can be done to anticipate them.

8.26. Water main failures are usually notified to the asset owner within a short period of time of the failure occurring and remedial Work is usually implemented soon

thereafter to prevent subsequent property damage and inconvenience. Any failure of a water main is therefore likely to continue for a relatively short period of time.

8.27. There is an existing foul pumping station in the north west corner of the site. It is believed that the pumping station is regularly maintained.

8.28. There are no records to confirm any previous flooding issues as a result of the pumping station failure.

8.29. Failure of the pumping station would be notified to the occupants of the warehouse within a short period of time and remedial work would be implemented soon thereafter. Any failure of the pumping station is therefore likely to continue for a relatively short period of time.

8.30. Information provided by the EA shows that Shawcross Brook runs in culvert under Shawbridge Street, adjacent to the eastern boundary of the site. Failure of this culvert could result in flooding of Shawbridge Street.

8.31. In the event of the failure of Shawcross Brook culvert flooding of Shawbridge Street would be expected. Flooding would flow down Shawbridge Street towards the low point of 75.23m AOD along the western channel at the location of the proposed site entrance.

8.32. Whilst flood water may form within the junction at the proposed site entrance it would not enter the site beyond the junction radii as levels within the junction rise to 75.45m AOD with levels continuing to rise within the proposed site. The proposed site levels are higher than the levels on Shawbridge Street which continue to fall towards the junction with Taylor Street.

8.33. Based on these levels flood waters would be expected to flow down Shawbridge Street, past the proposed site entrance, and continue down Taylor Street. Refer to drawing ELL/LIDL/128/009 in Appendix H.

8.34. Flood waters would not be expected to enter Peel Street due to the fact that levels rise from its junction with Shawbridge Street.

8.35. Based on the above information, the risk of flooding as a result of infrastructure failure is considered to be low and on this basis any further assessment of fluvial flooding is not considered necessary.

9.0 RESIDUAL RISKS & IMPACTS

RESIDUAL RISKS

9.1. Table 9.1 outlines the initial qualitative assessment of risk posed by each potential source of flooding, the mechanisms for flooding and the likely consequences. The Table also includes a review of possible mitigation measures and what effect, if any, the mitigation measures are likely to have on the residual risk posed by each potential flood source.

9.2. Categories of risk have been qualitatively defined as:

- 'High' Risk: Flooding is likely to result in significant damage to property and pose a significant risk to life;
- 'Medium' Risk: Flooding is likely to result in possible minor damage to property but flood progress would allow adequate time for residents to be warned and safely evacuated to higher ground or appropriate places of safety;
- 'Low' Risk: Flooding is unlikely to result in any damage to property damage and pose little or no risk to life.

Table 9.1 Qualitative Assessment of Residual Flood Risks

Source	Flood Mechanism & Consequences	Initial Assessment of Risk	Recommended Mitigation Measures	Residual Risk
Fluvial flooding	Rising water levels in Mearley Brook likely to have an impact on the site or any redevelopment Works on the site during the 1 in 100 year event.	Low	• Proposed floor level to be set a minimum 600mm above predicted 1 in 100 year flood level (inc. climate change). FFL to be set at 75.95m AOD; • Pedestrian access/egress will be possible via the site entrance to higher ground along Shawbridge Street • Additional mitigation measures outlined in PPS 25 Practice Guide, paragraph 4.47 to 4.52.	Low
Surcharging of artificial drainage systems	Drainage systems operating above design capacity, resulting in: • surcharging of manholes / drainage systems; • over-land flow through development; • ponding in low-lying areas of site; • no over-land flow route for flood waters accumulating in low-lying areas.	Medium	• Appropriate design of SW drainage system to provide sufficient attenuation; • Provision of overland flood flow routes through proposed development.	Low
Infrastructure failure	• Water main burst, resulting in possible over-land flows with possible inundation of property. • Failure/blockage of Shawbrook Culvert resulting in overland flows possibly flooding the site	Low	• Proposed levels at site entrance are set higher than the levels of Shawbridge Street meaning flood flows would bypass the site entrance and flow down Taylor Street.	Low

9.3. The mitigation measures proposed in this Report will generally reduce the risk of flooding from each potential source.

FLOOD PROBABILITY

9.4. Fluvial flooding of the site would not be expected.

9.5. Flooding of the site is more likely to occur as a result of the proposed drainage systems surcharging, resulting in over-land flood flows.

9.6. The preliminary design of the SW drainage system has confirmed that a drainage system could be provided to wholly contain the flows during a storm event that had a 1% (1 in 100) chance of occurring each year, including the effects of climate change. No surface flooding would therefore be anticipated during the 1% annual probability event.

9.7. Assessing the probability of flooding as a result of an infrastructure failure is not possible. Such failures occur very infrequently and there is little that can be done to anticipate them. Water mains bursts typically result in low over-land flow rates and are generally notified to the asset owner and subsequently remedied within a short duration of the leak occurring.

9.8. The probability of flooding as a result of the failure/blockage of Shawcross Brook culvert has been assessed and is deemed to be low due to proposed site levels being set above surrounding levels.

FLOOD PROGRESS

9.9. No surface flooding would be anticipated during the 1 in 100 year (1% annual probability) storm event.

9.10. Flooding of Shawbridge Street as a result of failure/blockage of Shawcross Brook culvert would be expected to flow past the proposed site entrance and down Taylor Street. Refer to drawing ELL/LIDL/128/009 in Appendix H.

9.11. Flooding may occur as a result of surcharged drainage systems operating above their design capacity. Through detailed design, surface flooding would be managed and confined to the areas of the proposed car park.

9.12. Emergency access/aggress to the site would also be provided via the proposed site entrance off Shawbridge Street.

Impact of Displaced Water

9.13. The proposed works will not displace any water and thus will have no impact.

Impact on Coastal or Fluvial Morphology

9.14. The proposed redevelopment will have no impact upon the fluvial morphology of Mearley Brook or any other River or Watercourse in the vicinity of the site.

10.0 CLIMATE CHANGE

10.1. In making an assessment of the impacts of climate change on flooding from land, rivers and sea, Table B.2 (PPS 25, Annex B) below recommends that peak rainfall intensities and peak river flows should be increased by 5% and 20% respectively between the years of 1990-2025; with both peak rainfall intensities and peak river flows increased by 20% for the years 2055-2085:

Table 10.1 PPS 25, Annex B, Table B.2

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

10.2. Over the next 75 years (the anticipated lifetime of the proposed development), the recommendations contained in Annex B of PPS 25, in terms of increased river flows, would equate to an increase of 20% in peak river flows.

10.3. The recommendations contained in Annex B of PPS 25, in terms of increased rainfall, would also equate to an increase of 20% in peak rainfall intensity flows.

10.4. The EA have confirmed that the 1 in 100 year flood levels provided by them, attached in Appendix B, do not include an allowance for climate change effects. Further discussions with the EA (Colin Worswick) confirmed that flood levels provided by them should be increased by 100mm to make allowance for climate change.

10.5. In accordance with EA guidelines, proposed finished floor levels for development on the site should be set a minimum of 600mm above the predicted 1 in 100 year

flood level, including climate change. Finished Floor Level will therefore be set at a minimum level of 75.95m AOD on the site.

10.6. The provision of finished floor levels a minimum of 600mm above the predicted 1 in 100 year flood level including climate change is therefore considered sufficient to have taken account of the effects of climate change.

10.7. The preliminary design of the proposed SW drainage system has taken account of this increase in peak rainfall intensity over the lifetime of the proposed development and has demonstrated that surface water run-off can be managed in a sustainable manner on the site, including the effects of climate change.

10.8. It is therefore considered that the proposed development has taken account of climate change effects

11.0 CONCLUSIONS & RECOMMENDATIONS

11.1. Lidl UK GmbH are proposing to redevelop the site off Shawbridge Street/Peel Street in Clitheroe for commercial purposes. The site is currently occupied by a warehouse.

11.2. The site is located immediately adjacent to Mearley Brook with Shawcross Brook located approx 100 yards to the south east of the site along Shawbridge Street. Shawcross Brook flows in culvert under Shawbridge Street adjacent to the eastern site boundary. A number of Combined public sewers are located in Shawbridge Street and Peel Street.

11.3. The Local Planning Authority (Ribble Valley Borough Council) have requested that the risk of flooding be formally assessed through a Flood Risk Assessment.

11.4. The Environment Agency (Colin Worswick) have been consulted during the production of this FRA.

11.5. The site is unlikely to be affected by fluvial flooding from nearby watercourses. Flooding of the site is more likely to occur as a result of the proposed drainage systems surcharging, resulting in over-land flood flows.

11.6. Redevelopment of the site will result in a decrease in the impermeable area on the Site of approximately 11%, resulting in a corresponding decrease in surface water run-off from these impermeable surfaces

11.7. A preliminary drainage design has been prepared in support of this Flood Risk Assessment which has proved that surface water run-off from the proposed development can be managed so as to ensure flows from the site following redevelopment will not exceed current levels. Redevelopment of the site will not therefore increase the flood risk to any other property.

11.8. A proposed drainage system can be provided which will wholly contain a storm event that has a 1% (1 in 100) chance of occurring each year. Surface water run-off

from the site will be an unrestricted and discharged to the adjacent Mearley Brook as agreed with the EA.

11.9. Data supplied by the Environment Agency indicates the site to lie within Flood Zone 3. Commercial Development is classed as 'Less Vulnerable'[12] and as such would be considered appropriate development within Flood Zone 3 as identified in Table D.3 of PPS 25 below:

Table 11.1 PPS 25, Annex D, Table D.3

Flood Risk Vulnerability classification (See Table D.2)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More vulnerable	Less vulnerable
Flood Zone (see Table D.1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	*	Exception Test required	✓
	Zone 3b 'Functional Floodplain'	Exception Test required	✓	*	*	*

11.10. Based on the information provided to Elluc Projects Limited in support of this Flood Risk Assessment, redevelopment of the site for commercial use would be considered sustainable in terms of Flood Risk, subject to the various recommendations contained in this Assessment being incorporated into the design of the final scheme, and in line with National and Local Planning Policy.

[12] Table D.2, PPS 25, Annex D

APPENDIX A:

PPS 25, Annex D, Table D.1 – Sequential Test

Extracts from the Ribble Catchment Flood Management Plan

Policy Unit	Preferred Policy	Justification	Opportunities	Actions	Uncertainties
		P3 would not address the current level of flood risk, leaving P4 as the most suitable policy.			
1.4 Clitheroe	P5 – Take further action to reduce flood risk	This very small policy unit (4km^2) is entirely urban, but set within a much larger rural catchment with considerable landscape, cultural and environmental interests. About 260 properties are at risk of flooding (1% AEP event), at a cost of £38M worth of damage, with a further 230 properties at risk in 100 years with a 'do nothing' scenario. In addition, 3 schools and 1 hospital are currently at risk in a 1% event, which is not forecast to increase in the future. Flood risk management activities in the town include the maintenance of screens on the inlet and outlet of culverted watercourses, general maintenance of banks of open watercourses, and the provision of formal flood warnings to the Clitheroe and Low Moor areas. Further action is needed to reduce the predicted effects of climate change and further urban development in and around Clitheroe. Culverted stretches of Mearley Brook pose a high flood risk to the town, and work is required to reduce this risk. Whilst the projected damages in this unit are not as high as other policy units where P5 is proposed, this level of damage in such a small area indicates the action is needed to reduce the flood risk and therefore a proactive P5 policy is recommended, rather than any policy which would provide a lower level of flood risk management now and into the future. Being a wholly urban policy unit means that, by implications, opportunities for a policy P6 policy are extremely limited, although there is potential for flood storage upstream of the town. Work in this policy unit is	Improving flood warning (complies with EU Floods Directive)	Address flood risk in Clitheroe Local authority to follow principles of PPS25 in assessing developments Develop a Surface Water Management Plan (SWMP) Local authority to develop a Strategic Flood Risk Assessment for Clitheroe	Funding levels for work within the Environment Agency in the future

Policy Unit	Preferred Policy	Justification	Opportunities	Actions	Uncertainties
		likely to get priority on a national scale, with work programmed in Clitheroe to address flood risk. Implementing flood resilience measures within existing and future properties may also help to reduce flood risk.			
2. Calder	P3 – Continue with existing or alternative actions to manage flood risk at the current level (accepting that flood risk will increase from this baseline)	This large policy unit (280km^2) is predominately rural, with only a few isolated flood risk areas/ problems in distributed villages, in particular in Whalley. Flood risk management activities in this area are minimal, and focus on general bank maintenance where they do take place. A 1-in-100 year flood (1% AEP event) would affect about 410 properties and cause about £22M of damage, with another 60 properties at risk in 100 years in a 'do nothing' scenario. In addition, one water treatment works and five sewage works are currently at risk, as well as two schools, one hospital and two scheduled ancient monuments, with an extra sewage works at risk in 100 years. It is worth noting that the policy unit is large in area and so the damage costs per unit area are very low in comparison with the other policy units. Therefore, policies P4 and P5 are not suitable for this rural policy unit, where future development will be limited. However, the village of Whalley represents a very small area of P5. A P3 policy has been recommended due to the nature of the social and economic flood risk receptors in this policy unit to maintain the current situation (by current or alternative means) whilst recognising that the level of flood risk will increase over time. This reflects the fact that activities will decrease in some areas but increase on others (e.g. Whalley). The introduction of a P1 or P2 policy would	Habitat creation to reduce run-off (contributes to Making Space For Water) Enhancing connectivity between the river and floodplain (contributes to Making Space For Water) Improve condition of sites with unfavourable status (aids in gaining good ecological status for WFD) Protect and improve character of landscape	Address flood risk in Whalley Promotion of habitat creation schemes	Funding levels for work within the Environment Agency in the future Extent of ESS / HLS funding in the future from Natural England

Annex D: The Sequential Test and Exception Test

The Sequential Test

D1. 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 (Zone 1).

D2. The Flood Zones are the starting point for the sequential approach. Zones 2 and 3 are shown on the Environment Agency Flood Map[18] with Flood Zone 1 being all the land falling outside Zones 2 and 3. These Flood Zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences.

D3. Regional Flood Risk Appraisals (RFRAs) (see Annex E) will refer to Environment Agency Flood Maps and will utilise further information such as Strategic Flood Risk Assessments to allow flood risk to be taken into account in a broad regional context (see Annex E para. E4).

D4. Strategic Flood Risk Assessments (SFRAs) (see Annex E) will refine information on the probability of flooding, taking other sources of flooding (see Annex C) and the impacts of climate change into account. The SFRA will provide the basis for applying the Sequential Test, on the basis of the Zones in Table D.1. Where Table D.1 indicates the need to apply the Exception Test, the scope of the SFRA will be widened to consider the impact of the flood risk management infrastructure on the frequency, impact, speed of onset, depth and velocity of flooding within the Flood Zones considering a range of flood risk management maintenance scenarios. Where a SFRA is not available, the Sequential Test will be based on the Environment Agency Flood Zones.

D5. The overall aim of decision-makers should be to steer new development to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, decision-makers identifying broad locations for development and infrastructure, allocating land in spatial plans or determining applications for development at any particular location should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should decision-makers consider the suitability of sites in Flood Zone 3, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

D6. Within each Flood Zone, new development should be directed first to sites at the lowest probability of flooding and the flood vulnerability of the intended use matched to the flood risk of the site, eg higher vulnerability uses located on parts of the site at lowest probability of flooding.

[18] See website for further details on Flood Map. www.environment-agency.gov.uk/maps/info/floodmaps/?lang=_e

D7. The preparation and review of Regional Spatial Strategies (RSSs) and Local Development Documents (LDDs) should be used to review existing and proposed development in order to allocate land in lower flood risk zones suitable for existing vulnerable uses already in medium and high flood zones, and in doing so, to realise opportunities arising through redevelopment to improve the sustainability of communities.

D8. When seeking planning permission for individual developments on sites allocated in development plans through the application of the Sequential Test, informed by a SFRA, developers need not apply the Sequential Test, but should apply the sequential approach (see para. 14) to locating development within the site. The plan should specify requirements for Flood Risk Assessment (see Annex E).

Table D.1: Flood Zones

(Note: These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 1 Low Probability
Definition This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)
Appropriate uses All uses of land are appropriate in this zone.
FRA requirements For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. This need only be brief unless the factors above or other local considerations require particular attention. See Annex E for minimum requirements.
Policy aims In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

Table D.1: contd.

Zone 2 Medium Probability

Definition

This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.

Appropriate uses

The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure in Table D.2 are appropriate in this zone.

Subject to the Sequential Test being applied, the highly vulnerable uses in Table D.2 are only appropriate in this zone if the Exception Test (see para. D.9.) is passed.

FRA requirements

All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

Zone 3a High Probability

Definition

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses

The water-compatible and less vulnerable uses of land in Table D.2 are appropriate in this zone.

The highly vulnerable uses in Table D.2 should not be permitted in this zone.

The more vulnerable and essential infrastructure uses in Table D.2 should only be permitted in this zone if the Exception Test (see para. D.9) is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

FRA requirements

All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.

Table D.1: contd.

Zone 3a High Probability *(continued)*

Policy aims

In this zone, developers and local authorities should seek opportunities to:

i reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques;

ii relocate existing development to land in zones with a lower probability of flooding, and

iii create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b The Functional Floodplain

Definition

This zone comprises land where water has to flow or be stored in times of flood. SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes).

Appropriate uses

Only the water-compatible uses and the essential infrastructure listed in Table D.2 that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood,
- result in no net loss of floodplain storage,
- not impede water flows, and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

FRA requirements

All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

i reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques, and

ii relocate existing development to land with a lower probability of flooding.

Table D.2: Flood Risk Vulnerability Classification

Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk, and strategic utility infrastructure, including electricity generating power stations and grid and primary substations
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding • Emergency dispersal points • Basement dwellings • Caravans, mobile homes and park homes intended for permanent residential use • Installations requiring hazardous substances consent [19]
More Vulnerable	• Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels • Buildings used for: dwelling houses, student halls of residence, drinking establishments, nightclubs, and hotels • Non–residential uses for health services, nurseries and educational establishments • Landfill and sites used for waste management facilities for hazardous waste.[20] • Sites used for holiday or short-let caravans and camping, **subject to a specific warning and evacuation plan**
Less Vulnerable	• Buildings used for: shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non–residential institutions not included in 'more vulnerable', and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment plants. • Sewage treatment plants (if adequate pollution control measures are in place).

[19] DETR Circular 04/00 – para. 18: *Planning controls for hazardous substances.* www.communities.gov.uk/index.asp?id=1144377

[20] See *Planning for Sustainable Waste Management: Companion Guide to Planning Policy Statement 10* for definition. www.communities.gov.uk/index.asp?id=1500757

Table D.2: contd.

Water-compatible Development	• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, **subject to a specific warning and evacuation plan**.

Notes:

1) This classification is based partly on Defra/Environment Agency research on Flood Risks to People (FD2321/TR2)[21] and also on the need of some uses to keep functioning during flooding.

2) Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

3) The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

[21] See website for further details. www.defra.gov.uk/science/Project_Data/DocumentLibrary/FD2320_3364_TRP.pdf

POLICY UNIT 1.4: CLITHEROE

Our preferred policy is P5: Take further action to reduce flood risk.

Summary & Vision:

This very small urban policy unit (4km^2) includes the main town of Clitheroe (pop. 14,000) within the Upper Ribble and Hodder catchment. For a flood with a 1% chance, there are about 260 residential properties (rising to 490 in 100 yrs), at risk of flooding and overall economic damages would be approximately £38M. The main sources of flooding here are from the watercourses and from undercapacity/blockage of culverts. The Low Moor area of Clitheroe is at risk of flooding from the River Ribble, whereas other parts of Clitheroe are at risk of flooding from Mearley Brook. In addition, within Clitheroe there are about 37 properties at risk during much smaller (e.g. 10% chance) flood events from Mearley Brook, which requires more urgent action.

- Flood risk in the town is high and will rise unacceptably if actions are not increased.
- Actions taken should not worsen flooding in built-up areas downstream of this policy unit
- A Strategic Flood Risk Assessment, produced by the Local Authorities, will steer development clear of existing and future floodplain and minimise flood risk to it.
- This area does not have a significant sewer flooding (DG5) problem, although actual theoretical risk of such flooding is unclear.
- This policy unit includes the Clitheroe and Low Moor flood warning areas.

Actions

Actions in the table below are colour coded according to priority:

High – essential to achieve policy aim & has large effect Medium – important to policy aim Low – desirable but benefits are not as great

Ref.	Guiding Principles	Action & Success Criteria (in italics)	Indicator	Partners (lead in bold)	Time-scale
1	c, d	Develop a strategy, subject to prioritisation and funding, to address flood risk within Clitheroe. This should incorporate a feasibility study, including modelling of the numbers of people and properties at risk in the towns, and a cost-benefit analysis for the installation of new flood defences. Particular attention should be paid to culverted sections of Mearley Brook within the town, and the options available to reduce flood risk from this watercourse. *Completed Clitheroe Strategy*	Timetable and programme of actions available	**Environment Agency**, Ribble Valley Borough Council, Lancashire County Council	2008 -2013 and ongoing
2	a, d	Promote application of rigorous planning control for any new development on floodplains in and around Clitheroe using the principles in PPS25 and encourage the implementation of SuDS. Where development must, exceptionally, take place in areas at risk of flooding, we will seek to ensure that floor levels are raised to an appropriate level, flood resilience is incorporated into buildings, and it is demonstrated that safe access and evacuation can be provided during flood events. *Guiding statement to discourage development on floodplains and encourage the use of SuDS within new developments*	No. of planning applications approved against Environment Agency Advice	**Ribble Valley Borough Council,** Environment Agency	Ongoing

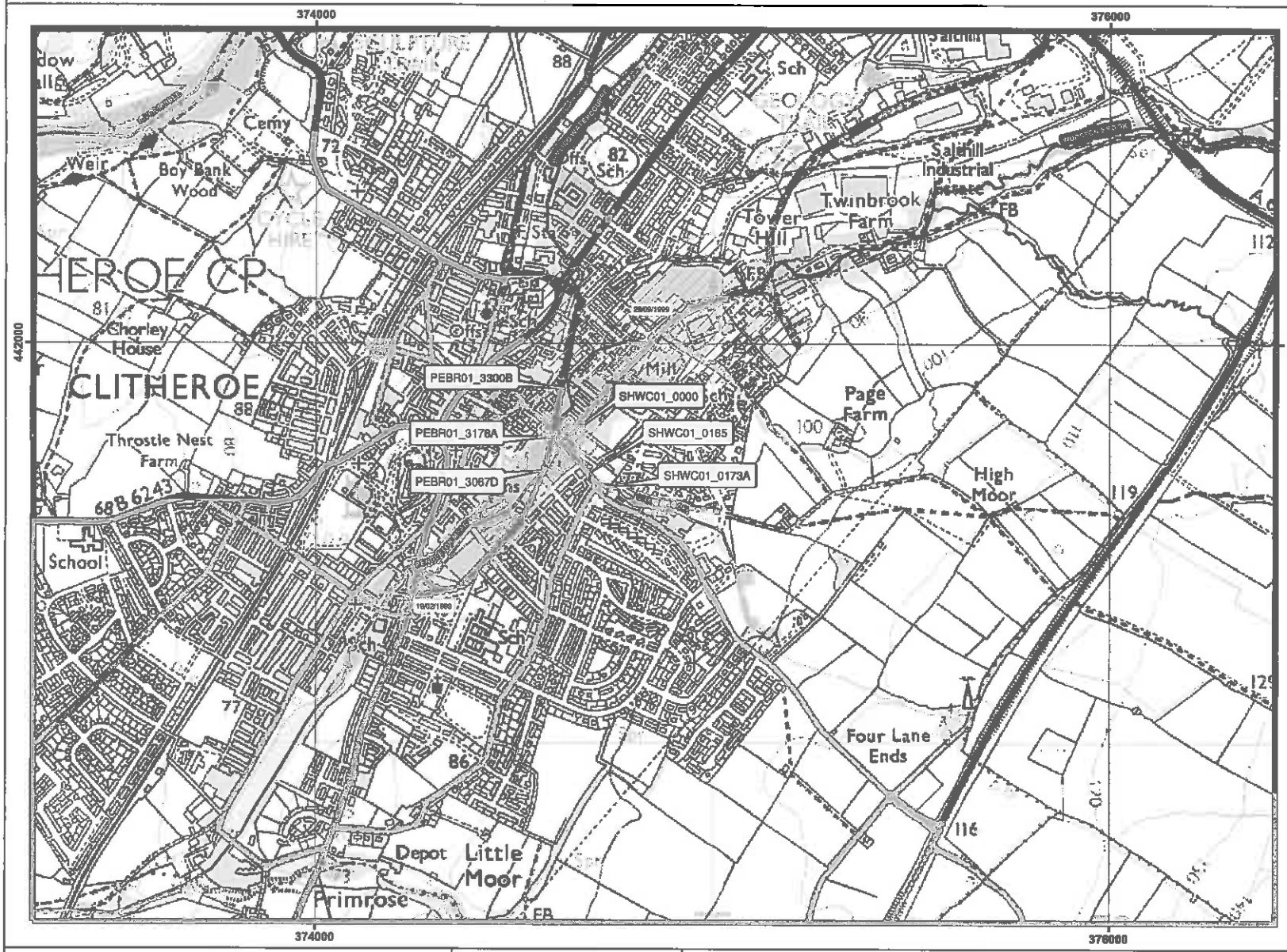
Ref.	Guiding Principles	Action & Success Criteria (in italics)	Indicator	Partners (lead in bold)	Time-scale
3	d	Develop a System Asset Management Plan, utilising NFCDD, to schedule maintenance of existing flood defence assets within the policy unit, to ensure that they meet their target asset condition and continue to protect against flooding. The plan should focus in particular on flood defences in Clitheroe, as well as assets of other organisations that can affect flood risk management. *Maintenance plan for flood defences in the Policy Unit*	Number of flood defence assets identified for maintenance	**Environment Agency,** United Utilities, Ribble Valley Borough Council, Landowners	2008-2010 and ongoing
4	a, d, f	Produce a Strategic Flood Risk Assessment (SFRA) for Clitheroe, linked to the Regional Flood Risk Assessment (RFRA), to help minimise flood risk to future development in the town from all sources. Exceptionally, where development is at risk appropriate flood mitigation measures will be implemented and residual risks fully considered. *SFRA recommendations implemented*	Average standard of protection for properties Annual average damages	**Ribble Valley Borough Council,** Environment Agency, Lancashire County Council, United Utilities, Regional Assemby	2008-2013

Ref.	Guiding Principles	Action & Success Criteria (in italics)	Indicator	Partners (lead in bold)	Time-scale
5	b	Implement improvements in flood warning and flood response. This should focus on the promotion of the existing formal flood warning areas in Clitheroe and Low Moor, through the attendance of community meetings, press articles, and maildrops, highlighting the benefits of registering to receive the service. Consideration in the future should be given to the effects of climate change on river flows and flood maps, with revisions to the area covered by the flood warning service if necessary. *Coverage target (number of properties at risk of flooding receiving flood warnings) met, coverage as a proportion of properties at risk in future does not reduce*	No. offered/receiving the warning service	**Environment Agency**	Ongoing
6	f	Investigate causes of surface water flooding and sewer flooding in Clitheroe and carry out remedial actions. This should include the dissemination of information by United Utilities and local councils relating to flood risk from their infrastructure, to enable targeted actions to be drawn up. *Investigation into the causes of surface water and sewer flooding*	No. of properties with sewer and / or surface water flooding problems	**United Utilities,** Ribble Valley Borough Council, Lancashire County Council, Highways Agency	2012-2020

Ref.	Guiding Principles	Action & Success Criteria (in italics)	Indicator	Partners (lead in bold)	Time-scale
7	d, f	Identify structures which cause flow restrictions or flow obstructions in Clitheroe, and prioritise structures for replacement / redesigning / removal according to their flood risk. This activity should focus particularly on culverted watercourses within the town and opportunities to open up these culverts, as well focusing on any bridges or channelised sections. Modelling should be carried out to determine the impact of these structures, to enable a prioritised list to be drawn up to aid in reducing flood risk in Settle. *Prioritised list of structures requiring replacement / redesigning / removal*	Number of structures identified	**Environment Agency**	2015-2025
8	**d**	Improve flood contingency planning in Clitheroe. This should focus on increasing the number of emergency plans for flood risk areas. It should also involve the formation of a local flood contingency planning group, incorporating the Environment Agency, emergency services, and local councils. *Increase in number of organisations with emergency plans*	Percentage of specified organisations / partners having an emergency plan in place	**Environment Agency, Lancashire County Council, Ribble Valley Borough Council,** United Utilities, British Waterways, Highways Agency	2008-2020 and ongoing

Flood Map - Land at Peel Street, Clitheroe

National Grid Reference:
SD 74620 41690



Environment Agency

North West Region - North Area

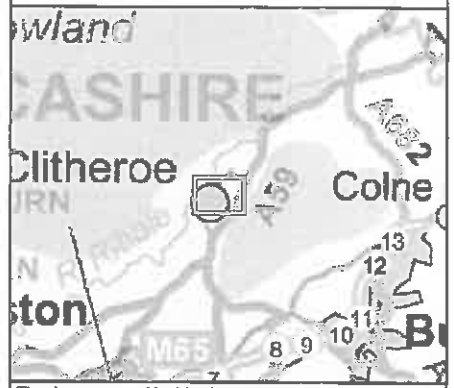
Lutra House, Dodd Way, Off Seedlee Road, Walton Summit, Bamber Bridge. Preston. PR5 8BX.

Tel: 08707 506 506 | www.environment-agency.gov.uk

Produced by David Hallworth, Flood Risk Management.

Map produced on: 10th December 2009

- Site
- Node Point Locations
- Main River
- Historic Flooding
- Flood Zone 3
- Flood Zone 2



The datasets used in this plan may not have been audited. The Agency cannot ensure that the data in its possession will always be accurate, up to date or valid but the Agency will use reasonable care to ensure an accurate copy of the data. The accompanying disclaimer should be used in conjunction with this plan.

0 100 200 400
Metres

Flood Zone 3: Shows the area that could be affected by flooding from rivers or the sea, if there were no defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) chance or greater of happening each year.
- or from a river by a flood that has a 1% (1 in 100) chance or greater of happening each year.

Flood Zone 2: Shows the additional extent of an extreme flood from rivers or the sea, if there were no defences. These outlying areas are likely to be affected by a major flood, that has up to a 0.1% (1 in 1000) chance of occurring each year.

Other Information: See Table 01 for data at Node Points.
Historic Flooding:
Can find no flood history relating directly to the property in question.
19/02/1999: Flooded Properties on Whalley Road No's 20, 22, 24, 26, 28, 30, 38, 40, 42, 44, 48, Honda Garage on Greenacre Street and Empty Offices on Mearley Street. Flooding from Main River.
29/09/1999: Flooding from Main River. Channel capacity exceeded (no raised defences). Properties affected included a factory with 14 terraced houses very marginally flooded.

Model Node	Flows (m^3/sec) and Levels (mAOD) at Return Period:							
	Q5	Q10	Q25	Q50	Q75	Q100	Q200	Q1000
PEBR01_3300B	74.76	74.88	75.16	75.38	75.49	75.57	75.83	77.69
PEBR01_3178A	73.98	74.29	74.75	74.94	75.02	75.07	75.21	77.07
PEBR01_3067D	73.60	74.09	74.66	74.86	74.93	74.97	75.07	76.04
SHWC01_0173A	77.55	77.64	77.78	77.88	77.96	78.03	78.57	81.38
SHWC01_0165	77.49	77.58	77.71	77.81	77.88	77.95	78.46	81.25
SHWC01_0000	73.96	74.28	74.74	74.93	75.00	75.05	75.15	76.45

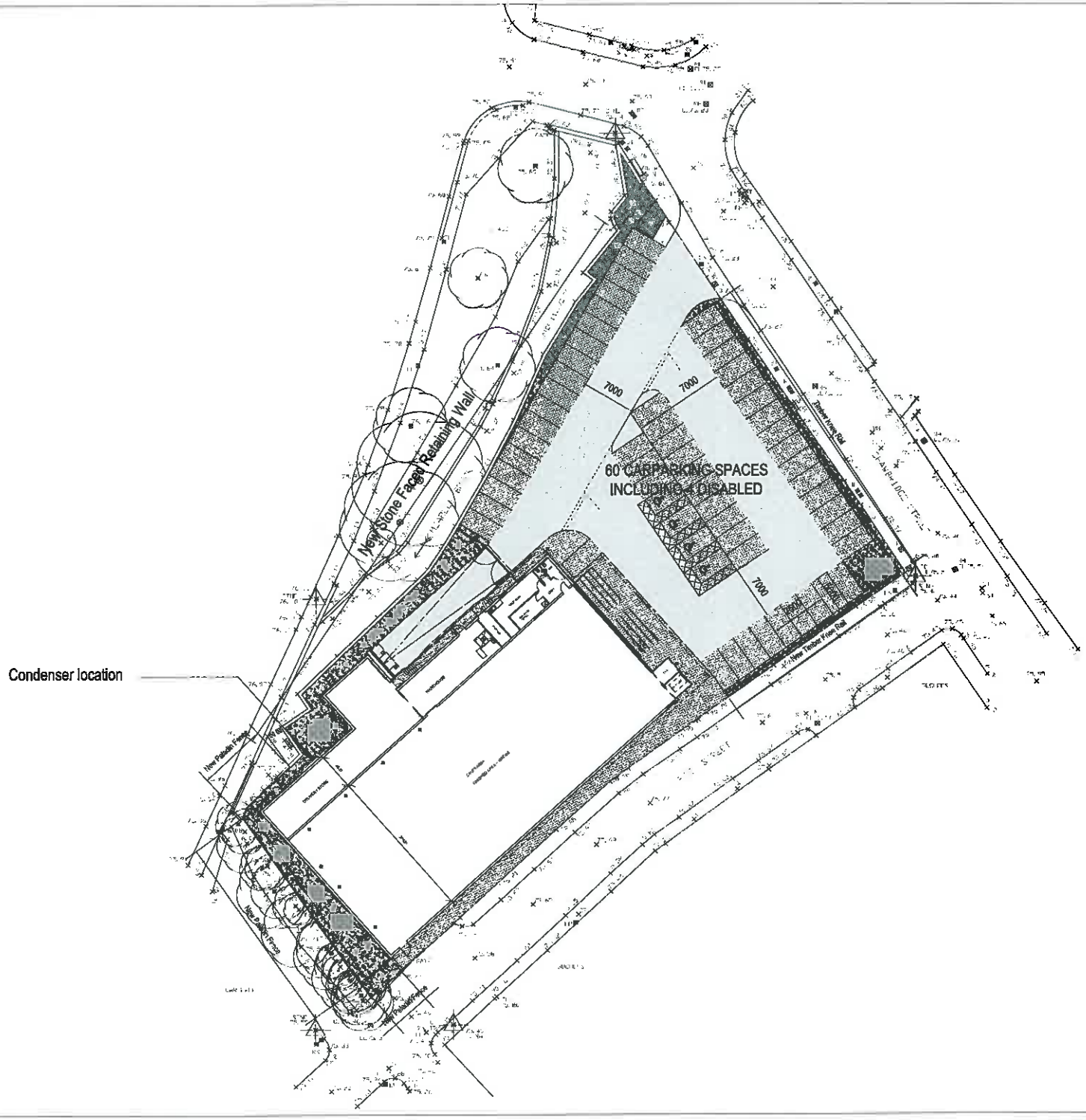
Table 01

Levels taken from Mearley SFRM (2007)

APPENDIX F:

Proposed Layout – Humphreys teal partnership dwg no. 827/01 Rev B.

DO NOT SCALE
ALL DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE WORK COMMENCES



No.	Date	Description	Person

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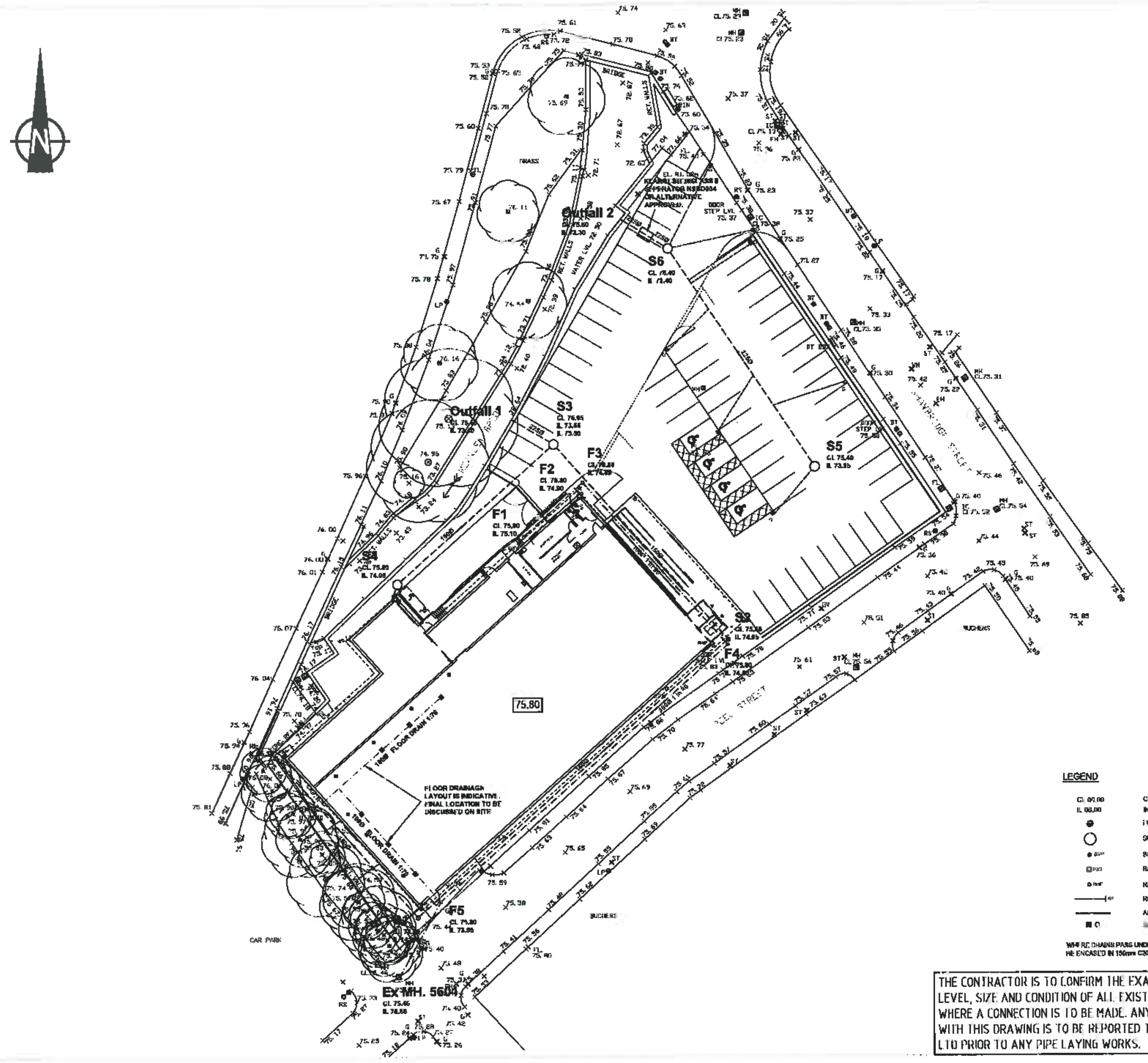
project
Shawbridge Street,
Clitheroe

drawing title
Proposed Site Layout

date	October 2009
status	Planning Issue
scale	1:500 @ A3
drawn	MU checked PH
job no.	827 dwg no. 01 rev B

APPENDIX G:

Proposed Drainage Layout - Elluc Projects Ltd dwg. no. ELL/LIDL/128/005



1. ALL ADOPTABLE DRAINAGE WORKS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH "SEWERS FOR ADOPTION 6TH EDITION" AND UU SUPPLEMENT GUILDELINES

2. ALL CLAY PIPE WORK SHALL BE EXTRA STRENGTH CLAYWARE TO B.S EN 295:1991 PART 1

3. ALL PRECAST CONCRETE PIPEWORK SHALL BE TO THE CLASS STATED ON THE DRAWINGS IN ACCORDANCE WITH B.S EN 1916:2002, ALSO, ALL MANHOLES AND CHAMBERS SHALL BE TO B.S EN 1917:2002

4. THE CONTRACTOR MAY ELECT TO USE REINFORCED PVC PIPES AS COVERED BY B.S 4660:2000 & B.S EN 1401-1. STRUCTURED WALL UPVC PIPES TO COMPLY WITH WIS 4-35-01 UPTO AND INCLUDING 300MM. (BY PRIOR AGREEMENT WITH ADOPTING AUTHORITY) MAX. PIPE LENGTH TO BE 3.0M

5. ALL LEVELS RELATE TO TOPOGRAPHICAL SURVEY DATUM

6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS

7. PLOT DRAINAGE CONNECTIONS TO SEWERS MUST BE 100MM DIAMETER AND UNLESS OTHERWISE STATED LAID TO THE INVERT SHOWN.

8. LEVELS GIVEN ON DRAGOUT CHAMBERS ARE INCOMING PIPE LEVELS

9. PLOT DRAINAGE RUNS TO BE KEPT WITHIN THE CURTILAGE OF THE PLOT THEY SERVE WHEREVER POSSIBLE.

10. THE CONTARCTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ANY EXISTING INVERT LEVELS INDICATED ON DRAWINGS ARE CORRECT BEFORE THE WORK ARE COMMENCED.

11. THE CONTARCTOR SHOULD SATISFY HIMSELF AS TO THE POSITION AND DEPTH OF ANY EXISTING STATUTORY UNDERTAKER PLANT WHICH COULD AFFECT THE WORKS BEFORE THE WORKS ARE COMMENCED.

12. ALL CONNECTIONS TO ADOPTABLE SEWERS SHALL BE MANUFACTURED JUNCTION PIPES. SADDLE CONNECTIONS WILL NOT BE PERMITTED, UNLESS SPECIFIED.

13. ALL SEWERS FOR ADOPTION WITH GREATER THAN 1.20M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE CLASS S GRANULAR BED AND SURROUND.

14. ANY SEWER FOR ADOPTION WITH LESS THAN 1.2M COVER IN ROADS OR 0.9M COVER IN FIELDS SHALL HAVE A MINIMUM OF 150MM ST4 CONCRETE SURROUND. FLEXIBILITY SHALL BE MAINTAINED BY THE PROVISION OF FLEXCELL OR SIMILAR APPROVED JOINT FILLER BREAKS IN THE CONCRETE SURROUND AT EACH PIPE JOINT

15. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM ALL OUTFALL INVERT LEVELS PRIOR TO COMMENCING ANY WORKS ON SITE, IF THERE ARE ANY DISCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIATLY

16. IT IS THE RESPONSIBILITY FOR THE CONTRACTOR TO CHECK ALL ONSITE EXISTING GROUND LEVELS PRIOR TO COMMENCING AND IF THERE ARE ANY DESCREPENCIES THE CONTRACTOR MUST REPORT TO THE ENGINEER IMMEDIATLY

17. IT IS THE RESPONSIBILLITY OF THE CONTRACTOR TO NOTIFY UNITED UTILITIES OF THE COMMENCEMENT OF ANY DRAINAGE WORKS AND TO COMPLETE ANY REQUIRED SEWER CONNECTION FORMS INCLUSIVE OF PAYING ANY REQUIRED FEES. THE CONTRACTOR MUST ALLOW FOR THE SUPERVISION OF THE SEWER CONSTRUCTION WORKS BY UNITED UTILITIES AND NOTIFY THE SUPERVISING OFFICER, GIVING NOTICE WHICH FOLLOWS UNITED UTILITIES REQUIREMENTS.

18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO APPLY FOR ANY REQUIRED ROAD OPENING PERMITS WITH THE LOCAL AUTHORITY INCLUDING THE PAYMENT OF ANY FEES

LEGEND

CL 00.00	COVER LEVEL
IL 00.00	INVERT LEVEL
●	FOUL MANHOLE
○	SURFACE WATER MANHOLE
● SVP	SOIL AND VENT PIPE
BIG	BACK INLET GULLY
RWP	RAINWATER DOWN-PIPE
RE	RODDING EYE
	ACO DRAIN
■ ○	GULLY

WHERE DRAINS PASS UNDER SLABS, THE PIPE IS TO BE ENCASED IN 150mm C20F CONCRETE.

THE CONTRACTOR IS TO CONFIRM THE EXACT POSITION, LINE, LEVEL, SIZE AND CONDITION OF ALL EXISTING SEWERS WHERE A CONNECTION IS TO BE MADE. ANY DISCREPANCY WITH THIS DRAWING IS TO BE REPORTED TO ELLUC PROJECTS LTD PRIOR TO ANY PIPE LAYING WORKS.

Rev	Date	Drawn	Description	Check by	Approved by
B	18/01/10	ELLUC	GULLIES ADDED AT SITE ENTRANCE.	ELLUC	ELLUC
A	21/12/09	ELLUC	PIPE SIZES REVISED.	ELLUC	ELLUC

CLIENT: Lidl UK GmbH

PROJECT: SHAWBRIDGE MILL, CLITHEROE

TITLE: PROPOSED DRAINAGE LAYOUT

ELLUC Projects Ltd

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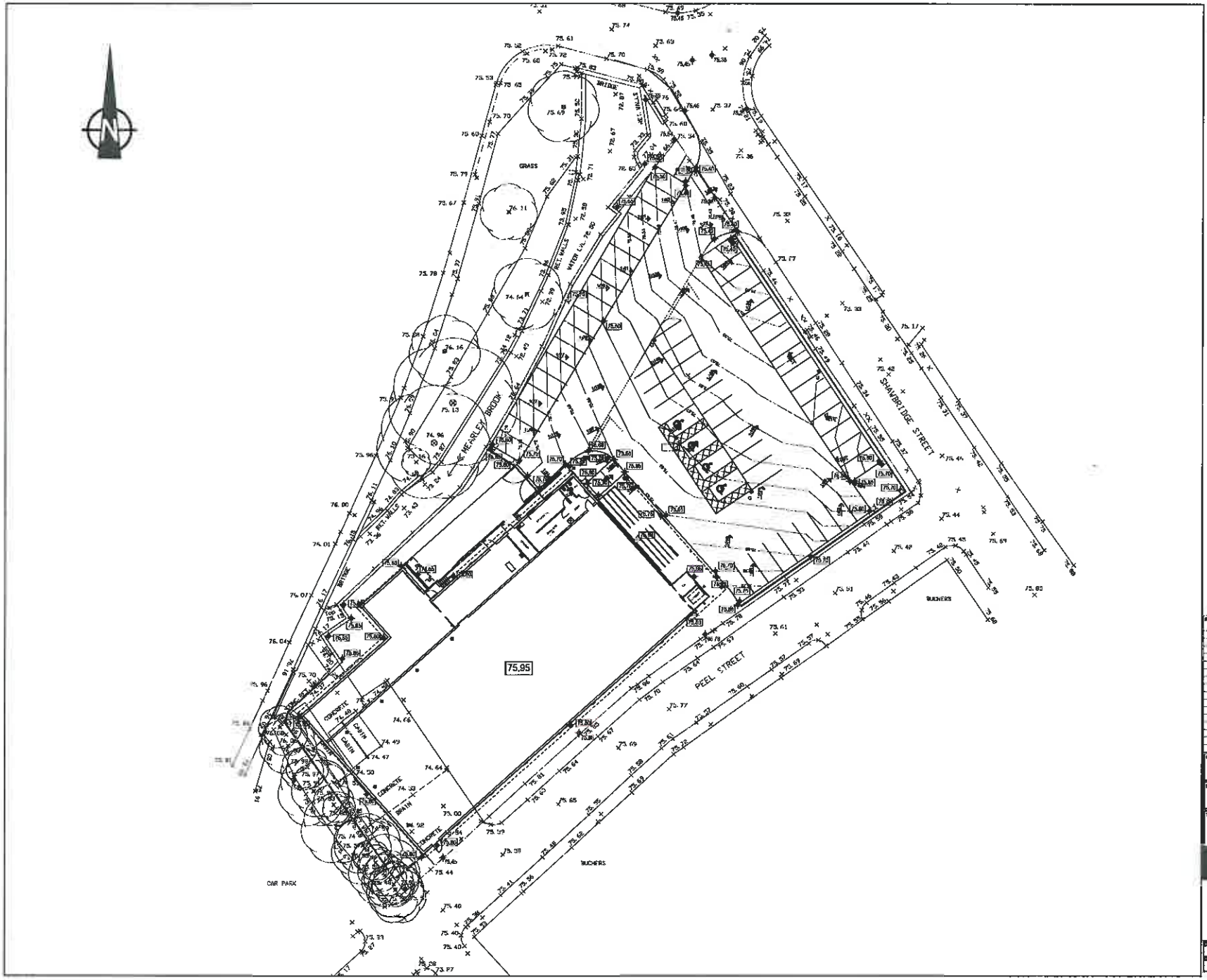
Drawn by	Scale	Drawing No.	Rev
Elluc	1:500 @A1	ELL/128/LIDL/005	B
Date: DEC '09			

APPENDIX H:

Existing and Proposed Impermeable Areas - Elluc Projects Ltd dwg no ELL/LIDL/128/004

Proposed Levels Layout - Elluc Projects Ltd dwg no ELL/LIDL/128/006

Flood Progress - Elluc Projects Ltd dwg no ELL/LIDL/128/009



NOTES

DO NOT SCALE.

ALL LEVELS ARE IN METRES.

DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS, SPECIFICATIONS AND SITE INVESTIGATION REPORT.

LEGEND

75.95 PROPOSED FINISHED FLOOR LEVEL

75.55 EXISTING LEVELS

[75.80] PROPOSED EXTERNAL LEVELS

PROPOSED GULLIES

PROPOSED GRADIENTS

PROPOSED CONTOURS

Rev	Date	Drawn	Description	Check by	Approved by
A	16/01/10	ELLUC	PROPOSED LEVELS REMOVED, GULLIES ADDED AT ENTRANCE.	ELLUC	ELLUC

CLIENT: LIDL UK

PROJECT: SHAWBRIDGE MILL, CLITHEROE

TITLE: PROPOSED LEVELS LAYOUT

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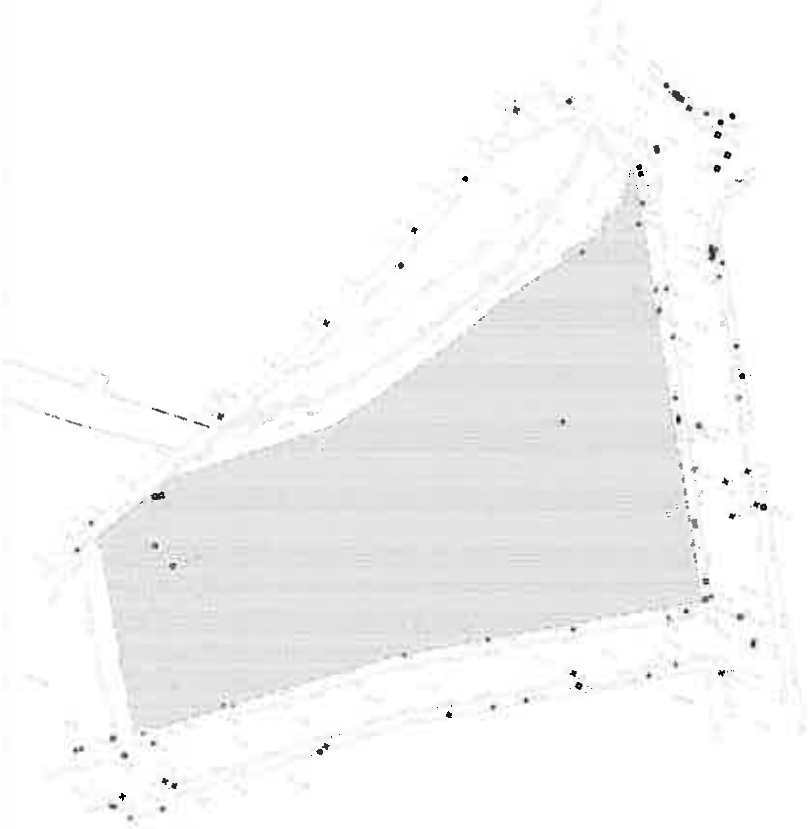
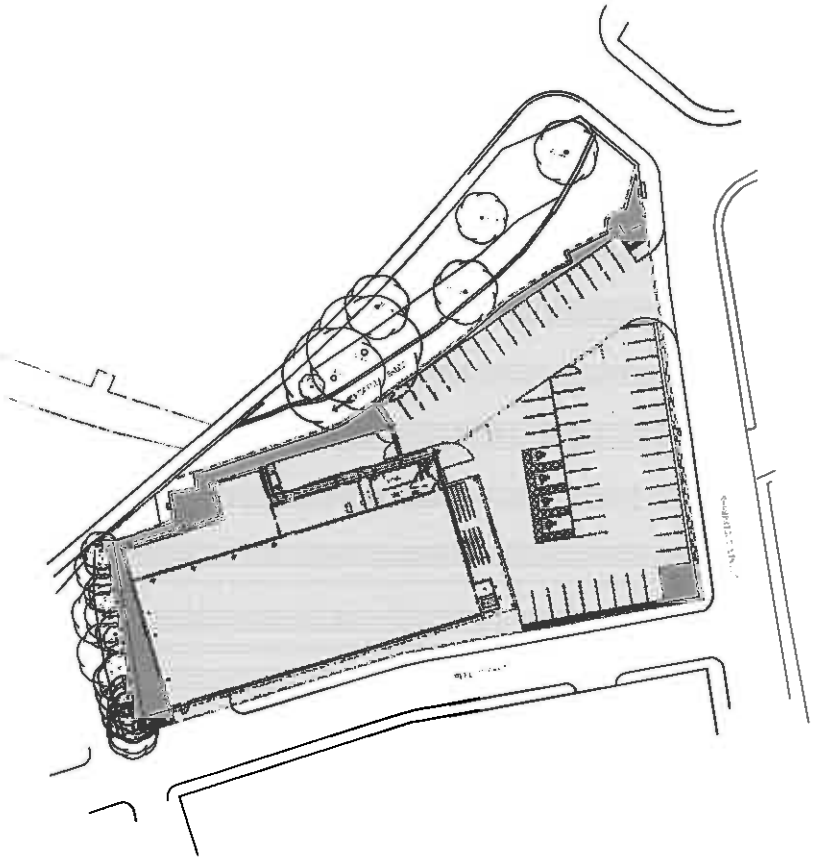
Drawn by	Scale	Drawing No.	Rev
Elluc	1:250 @A1	ELL/LIDL/128/006	A
Date: DEC'09			



EXISTING IMPERMEABLE AREAS - 3934m²



PROPOSED IMPERMEABLE AREAS - 3509m²

No	Date	Drawn	Description	Check by	Approved by

CLIENT: Lidl UK GmbH

PROJECT: SHAWBRIDGE MILL, CLITHEROE

TITLE: EXISTING AND PROPOSED IMPERMEABLE AREAS

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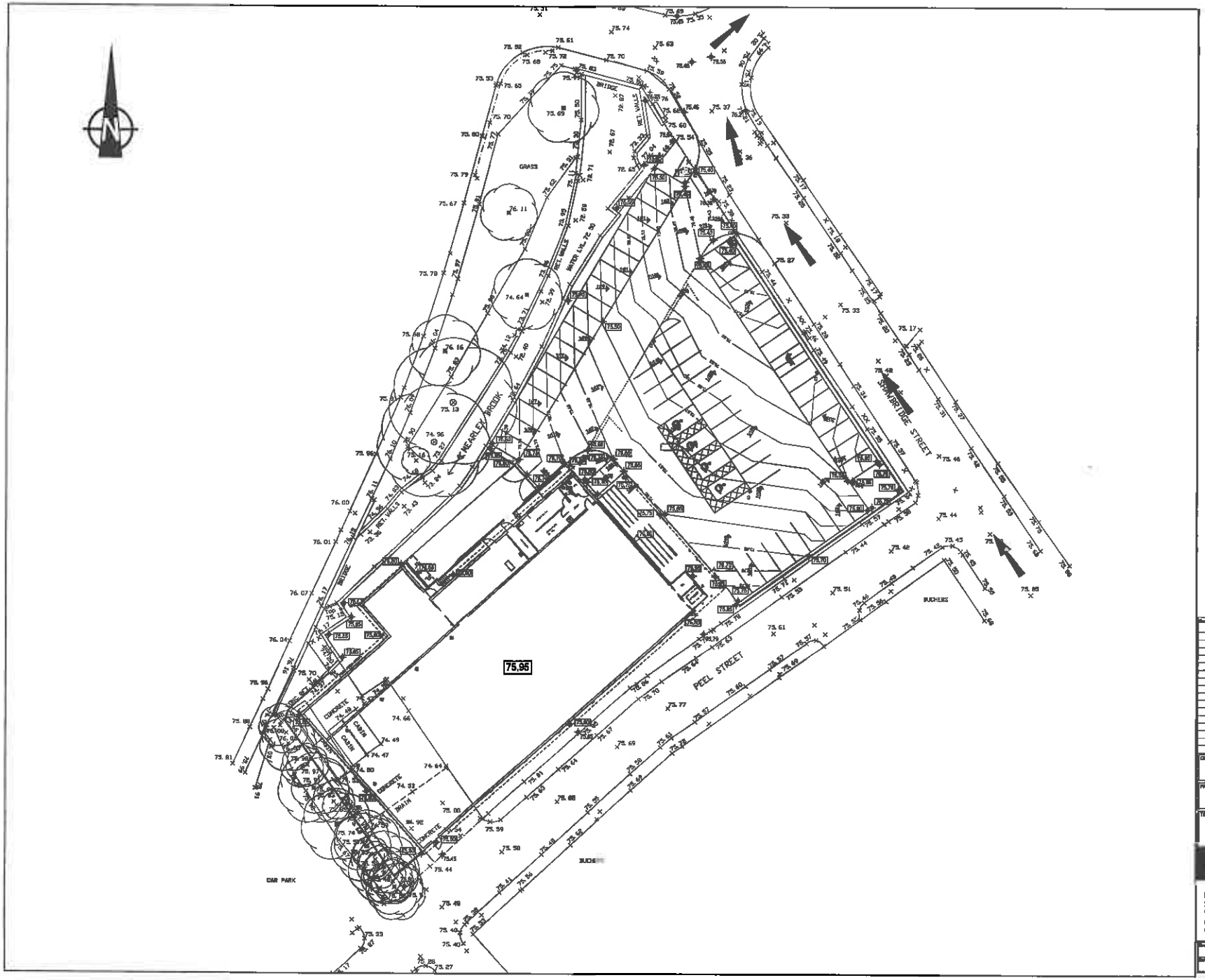
Drawn by	Scale	Drawing No.	Rev
Elluc	N.T.S	ELL/128/LIDL/004	
Date: DEC '09			



NOTES

DO NOT SCALE.

ALL LEVELS ARE IN METRES.

DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS, SPECIFICATIONS AND SITE INVESTIGATION REPORT.

LEGEND

75.95 PROPOSED FINISHED FLOOR LEVEL

75.55 EXISTING LEVELS

75.60 PROPOSED EXTERNAL LEVELS

PROPOSED GULLIES

PROPOSED GRADIENTS

PROPOSED CONTOURS

PROPOSED FLOOD PROGRESS IN THE EVENT OF FAILURE OF SHAWCROSS CULVERT

Rev	Date	Drawn	Description	Check by	Approved by

Client: LIDL UK

Project: SHAWBRIDGE MILL, CLITHEROE

Title: FLOOD PROGRESS

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Drawn by	Scale	Drawing No.	Rev
Elluc	1:250 @A1	ELL/LIDL/128/009	-
Date: JAN 2010			

ELLUC Projects Ltd

- Consultancy
- Project Management
- Site Regeneration




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