



Bowsall Limited

320130169P

Flood Risk and Drainage Assessment

Proposed Residential Development: Pendle Garage, Clitheroe Road, Barrow, Clitheroe

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RSK



RSK GENERAL NOTES

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1 INTRODUCTION

RSK Land and Development Engineering Ltd were commissioned to carry out a Flood Risk Assessment (FRA) and a Drainage Assessment for Bowsall Limited. The assessment is in support of the planning submission for a residential development located at Pendle Garage, Clitheroe, Barrow.

This assessment has been prepared in accordance with National Planning Policy Framework (NPPF) (Ref. 1) and its accompanying guidance document (Ref. 2), the Interim Code of Practice for Sustainable Drainage (Ref. 3) and BS 8533-2011 Assessing and managing flood risk in development Code of practice (Ref. 4), with site-specific advice from the Environment Agency, the Local Planning Authority, the architect and the Client.

The NPPF sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. The key definitions are:

- "areas at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency
- "flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

For this site, the key aspects that require the assessment are:

- the Environment Agency's indicative flood map shows the whole site to lie within Flood Zone 1.

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

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2 CONTEXT AND SCOPE OF WORKS

A key element of project development is to prepare a Flood Risk Assessment to establish the risk associated with the proposed development and to propose suitable mitigation, if required to reduce the risk to a more acceptable level.

The scope of work relating to a flood risk assessment is based on the guidance provided in Section 10 of NPPF (Ref. 1) and its accompanying guidance (Ref. 2).

A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. The scope of this assessment therefore comprises of the following elements:

- to obtain information on the hydrology and hydrological regime in and around the site
- to obtain the views of the Environment Agency including scope, location and impacts
- to determine the extent of new flooding provision and the influence on the site
- to review site surface water drainage based on the proposed layout. To determine the extent of infrastructure required
- to review architect plans and planning information and other studies to determine the existing site conditions
- to assess the impact on the site from climate change effects and anticipated increases in rainfall over a 100 year period for residential uses
- preparation of a report including calculations and summaries of the source information and elements reviewed.

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3 SITE DESCRIPTION

3.1 Site location and description

The site can be located to the north of Whalley and to the south of Barrow. Pendle Garage is located to the east of Clitheroe Road in Barrow; the site is currently a disused garage, with associated hard standing and grassed areas. The site is in an area predominantly consisting of rural land, residential properties, industrial park, and a public house.

The site is currently a Brownfield site and can be located by National Grid reference 373592E 437553N.

A site location plan is presented in **Figure 1**.

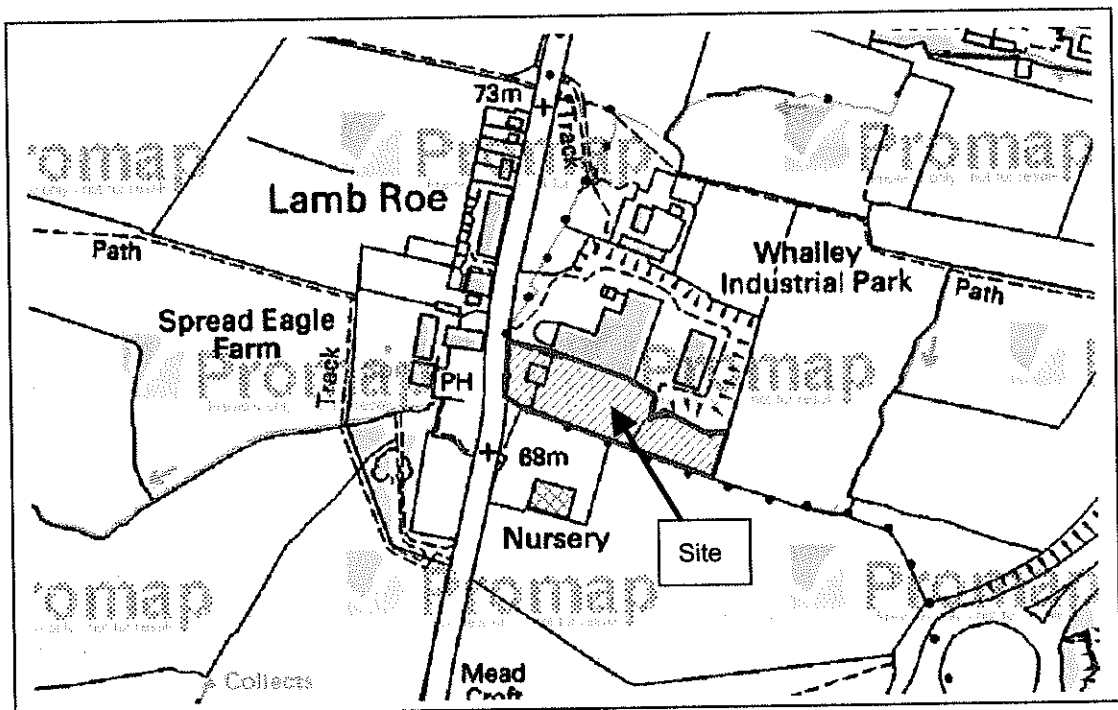


Figure 1: Site location plan

The site is bounded by:

- north – directly bounded by Whalley Industrial Park, with residential beyond
- east – directly bounded by open fields, followed by the A59
- south – directly bounded by a Brownfield site, followed by open fields and the A59
- west - directly bounded by Clitheroe Road, with a public house, car park, residential properties and open fields beyond.

The total site area is approximately 0.62Ha, comprising of a derelict garage and open land to the rear.



A topographical survey has been carried out for the site and is included as **Appendix B**. The survey shows that the site slopes from the north eastern corner to the south. The lowest point of 68.22mAOD is located in the south western corner and the highest point of 72.75mAOD is located in the north eastern corner of the site.

3.2 **Development proposals**

This assessment has been based on the development proposal for the site as detailed in **Appendix C**.

The proposals for the site is for a residential development comprising of the following – Nine, two bedroom apartments, Three, two bedroom bungalows, Eight, two bedroom houses, and Nine, three bedroom houses.

Giving a total of 29 units.

The proposals also include for associated parking, access, and areas of soft landscaping and gardens.

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4 LEGISLATION AND POLICY CONTEXT

4.1 National

Table 4.1: National legislation and policy context

Policy/Legislation name	Key Provisions
National Planning Policy Framework	The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.
Water Resources Act 1991	<i>Section 24</i> - The Environment Agency (EA) is empowered under this Act to maintain and improve the quality of 'controlled' waters <i>Section 85</i> - It is an offence to cause or knowingly permit pollution of controlled waters <i>Section 88</i> - Discharge consents are required for discharges to controlled waters
Flood and Water Management Act 2010	This is new legislation formally ratified in July 2010. The aim is to implement the findings of the 2007 Pitt Review and co-ordinate control of drainage and flood issues. There are a number of increased responsibilities within the act that affect adoption of Sustainable Drainage Systems (SuDS) features and the role of the EA to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.
Water Framework Directive (2000)	The Water Framework Directive (WFD) came in to force in 2000 and requires all inland and coastal waters to reach 'good' chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by floodwaters. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites identified by the EC Habitats Directive and Birds Directive that have water-related features, by designating them as 'protected sites'.

4.2 Local policy

Local policy ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and making development safe without increasing flood risk elsewhere and where possible, reducing flood risk.

At present Ribble Valley's local plan is the key document to guide development within the district, though the Policies relating to flood risk management were replaced by those contained in the now revoked North West Regional Spatial Strategy (RSS). At present the Ribble Valley's Core Strategy is in the final consultation stages (proposed adoption Nov 2012-according to the Ribble Valley LDS) and will become one of the key tools to realise the vision of the Community Strategy. It is the central document within the Council's emerging Local Development Framework and it will provide us with a plan to 2028 to guide and control development on the ground - helping to shape what the Borough will look like in the future.

Table 4.2: Local legislation and policy context

Policy/Legislation	Key Provisions
RSS Policy EM5 Integrated Water Management (Revoked 2010)	In achieving integrated water management and delivery of the EU Water Framework Directive, plans and strategies should have regard to River Basin Management Plans, Water Company Asset Management Plans, Catchment Flood Management Plans, and the Regional Flood Risk Appraisal. Local planning authorities and developers should protect the quantity and quality of surface, ground and coastal waters, and manage flood risk, by: • Working with the Water Companies and the Environment Agency when planning the location and phasing of development. Development should be located where there is spare capacity in the existing water supply and waste water treatment, sewer and strategic surface water mains capacity, insofar as this would be consistent with other planning objectives. Where this is not possible development must be phased so that new infrastructure capacity can be provided without environmental harm; • Producing sub-regional or district level strategic flood risk assessments, guided by the Regional Flood Risk Appraisal. Allocations of land for development should comply with the sequential test in PPS25. Departures from this should only be proposed in exceptional cases where suitable land at lower risk of flooding is not available and the benefits of development outweigh the risks from flooding; • Designing appropriate mitigation measures into the scheme, for any development which, exceptionally, must take place in current or future flood risk areas, to ensure it is protected to appropriate standards, provides suitable emergency access under flood conditions, and does not increase the risk of flooding elsewhere; • Requiring new development, including residential, commercial and transport development, to incorporate sustainable drainage systems and water conservation and efficiency measures to the highest contemporary standard; • Encouraging retrofitting of sustainable drainage systems and water efficiency within existing developments; • Raising people's awareness of flood risks (particularly for vulnerable groups) and the impacts of their behaviours and lifestyles on water consumption.

5 SOURCE OF FLOOD RISK

In accordance with NPPF (Ref. 1) and advice from the EA, a prediction of the flood sources and levels is required along with the effects of climate change from the present for the design life of the development (in this case assumed to be 100 years). To consider these effects of climate change, NPPF Technical Guidance Table 5 recommends consideration of a 30% increase in rainfall intensity and 20% increase in peak river flows over this timeframe.

The flood risk elements that need to be considered for any site are defined in BS 8533 as the "Forms of Flooding" and are listed as:

- flooding from Rivers (fluvial flood risk)
- flooding from the Sea (tidal flood risk)
- flooding from the Land (overland pluvial flood risk)
- flooding from Groundwater
- flooding from Sewers (sewer and drain exceedance, pumping station failure etc)
- flooding from Reservoirs, Canals and other Artificial Structures.

The following section reviews each of these in respect of the subject site.

5.1 Environment Agency flood zone

The Environment Agency has produced Flood Zone maps for much of England and Wales, (Figure 2). This map shows the site to be located in Flood Zone 1, indicating a low risk from tidal and fluvial sources.

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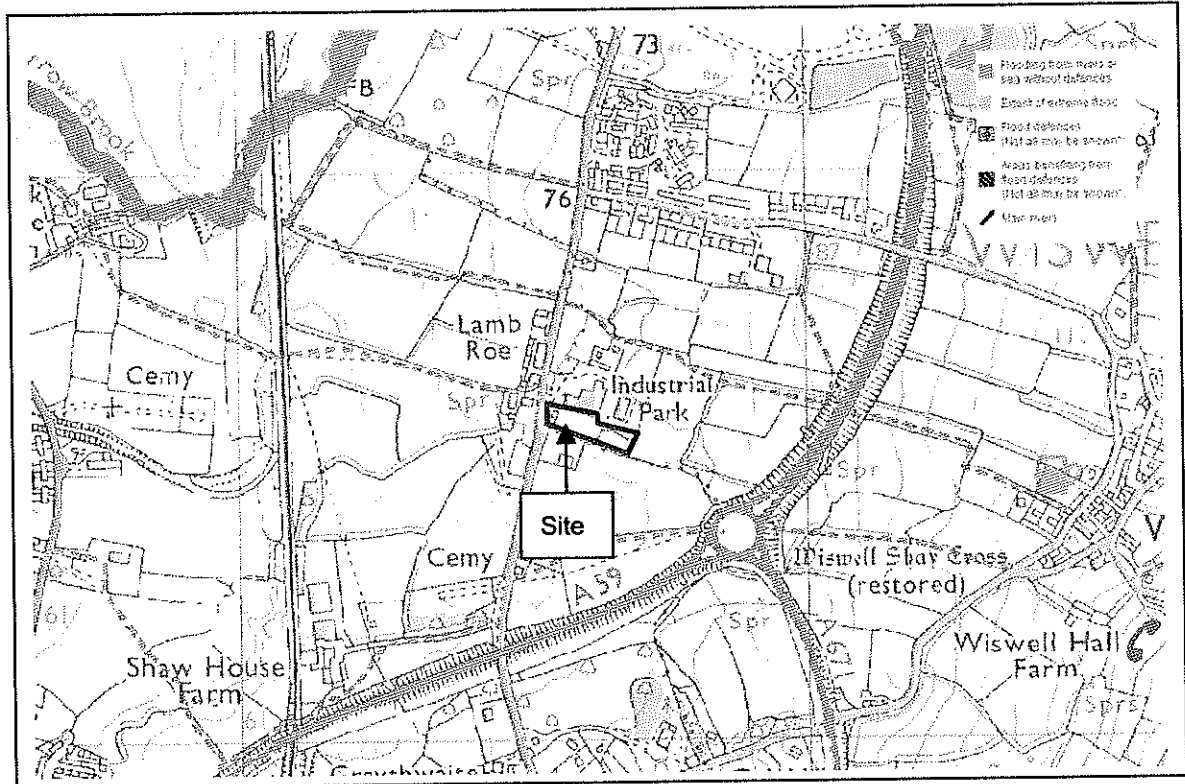


Figure 2: Environment Agency flood zone map

5.2 Flooding from rivers (fluvial flood risk)

The Environment Agency confirms that the site lies outside of any known fluvial or tidal floodplains and is therefore at little risk of fluvial or tidal flooding.

The nearest watercourse is an unnamed stream located approximately 10m to the north west and flows in a south westerly direction away from the site. This watercourse is culverted under the road directly to the west of the site, and re-surfaces on the opposite side of the road to the site. The watercourse then flows towards the south west.

This watercourse is not shown to be a flood risk to the site from the Environment Agency flood maps. The Environment Agency National Flood Zone Mapping exercise only considers catchments up to 3km² in size. The watercourse to north west of the site has a small catchment (less than 3km²) and it is believed that this watercourse takes runoff from the surrounding hard standing areas. Therefore a high intensity rainfall event may cause the watercourse to flood. The watercourse is located to the north west of the site, where the ground is lower than the proposed site. At this point the watercourse is culverted and flows away from the site to the south west. This means that any excess flows will gravitate in the same direction away from the site. The site is situated at a slightly higher level than that of the watercourse, the site also slopes away from the watercourse, with the highest point of the site located at approximately 5m above the watercourse level.

The nearest watercourse with an associated floodplain is Barrow Brook approximately 620m to the north and flows in a westerly direction towards the confluence with the

River Ribble. The associated floodplain with Barrow Brook is located approximately 625m to the west of the site.

There are 3 Main Rivers (Environment Agency classification) located between 1.6km and 2.6km from the site; these are the River Ribble, the River Calder and the River Hodder. None of these Main Rivers pose a fluvial flood risk to the proposed site.

5.3 Flooding from the sea (tidal flood risk)

On the coast storm surges and high tides can threaten low lying coastal areas, and can sometimes be large and rapid enough to overtop defence works, causing significantly more damage than river flooding.

Tidal flooding is not considered a risk to the site, due to its inland location.

5.4 Flooding from the land (overland pluvial flood risk)

If intense rain is unable to soak into the ground or be carried through man-made drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff will occur. Excess surface water flows from the site, are believed to drain into the surrounding surface water drainage network and naturally infiltrate into soft landscaping on the site.

Within the Ribble Valley SFRA (Ref 5) and the Lancashire PFRA (Ref 6) there is no evidence in either report that pluvial or overland flooding will affect the site.

The proposed development of the sites has the potential to increase the surface runoff generated from the site. Attempts should be made to mitigate against the increased velocity and volume of runoff from the sites, and as such Sustainable Drainage Systems (SuDs) ought to be adopted throughout the developments.

The risk to the from off-site runoff stems mainly from any surrounding hardstanding, which is predominantly located to the north and the west of the site, in the form of a road and an industrial park. It is considered, however, that the volumes of runoff that these areas would generate would be relatively insignificant and would be controlled by existing drainage systems. These areas of hard standing are also located at lower levels than that of the site therefore excess flows will be directed away from the site.

5.5 Flooding from groundwater

Groundwater flooding tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as Chalk or

sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground. Where groundwater exists it flows through strata very slowly and in limited quantities.

The Ribble Valley SFRA (Ref 5) has stated that this is not considered by the Environment Agency to be a significant flood risk factor in the Ribble Valley Borough Council area.

The site is recognised by the Lancashire PFRA (Ref 6) to not be in an area susceptibility to flooding from groundwater.

According to the Environment Agency the site is not located within the Environment Agency's Groundwater Source Protection Zones.

5.6 Flooding from sewers

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff will occur. The existing developments surrounding the sites are believed to be served by an adequate surface water drainage system and there is no evidence that sewer flooding will affect the site.

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption (Ref. 7). One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30 year rainfall event. By definition a 1 in 100 year event would exceed the capacity of the surrounding sewer network as well as any proposed drainage.

On the basis that any new foul water sewerage and surface water systems for the proposed development will be designed to meet the specifications of United Utilities, this should ensure that the systems have sufficient capacity to prevent overloading under the normal range of operating conditions.

The closest United Utilities surface water sewer is located to the west of Exton Terrace and to the west of The Eagle Public House; both of these are 150mm Dia. sewers.

The closest United Utilities foul sewer is located to the west of Bramley Croft and is a 150mm Dia sewer, there is also a 225mm Dia. foul sewer approximately 30m to the west of the 150mm Dia. sewer. All of these sewers are close to the site but would require crossing third party land to access them.

There is also a surface water sewer located along the northern boundary of the site; this is thought to be a private sewer and takes runoff from the site located to the north. It is believed that this then outfalls into the watercourse located to the north west of the site.

A copy of the United Utilities sewer plans can be found within **Appendix D**.

The flood risk from artificial drainage systems should therefore remain as low.

5.7 Flooding from reservoirs, canals and other artificial structures

The Environment Agency has recently published flood risk mapping as a result of potential failure of reservoirs and artificial structures.

Reservoir flooding is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to make sure reservoirs are well maintained.

The site does not lie within an area shown as being at risk from any type of reservoir flooding according to the Environment Agency's web based reservoir flood maps, as shown in **Figure 3**.

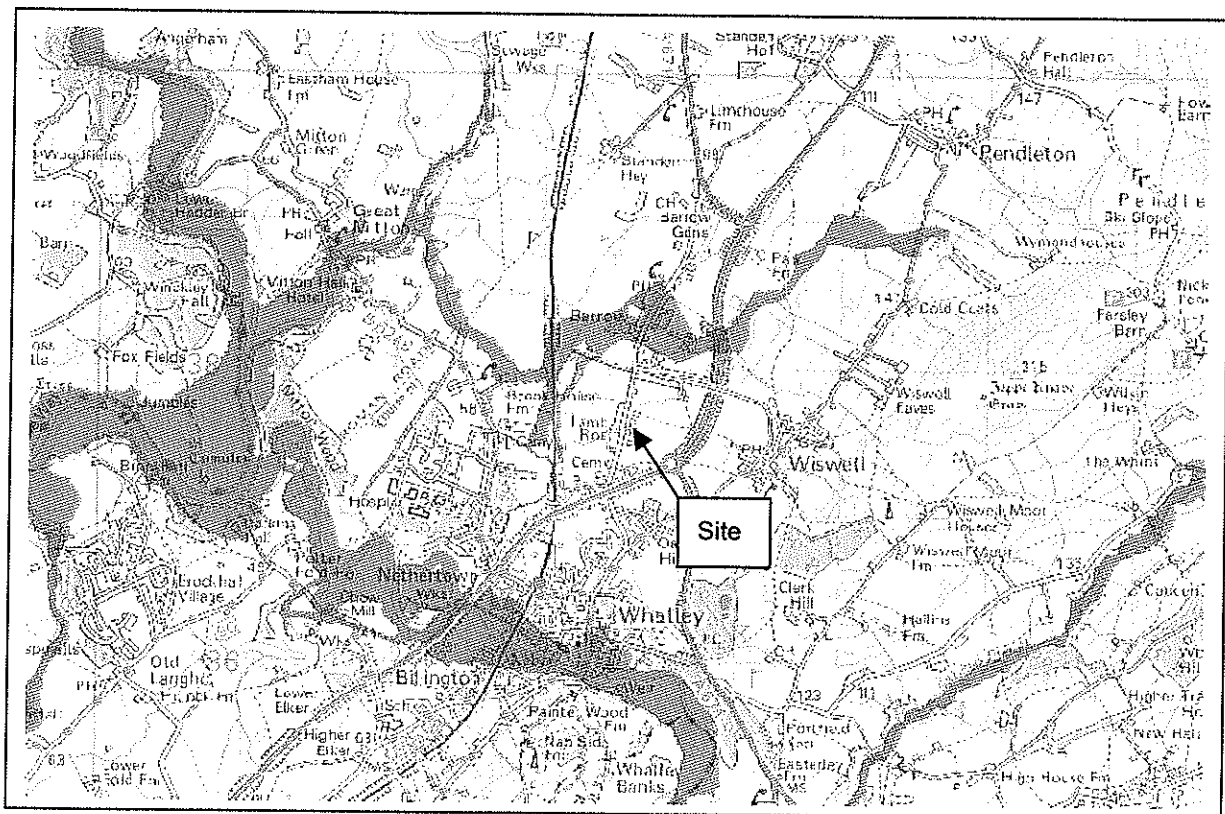


Figure 3: Environment Agency reservoir flood map

5.8 Historic flooding

The Ribble Valley SFRA (Ref 5) flood records show a history of flooding across the Ribble Valley area, none of these have been known to affect the site. The Lancashire area PFRA (Ref 6) also does not specify that any historical flooding has taken place onsite or in close proximity to the site.

The Environment Agency does not have any historical flooding records for the site.

6 SURFACE WATER DRAINAGE ASSESSMENT

6.1 Scope

An outline surface water drainage strategy has been carried out to identify the options for the design of the surface water drainage system and how it will affect the site layout.

6.2 Pre-development situation

The existing site is partially developed and includes a combination of hard standing, building coverage and Greenfield area. It should be noted that the proposed National SuDS Standards makes it clear that off-site impacts should not increase flood risk elsewhere.

Previously Developed Area

As the site is partially developed the surface water runoff from the paved area has been calculated using the Rational Method.

Rational Method

$$Q = C \times i \times A$$

Where: C – is the runoff coefficient with a value of 2.78

i – is the design rainfall intensity which is calculated using the DDF function within the FEH CD ROM (Version 3) for the 6 hour 1 in 100 year-rainfall event

A – is the impermeable site area (Ha)

$$30 \text{ year, } Q = 2.78 \times 56.1\text{mm} \times 0.123\text{Ha}$$

$$Q_{30} = 19.18 \text{ l/s}$$

$$100 \text{ year, } Q = 2.78 \times 75.2\text{mm} \times 0.123\text{Ha}$$

$$Q_{100} = 25.71 \text{ l/s}$$

Using this method assumes that all surface runoff will be directed into the surface water pipe network immediately and therefore the method does not account for natural attenuation and possible infiltration across the internal permeable areas.

Surface water flows from the existing site are believed to drain into the existing watercourse located to the north east of the site. Therefore it is essential that the volume of runoff generated as a result of the development of the site should either remain the same as the existing discharge rates or be reduced.

Generally any discharge system from the proposed site should, therefore be designed such that peak flows are no more than the pre development runoff rate for the current site. It is also anticipated that any surface water drainage system will be designed to the latest best practice.

In terms of estimating the potential runoff for the Greenfield portion of the site, the prorated IOH method has been used to estimate the existing runoff from the sites in a Greenfield condition. Additional information is contained in **Appendix E**.

GREENFIELD AREA

Return Period	Peak flow
Greenfield (undeveloped – urban extent 0.00 Ha)	
QBAR _{URBAN}	4.0l/sec
1 in 1 year peak flow	3.5l/sec
1 in 30 year peak flow	6.7l/sec
1 in 100 year peak flow	8.3l/sec

TABLE 5.1 : IOH surface water runoff calculations (greenfield)

The existing site is 82% permeable land, with the remaining area consisting of hard standing and building coverage. For the range of annual flow rate probabilities up to and including the 1% annual exceedence probability (1 in 100 years) event, including an appropriate allowance for climate change, the developed rate of run-off into a watercourse, or other receiving water body, should be no greater than the existing rate of run-off for the same event.

Therefore, it is essential that the volume of runoff generated as a result of development should either remain the same as the existing discharge rate or be reduced. Preferably the discharge rate should be restricted to near the greenfield runoff rate if possible, by combining the use of SuDS onsite where feasible.

Any drainage system for the site should therefore be designed such that peak flows are to be restricted to 34.01 l/s for the 100-year rainfall event including climate change of 30%. This is to replicate or improve the current discharge. It should be noted that in restricting flows to a given value and providing appropriate attenuation provides additional benefit for storm events in excess of the peak discharge criteria. (i.e. if discharge is limited to the 1 in 100 year existing then runoff for a 1 in 250 year event will be better controlled).

6.3 SuDS drainage principles

A SuDS system aims to mimic natural systems whereby water is held close to the source, then released slowly over time. This acts to both reduce peak discharge and to promote the settlement of sediment thereby improving the water quality of any resulting discharge.

The final sustainable drainage strategy for this site will be designed in line with the SuDS management train and inline with the SUDs Manual (Ref 8). This requires that:

1. Source control techniques such as permeable paving, green roofs and rainfall harvesting are incorporated into the development design wherever reasonably possible.
2. Where appropriate infiltration drainage is encouraged. This is not suitable for this site due to the ground conditions beneath the site.

3. In situations where it is not possible to discharge all surface water to the ground, storm water will be controlled and discharged as locally as possible with excess storm water stored on the site in surface water features.

Off site solutions and hard engineering to achieve the design criteria will only be considered where it can be demonstrated that more sustainable options above are not possible.

6.4 Off site discharge

An order of preference exists for drainage receptors. Infiltration drainage should be used where possible. Where this is not possible, or does not provide sufficient capacity, attenuated discharge to watercourses should be sought. Only where neither of these two options are available should discharge to sewers be considered.

Infiltration tests will be required to determine if the ground conditions beneath the site is suitable for infiltration. According to the British Geology Society website, the geology beneath the site consists of Till, Devensian – Diamicton as superficial geology and the Hodderense Limestone Formation as bedrock. Therefore infiltration should work on the site but further investigation will need to be completed to confirm the permeability of the site.

Attenuation storage of some kind should be used to achieve the requisite run-off rates. This method involves restricting site runoff to an agreed limit (normally those assigned to predevelopment rates) and then temporarily storing any excess storm water on the site. The way this water is stored and attenuated can vary depending on the context and nature of the development being proposed.

An engineering appraisal has been developed and is included within **Appendix F**.

6.5 Post-development situation

As mentioned in section 6.4, infiltration tests will need to be carried out on site to establish if the ground conditions beneath the site are suitable for infiltration. Connection to watercourse and sewer has been investigated; connection to watercourse would be restricted to 34.01 l/s for the 1 in 100 year, with all flows in excess of this rate being retained onsite in a suitably sized attenuation structure. Further details of this system should be provided at a detailed design stage.

The engineering appraisal states that attenuation for the site will be contained within oversized pipes with a hydrobrake restricting discharge rates leaving the site. The outfall from the site will be into the watercourse located to the north east of the site. Further investigation will be needed to determine the exact location of the point of connection.

The final option will be decided at a more detailed stage of drainage design.

7 PLANNING CONTEXT

7.1 Application of planning policy

NPPF includes (Section 10) measures specifically dealing with development planning and flood risk using a sequential characterisation of risk based on planning zones and the Environment Agency Flood Map. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

Within NPPF Technical Guidance on flood risk each flood zone has a list of appropriate land uses dependent on vulnerability to flooding.

7.2 Land use vulnerability

From the NPPF Technical Guidance, a development that is of 'More Vulnerable' is permitted within Flood Zone 1 (site located within Flood Zone 1).

A "less vulnerable" land use could be appropriate to Flood Zone 3a (High Probability of flooding at higher than 1 in 100 annual probability) with the "more vulnerable" use only permitted if the exception test is passed. For a "more vulnerable" class, development on this site could be appropriate within Flood Zone 2 (Medium Probability of flooding at less than 1 in 100 but higher than 1 in 1,000 annual probability).

In applying the sequential test, reference is made to the following table (reproduced from Table 3 contained within NPPF).

Table 7.1 Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to the development proposals and Table 2 of the NPPF, this residential development can be classed as 'more vulnerable'.

7.3 Sequential and exception tests

The Sequential Test is required to assess flood risk and NPPF Technical Guidance recommends that the test be applied at all stages of the planning process to direct new development to areas with the lowest probability of flooding (Flood Zone 1).

According to NPPF, if there is no reasonably available site in Flood Zone 1, the flood vulnerability of the proposed development (see NPPF Technical Guidance Table 2) can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3. Within each Flood Zone new development should be directed to sites at the lowest probability of flooding from all sources.

The development proposals include 'more vulnerable' residential uses to be developed on this site. With reference to Table 6.1 above, this development would be appropriate for areas within Flood Zone 1.

The stipulations of the Exception Test (reproduced from Section 10, Paragraph 102 within NPPF), both of which will have to be passed for development to be allocated or permitted, are:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared
- the development will provide additional housing to the area in keeping with the local housing policies
- a site-specific FRA must demonstrate the development will be safe for its lifetime taking into account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

8 CONCLUSIONS AND RECOMMENDATIONS

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This Flood Risk Assessment has been prepared in support of the proposed residential development at Pendle Garage, Clitheroe Road, Barrow.

The site is located within Flood Zone 1 according to the latest Environment Agency Flood Zone maps. This report has also concluded that flood risk from other sources is low.

The sites are not located within the Environment Agency reservoir flood zone.

Data obtained from the SFRA and PFRA also places the area of development at low risk of flooding from other sources.

In accordance with NPPF and local policy, this FRA has considered the impact on the surface water regime in the area should development occur. An engineering appraisal has been completed and can be found in **Appendix F**. A detailed surface water drainage strategy should be developed to assess the system most suitable for surface water discharge from the site.

Based on the information available the flood risk to the proposed development is **low** and **development should not be precluded** on flood risk grounds.

9 REFERENCES

1. NPPF - Nation Planning Policy Framework, March 2012.
2. Technical Guidance to the National Planning Policy Framework, March 2012.
3. DEFRA "Interim Code of Practice for Sustainable Drainage Systems" National SUDS Working Group, July 2004.
4. British Standard BS 8533-2011 "Assessing and managing flood risk in development Code of practice" October 2011.
5. Ribble Valley Strategic Flood Risk Assessment, May 2011.
6. Lancashire Council Preliminary Flood Risk Assessment, May 2011.
7. WRC "Sewers for Adoption" 6th Edition, 2006.
8. 'Sustainable Drainage System (SUDs) Manual' February 2007.



APPENDICES

320130169P



APPENDIX A

RSK SERVICE CONSTRAINTS

1. This report (the "Service") was compiled and carried out by RSK LDE Ltd (RSK) for Bowsall Limited (the "client") in accordance with the terms of a contract between RSK and the "client. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable Civil Engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.



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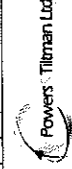
APPENDIX B
SITE TOPOGRAPHICAL SURVEY

puberty

KEY QUESTIONS SHOULD BE ASKED ON DAY

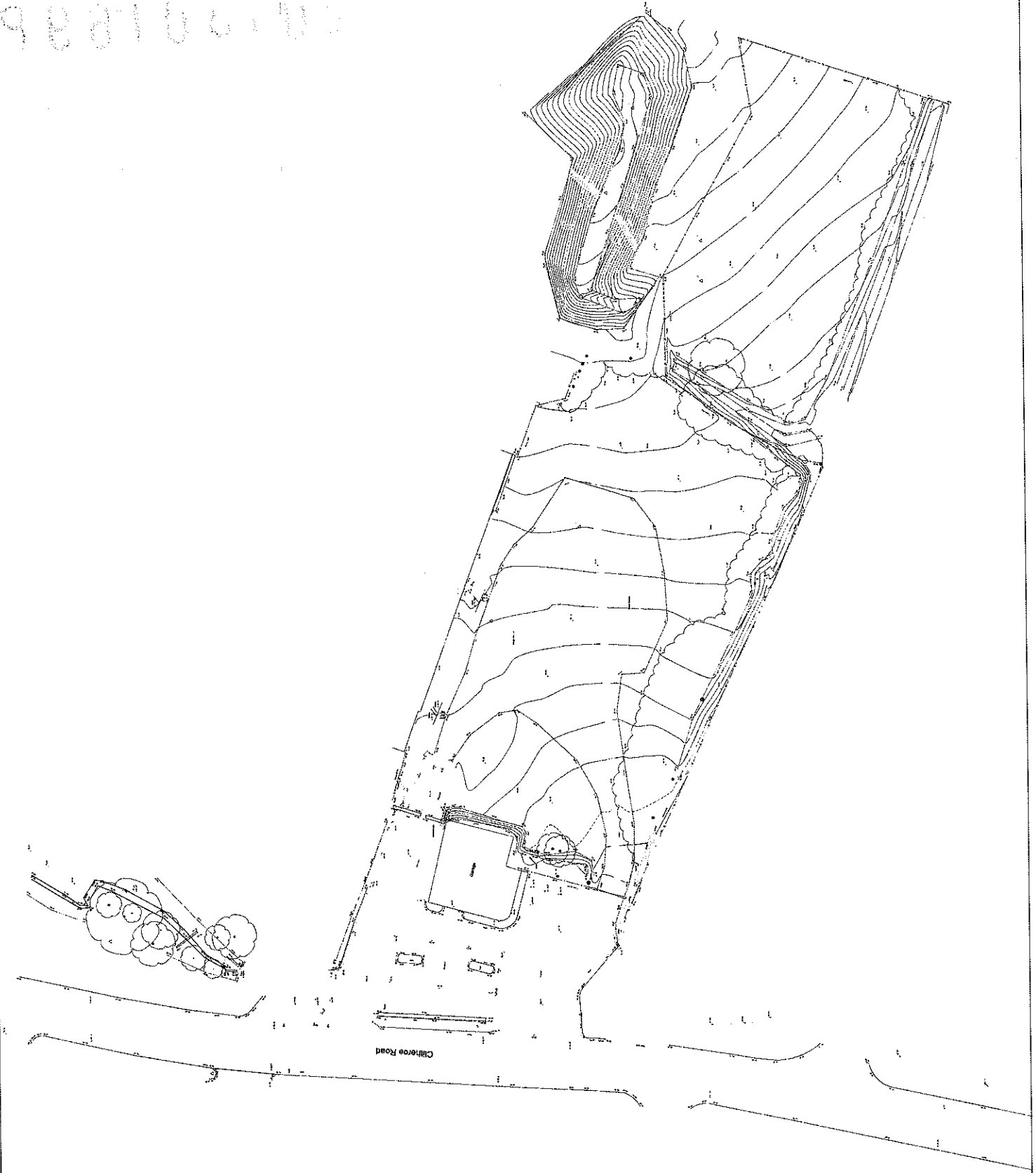
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Sample name	Time	Sample	Overlapping with
16	16:00-2	2-6	None missing
17	17:00-2	7-12	16-17
18	18:00-2	13-18	17-18
19	19:00-2	19-24	18-19
20	20:00-2	25-30	19-20
21	21:00-2	31-36	20-21
22	22:00-2	37-42	21-22
23	23:00-2	43-48	22-23
24	24:00-2	49-54	23-24
25	25:00-2	55-60	24-25
26	26:00-2	61-66	25-26
27	27:00-2	67-72	26-27
28	28:00-2	73-78	27-28
29	29:00-2	79-84	28-29
30	30:00-2	85-90	29-30
31	31:00-2	91-96	30-31
32	32:00-2	97-102	31-32
33	33:00-2	103-108	32-33
34	34:00-2	109-114	33-34
35	35:00-2	115-120	34-35
36	36:00-2	121-126	35-36
37	37:00-2	127-132	36-37
38	38:00-2	133-138	37-38
39	39:00-2	139-144	38-39
40	40:00-2	145-150	39-40
41	41:00-2	151-156	40-41
42	42:00-2	157-162	41-42
43	43:00-2	163-168	42-43
44	44:00-2	169-174	43-44
45	45:00-2	175-180	44-45
46	46:00-2	181-186	45-46
47	47:00-2	187-192	46-47
48	48:00-2	193-198	47-48
49	49:00-2	199-204	48-49
50	50:00-2	205-210	49-50
51	51:00-2	211-216	50-51
52	52:00-2	217-222	51-52
53	53:00-2	223-228	52-53
54	54:00-2	229-234	53-54
55	55:00-2	235-240	54-55
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57	57:00-2	247-252	56-57
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62	62:00-2	277-282	61-62
63	63:00-2	283-288	62-63
64	64:00-2	289-294	63-64
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66	66:00-2	301-306	65-66
67	67:00-2	307-312	66-67
68	68:00-2	313-318	67-68
69	69:00-2	319-324	68-69
70	70:00-2	325-330	69-70
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82	82:00-2	397-402	81-82
83	83:00-2	403-408	82-83
84	84:00-2	409-414	83-84
85	85:00-2	415-420	84-85
86	86:00-2	421-426	85-86
87	87:00-2	427-432	86-87
88	88:00-2	433-438	87-88
89	89:00-2	439-444	88-89
90	90:00-2	445-450	89-90
91	91:00-2	451-456	90-91
92	92:00-2	457-462	91-92
93	93:00-2	463-468	92-93
94	94:00-2	469-474	93-94
95	95:00-2	475-480	94-95
96	96:00-2	481-486	95-96
97	97:00-2	487-492	96-97
98	98:00-2	493-498	97-98
99	99:00-2	499-504	98-99
100	100:00-2	505-510	99-100



344025494 Paul Jackson, Clerk in WMA QAD
 The NORTHERN TOWNSHIP, INC. MAY 1975
 (Paul Jackson, Clerk in WMA QAD)
 www.government.com

Client: Bowall Ltd	Doc: 100022	Serial: 1000
By: JLS	Date: 04/04/2002	
By: JLS	Amount: 0	





APPENDIX C
PROPOSED SITE PLANS

320130169P

Notes

1. All dimensions are in millimetres unless otherwise stated.

2. All dimensions are to the centre of the wall unless otherwise stated.

3. All dimensions are to the finished surface unless otherwise stated.

4. All dimensions are to the external face of the wall unless otherwise stated.

5. All dimensions are to the internal face of the wall unless otherwise stated.

6. All dimensions are to the top of the wall unless otherwise stated.

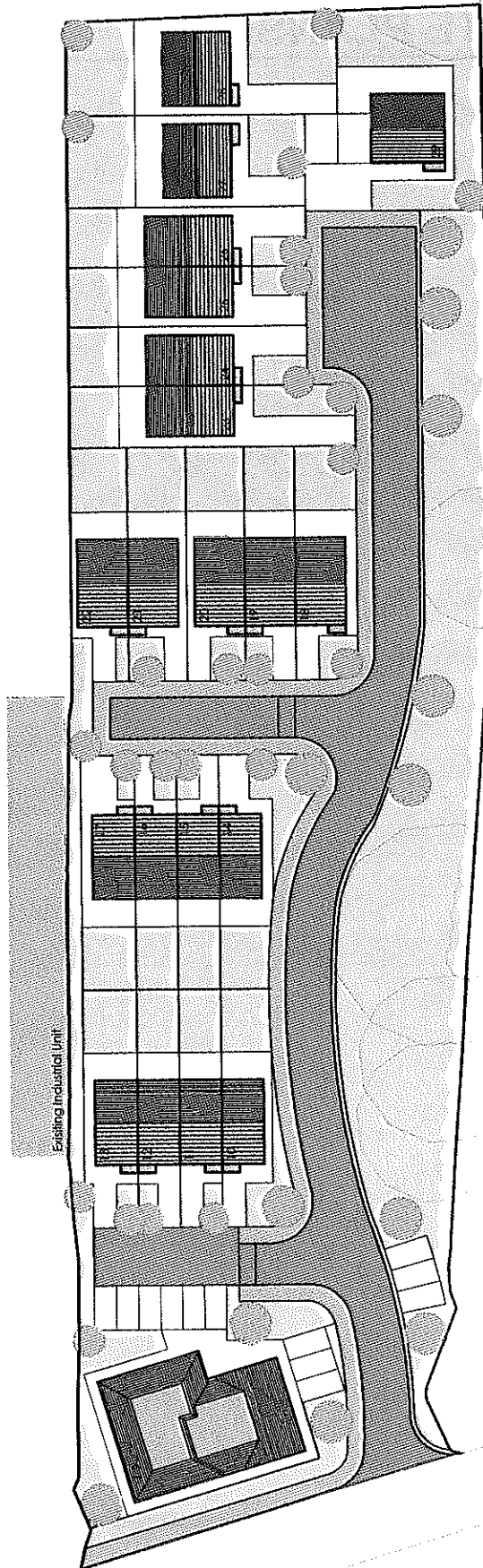
7. All dimensions are to the bottom of the wall unless otherwise stated.

8. All dimensions are to the side of the wall unless otherwise stated.

9. All dimensions are to the front of the wall unless otherwise stated.

10. All dimensions are to the back of the wall unless otherwise stated.

SOA	
28 3P Apartments 40m ² - 9no	
28 3P Bungalow 64m ² - 3no	
28 4P House 72m ² - 8no	
38 5P House 83m ² - 9no	
Total Units 29	



Rev	Description	Date	By
1	Issue for tender		

Jennings Design Associates

Architects

Client	Local Council
Project	Local Council
Location	Local Council
Project	Local Council
Project	Local Council

Architects Designers Project Managers
The Warehouse, Saxon Street, Bolton,
Manchester M34 3DS
Tel: 0161 275 8811 Fax: 0161 275 8812
www.jenningsdesign.co.uk

Project	Local Council
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Project	Local Council

Project	Local Council
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Project	Local Council
Project	Local Council
Project	Local Council

Scale 1:500



320130169P

APPENDIX D
UNITED UTILITIES SEWER RECORDS

488100103

RSK Land and Development Engineering Limited
Spring Lodge
172 Chester Road
Helsby
Cheshire
WA6 0AR

FAO: Emma Evans

Dear Sirs

Location: PENDLE GARAGE CLITHEROE ROAD BARROW CLITHEROE BB7 9AQ

I acknowledge with thanks your request dated 28/06/12 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.

I attach General Condition Information sheets, which details contact numbers for additional services (i.e. new supplies, connections, diversions) which we are unable to deal with at this office. In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

I trust the above meets with your 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 0870 7510101.

Yours Faithfully,

S McManus

Sue McManus
Operations Manager
Property Searches

United Utilities Water PLC

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

DX 715568 Warrington
Telephone 0870 751 0101
Fax Number 0870 7510102

Property.searches@uuwplc.co.uk

Your Ref: 880298
Our Ref: 12/ 878229
Date: 03/07/12

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) (UUW apparatus) of United Utilities Water PLC ("UUW").

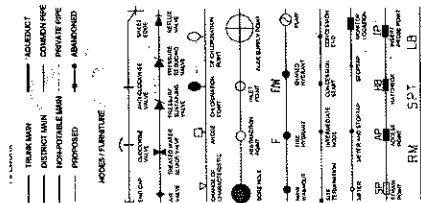
TERMS AND CONDITIONS:

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 UUW apparatus shown on the Map are approximate only. UUW strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUW 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 UUW 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 UUW 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 UUW apparatus by reason of the actual position and/or depths of UUW 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 UUW from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



OS Sheet No: SD7337SE
Scale 1:1250 Date: 3-Jul-2012

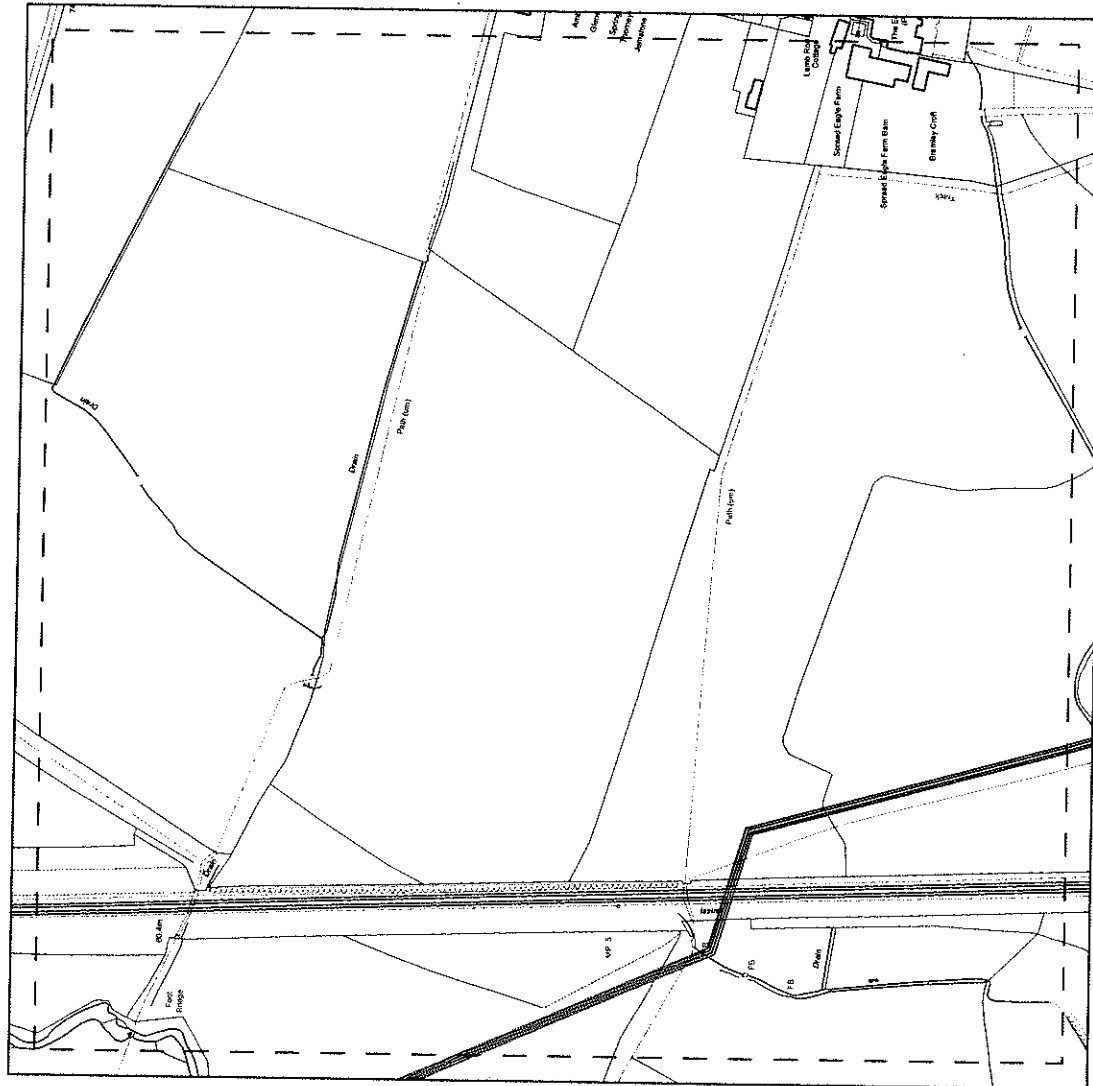
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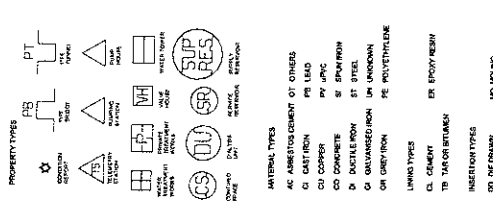
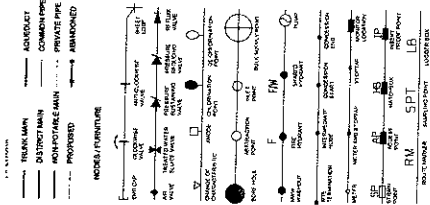
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Scale 1:1250 Date: 3-Jul-2012

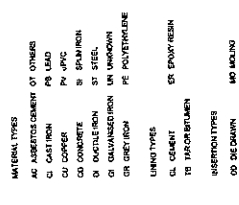
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Scale 1:1250
Date: 3-Jul-2012

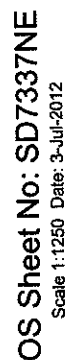




OS Sheet No: SD7337NE
Scale 1:1250
Date: 3-Jul-2012



WATER MAINS RECORDS



Printed by: Pam Handcastle



There are no nodes in SD7337SE.

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OS Sheet No: SD7337SE
Scale 1:1250 Date: 3-Jul-2012

Printed by: Pam Hardcastle

WASTE WATER SYMBOLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

MANHOLE FUNCTION

1. Final

2. Transfer

3. Combined

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[illegible]

MODE TABLE ABBREVIATIONS

MANHOLE FUNCTION	7 Transition
8 Feed	8 Overflow
9 Sump	9 Unspecified
0 Combined	
MANHOLE / NODE TYPE	
01 Manhole	20 Drop in Rising Main
02 Junction	3 Cesspits
03 Catchment	4 Gully
04 Lampchamber	5 Siphon
05 Manhole	6 Oil Separator
06 Riser	7 Inlet
07 Offset	8 Hydrophobic
08 Vent	9 Vent Columns
09 Combined Sewer	0 Valve
10 Overflow	1 Unspecified
2 Pumping Station	2 Unspecified
3 Sump	3 Unspecified
4 Sump	4 Unspecified
5 Dual Function	5 Unspecified
6 Manhole	6 Unspecified
7 Manhole	7 Unspecified
8 Manhole	8 Unspecified
9 Manhole	9 Unspecified

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15 Nodes
Sheet 1 of 1



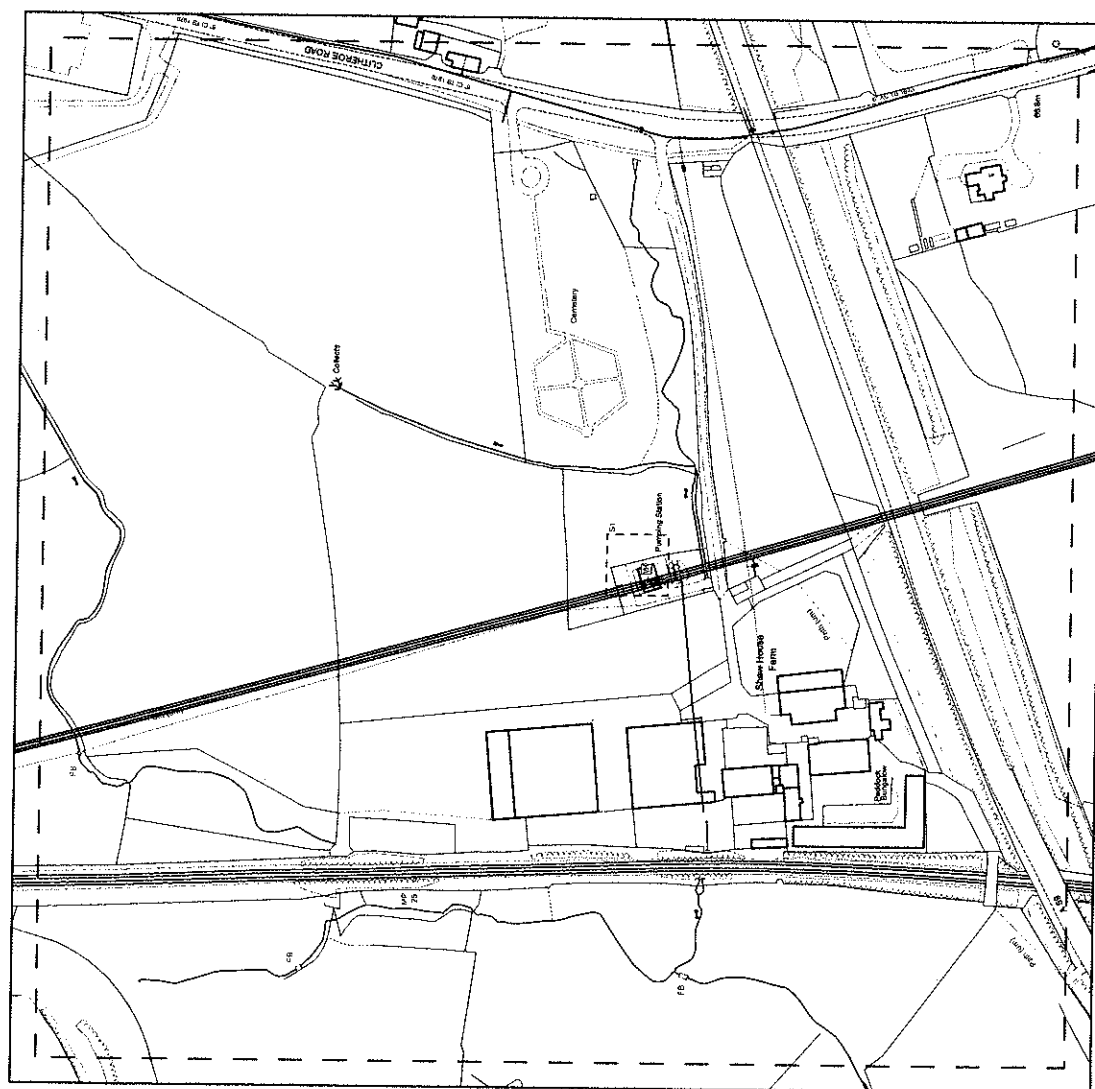
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Scale 1:1250 Date: 3-Jul-2012

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Pum

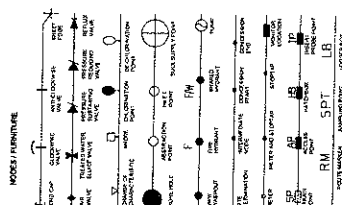
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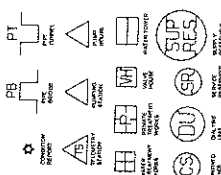
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_____	TRUNK MAIN	_____	AQUEDUCT
_____	DISTRICT MAIN	_____	COMMON PIPE
_____	NON-POTABLE MAIN	_____	PRIVATE PIPE
_____	PROPOSED	_____	ABANDONED



PROPERTY TYPES



INTERNAL TYPE8

C ASBESTOS CEMENT OF OTHERS

CEMENT	EPH	EPPOXY RESIN
--------	-----	--------------

4. PAROCHISM

SEASON TYPES

QUE CRAYON

Adaptive Control

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OS Sheet No: SD7337SW
Scale 1:1250
Date: 3-Jul-2012



WATER MAINS RECORDS



Conditions and information regarding wastewater network

**These general conditions and precautions apply
to the wastewater network of United Utilities.**

**Please ensure that a copy of these conditions is passed to
your representative and contractor on site.**

1. United Utilities provides the approximate locations of its sewers according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of every sewer culvert or drain, private connections from properties to the public sewers or the particulars of any private system. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated. The records do indicate the position of the nearest known public sewer from which the likely length of private connections can be estimated together with the need for any off site drainage rights or easements.
2. Special requirements relative to our sewers may be indicated. United Utilities employees or its contractors will visit any site at reasonable notice to assist in the location of its underground sewers and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, or any notification required under these General Conditions, please call us on **0845 746 2200**.
3. Where public sewers are within a site which is to be developed and do not take any drainage from outside the area, they are from an operational viewpoint redundant. The developer must identify all redundant sewers affected by the development and apply to United Utilities in writing for these sewers to be formally closed. The developer shall bear all related costs of the physical abandonment work.
4. Public sewers within the site that are still live outside the area, will be subject to a "Restricted Building zone". This would normally be a surface area equivalent to the depth of the sewer measured from the centre line of the sewer on either side. No construction will be permitted within that zone. The developer should also note that deep and wide rooted trees must not be planted in close proximity to live sewers. Access to public sewers must be maintained at all times and no interference to manholes will be permitted during construction work.
5. Where there is a public sewer along the line of a proposed development/building, arrangements shall be made by the developer at his cost to divert the sewer around the development. Where this is not possible and as a last resort, a "Building Over Agreement" will need to be completed under section 18 of the Building Act 1984. The developer shall design building foundations to ensure that no additional loading is transferred to the sewer and submit such details both to the Local Authority's Building Control Officer and to United Utilities for approval/acceptance. United Utilities on a rechargeable basis would normally undertake all aspects of design work associated with the diversion of any part of the operational wastewater network.
6. Where there is a non-main river watercourse/culvert passing through the site, the landowner has the responsibility of a riparian owner for the watercourse/culvert and is responsible for the maintenance of the fabric of the culvert and for all works involved in maintaining the unrestricted flow through it. Building over the watercourse/culvert is not recommended. The developer must contact the local authority before any works are carried out on the watercourse/culvert. Where it is necessary to discharge surface water from the site into the watercourse/culvert the developer shall make an assessment of the available capacity of the watercourse/culvert (based on a 1 in 50 year event) and ensure that the additional flow to be discharged into the watercourse/culvert will not cause any flooding. In appropriate cases, flooding may be prevented by on-site storage. The developer shall submit the relevant details required to substantiate his development proposals. Details of any outfall proposed shall also be submitted to the Environment Agency, PO Box 12, Richard Fairclough House, Knutsford Road, Warrington, Cheshire, WA4 1HT for their approval.
7. Where there is a main river watercourse/culvert passing through the site, the developer shall submit all proposals affecting the river to the Environment Agency at the address stated in paragraph 6 for approval/acceptance.

8. Your attention is drawn also to the following:

- **Private drains or sewers which may be within the site.**

United Utilities has no duty to keep records of private drains and sewers, and there are no comprehensive records kept elsewhere. Local Authority Building Control Officers may have records of recent developments and they or the developer may be able to provide information in this respect.

- **Applications to make connections to the public sewer.**

The developer must write to United Utilities requesting an application form that must be duly completed and returned. No works on the public sewer shall be carried out until a letter of consent is received from United Utilities.

- **Sewers for adoption.**

If an agreement for the adoption of sewers under Section 104 of the Water Industry Act 1991 is being contemplated, a submission in accordance with "Sewers for Adoption", Fifth Edition, published by the Water Research Centre (2001) Plc, Henley Road, Medmenham, PO Box 16, Marlow, Buckinghamshire, SL7 2HD will be required, taking into consideration any departures from the general guide stipulated by United Utilities.

- **Further consultation with United Utilities.**

Developers wishing to seek advice or clarification regarding sewer record information provided should contact United Utilities to arrange an appointment. A consultation fee may be charged, details of which will be made available at the time of making an appointment.

9. Combined sewers, foul sewers, surface water sewers, and pumped mains. These are shown separately in a range of colours or markings to distinguish them on our drawings, which are extracts from the statutory regional sewer map. A legend and key is provided on each extract for general use, although not all types of sewer will be shown on every extract.

Combined sewers shown coloured red carry both surface water and foul sewage, especially in areas where there is no separate surface water sewerage system.

Foul sewers coloured brown may also carry surface water and there may be no separate surface water system indicated in the immediate area. Both combined and foul sewers carry wastewater to our treatment works before it can safely be returned to the environment.

Surface water sewers coloured blue on our drawings are intended only to carry uncontaminated surface water (e.g. rainfall from roofs, etc) and they usually discharge into local watercourses. It is important for the protection of the environment and water quality that only uncontaminated surface water is connected to the surface water sewers. Improper connections to surface water sewers from sink wastes, washing machines and other domestic use of water can cause significant pollution of watercourses.

Pumped mains, rising mains and sludge mains will all be subject to pumping pressures and are neither suitable nor available for making new connections.

Highway drains, when included, show as blue and black dashed lines. Highway drains are not assets belonging to United Utilities and are the responsibility of local authorities.

10. For information regarding future proposals for construction of company apparatus please write to United Utilities, PO Box 453, Warrington, WA5 3QN.

11. For information regarding easements, deeds, grants or wayleaves please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (Tel: 01925 463 654).

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United Utilities Water PLC
Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington WA5 3LP
www.unitedutilities.com

Registered in England and Wales Registered Number 2366678

Things you need to know

- Q. What is a pumping station?**
A pumping station is a sewage collection system used to assist gravity in getting sewage from its place of origin to a works for treatment. There will also be a power supply located somewhere near the pumping station, in a kiosk or in some circumstances in a garage.
- Q. Is this change just happening in the North West?**
No, this is new Government policy so all eligible private pumping stations in England and Wales will transfer on October 1st 2016.
- Q. Why has the Government made these changes?**
Under the current rules there is an unfair level of ownership on customers so the Government decided to remove this responsibility from the customer and give it to the water companies.
- Q. Does the transfer include commercial properties?**
The transfer applies to eligible assets serving both domestic and commercial properties.
- Q. When will the rising main transfer?**
The rising main (pressurised main which leaves the pumping station and connects with the gravity sewer) will transfer with the pumping station on October 1st 2016.
- Q. What is deemed to be a single property and therefore will not transfer?**
Apart from a single house other examples may commonly include:
- A residential building with multiple flats or apartments, either as a conversion or purpose built
 - A caravan site or residential/holiday home park
 - A hotel/boarding house
 - An office or commercial building
 - An industrial, business, retail or science park
 - A school or university campus
 - A hospital or other medical facility
 - A railway station, airport or port.
- Q. Why are you surveying my pumping station twice?**
The preliminary survey is to determine the eligibility to transfer under the regulations and assess the condition of the station. The follow up survey will be nearer to 2016 and will be a more detailed inspection to identify what work may be required to upgrade the station.
- Q. Who will be paying for the necessary upgrade work?**
UU will be paying for the necessary upgrade work and ongoing maintenance costs once the station is transferred – not the customer.

For more information on the transfer visit:

unitedutilities.com/PrivatePumpingStationOwnership

Where you can find:

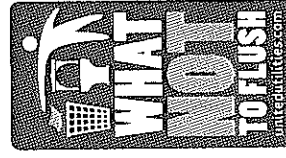
- Short video to explain the transfer
- Frequently asked questions
- Online Questionnaire

If you haven't already done so please help us to locate any Private Pumping Stations – if you're responsible for or know of a private pumping station complete the questionnaire on the website or email us at:

privatepumpingstations@uu plc.co.uk

Alternatively you can contact us 0845 746 2200

Prevention is better than cure – we can all do our bit



Nobody wants the hassle of dealing with blocked or damaged sewer pipes.

Many of the problems on sewer pipes occur when the wrong things are flushed down the loo or put down the kitchen sink – from baby wipes and sanitary products to cooking fats and oils.

These items don't break down, so they block pipes and cause sewage to spill out into homes, gardens and roads.

Please help spread the message to keep the north west's sewer pipes flowing. Put wipes and cooking fats in the bin, to avoid the mess and inconvenience of blocked pipes.

For more information please visit whatnottoflush.com

Our guide to help you understand the transfer of private pumping stations

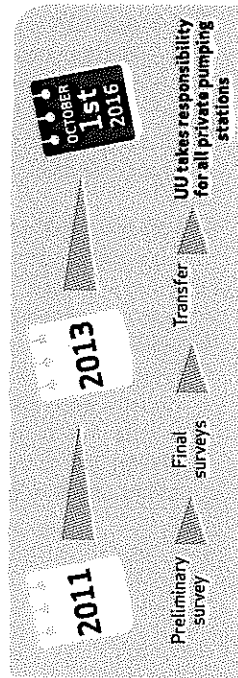
All Private Pumping Stations that serve two or more properties or the station is outside of the property boundary will transfer ownership to the wastewater service provider on October 1st 2016.

A recent change in Government Legislation means that all eligible Private Pumping Stations will transfer ownership to the wastewater service provider on.....

OCTOBER 1st 2016

That sounds a long way off...

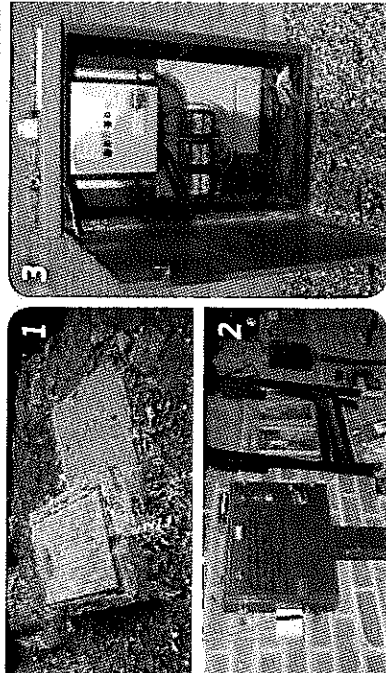
But this is a 5 year process which started on October 1st 2011 and all eligible stations will have transferred by October 1st 2016. This is how we plan to spend the time:



We estimate that there will be around 2100 private pumping stations in the North West and we are currently trying to find the location of them all. This is more than double the number of existing stations which United Utilities is responsible for and finding them is not going to be an easy task!

Pumping stations come in all different shapes and sizes. Here are some examples.

A manhole cover in the garden could be home to a pumping station (1), a pumping station control panel can sometimes be located in a garage (2) or on the side of a house (3).



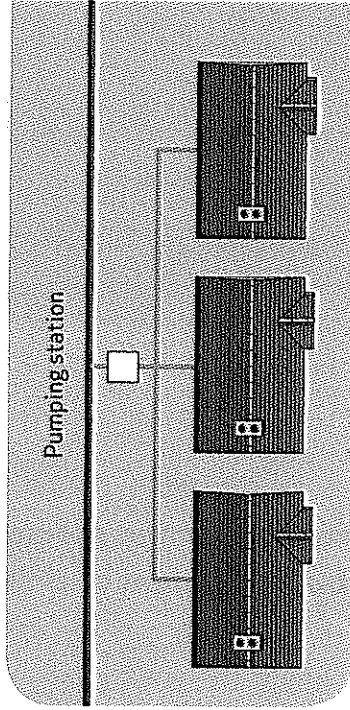
Get to know what will transfer over to United Utilities

The illustrations below give you a simple guide to what will transfer and what will remain your responsibility.

Need more information?
See our short video at:
unitedutilities.com/privatesewers
We have a section on private pumping stations for you to look at.

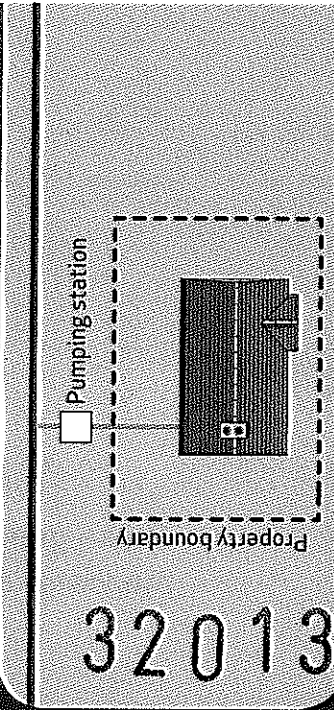
Is the pumping station serving more than one property?

If a pumping station serves more than one property it **WILL** transfer.

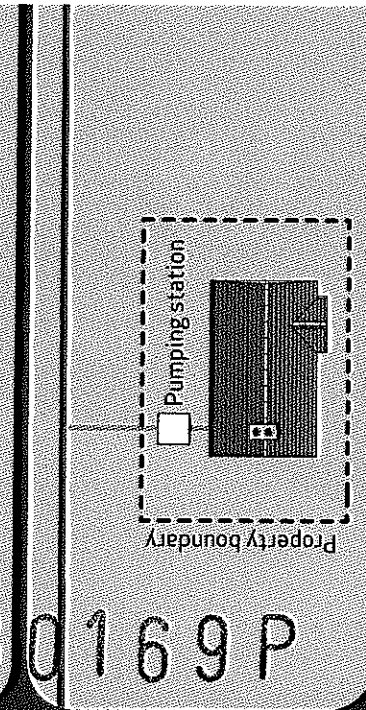


Is the pumping station serving a single property?

If a pumping station serves a single property but is located **outside** the property boundary it **WILL** transfer.



If a pumping station serves a single property but is located **inside** the property boundary it **WILL NOT** transfer.



**These general conditions and precautions apply to
the water distribution system of United Utilities.**

**Please ensure that a copy of these conditions is passed to
your representative and contractor on site.**

1. United Utilities provides approximate locations of its water mains or apparatus according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of private service pipes from the mains to properties. Where service pipes are shown, a blue broken line indicates their approximate position. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated.
2. Special requirements relative to our apparatus may be indicated. United Utilities employees will visit any site at reasonable notice to assist in the location of its underground water apparatus and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, future proposals for construction of company apparatus or any notification required under these General Conditions, please telephone us on **0845 746 2200** or write to United Utilities, PO Box 453, Warrington, WA5 3QN.
3. In order to achieve safe working conditions adjacent to any water apparatus the following should be observed;
 - (a) All water apparatus should be located by hand digging prior to the use of mechanical excavation.
 - (b) During construction work where heavy plant may have to cross the line of a water main, and the main is not under a carriageway of adequate standard of construction, crossing points should be suitably reinforced with sleepers, steel plates or a specially constructed reinforced concrete raft as necessary. These crossing points should be clearly indicated and crossing the line of the water main at other places should be prevented. United Utilities employees will advise on the type of reinforcement necessary. This is particularly important on agricultural or open land, where tilling or erosion may have significantly reduced the original cover.
- (c) No explosive should be used within 32 metres of any United Utilities apparatus without prior consultation with United Utilities.
- (d) Where it is proposed to carry out piling within 15 metres of any water main United Utilities should be consulted so that the affected main may be surveyed.
4. During any excavation, it is important that measures should be taken to ensure continued support for any water main:
 - (a) Where excavation of trenches adjacent to any water main is likely to affect its support, the main must be supported to the satisfaction of United Utilities.
 - (b) Where a trench is excavated crossing or parallel to the line of a water main, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the main. In special cases it may be necessary to provide permanent support to a main which has been exposed over the length of the excavation before back-filling and reinstatement is carried out. No back-filled concrete should contact the main.
5. No other apparatus should be laid over and along the line of a water main irrespective of clearance. A minimum clearance of 450 millimetres should be allowed between any plant being installed and an existing main, to facilitate maintenance and repair, whether the adjacent plant is parallel to or crossing the main. No manhole, chamber, or other obstruction should be built over or around a water main.
6. Where a water main is coated with special wrapping and the wrapping is damaged, even to a minor extent, United Utilities must be notified, and the excavation must be left open for ready access so that repairs can be made. In case of any material damage to the main itself causing leakage, or weakening of the mechanical strength of the pipe, the person or body responsible should immediately notify United Utilities in order that the necessary remedial work can be carried out. The full cost of the necessary remedial work will be charged to the person or body responsible for the damage.

7. If you propose to change existing levels over water mains you will need to inform us. We will need specific locations to be identified together with precise details as to the scale of the proposed changes to existing ground levels. Changes to existing levels may require the diversion of our apparatus at your cost. However, in certain circumstances we may wish to leave our apparatus where it is. On these occasions you will usually be required to protect our apparatus by means of a concrete raft and either raise or lower any surface boxes affected.
8. Under no circumstances should our surface boxes be either buried or left in a situation where they are raised above finished ground levels. You should re-use and re-set any surface boxes affected by your works into the new surface so that they align over the water apparatus below. You will be responsible for the cost of repairing any damage to our apparatus as a result of your works.
9. Where proposals involve resurfacing, you must notify United Utilities if your excavation will be greater than 750mm in the highway and 300mm in a footpath, verge or other location.
10. For information regarding easements, deeds, grants, licences or wayleaves, please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (Tel: 01925 463 654).

Tree planting restrictions over water mains

- a) Poplar and willow trees have extensive root systems and should not be planted within 10 metres of any water main.
- b) The following trees and those of a similar size, whether they are deciduous or evergreen, should not be planted within six metres of any water main:
 - Ash, beech, birch, elm, horse chestnut, lime, oak, sycamore;
 - Apple trees and pear trees;
 - Most conifers.
- c) United Utilities requires access to the route of its mains at all times to inspect for leaks and carry out surveys. We recommend that no shrubs or bushes which might obstruct or interfere with our access should be planted within one metre of the centre line of any water main.
- d) There may be instances when both United Utilities and the landowner will wish to plant shrubs or bushes close to the water main for screening or other purposes. The following shallow rooting shrubs would be suitable for this purpose:
 - Blackthorn, broom, cotoneaster, elder;
 - Hazel, laurel, privet, quickthorn, snowberry;
 - Most ornamental flowering shrubs.
- e) In areas where soft fruit is grown, blackcurrant, raspberries and gooseberries may be planted close to the main, provided that a path is left clear for inspection access and surveys. United Utilities can give additional advice where required in particular circumstances.



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APPENDIX E

MICRO DRAINAGE CALCULATIONS

RSK LDE Ltd		Page 1
18 Frogmore Road Hemel Hempstead Herts, HP3 9RT	Pendal Garage	
Date 26/10/12 File	Designed By EE Checked By	
Elstree Computing Ltd	Source Control W.12.5	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.593	Urban	0.000
SAAR (mm)	1005	Region Number	Region 10

Results 1/s

QBAR Rural	4.0
QBAR Urban	4.0
Q100 years	8.3
Q1 year	3.5
Q30 years	6.7
Q100 years	8.3

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APPENDIX F

ENGINEERING APPRAISAL

900100101

