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**FLOOD RISK ASSESSMENT  
AND DRAINAGE STRATEGY**

**FOR**

**PROPOSED RESIDENTIAL DEVELOPMENT**

**ON**

**PARCEL G, FORMER INGOL GOLF CLUB, PRESTON.**

**Project** : 2022.171  
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**Engineer** : G Schofield  
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**Issue No. 2** : 30.11.2022

## CONTENTS

1.0	EXECUTIVE SUMMARY	1
2.0	INTRODUCTION	2
3.0	SITE CHARACTERISATION	3
3.1	Site Location	3
3.2	Site Description	3
3.3	Geology	4
3.4	Hydrogeology and Hydrology	4
3.5	Existing Drainage and Run-off	4
4.0	ASSESSMENT OF FLOOD RISK	5
4.1	Background	5
4.2	Data Collection	5
4.3	Environment Agency Flood Mapping	6
4.4	Strategic Flood Risk Assessment	6
4.5	Historic Flooding	6
4.6	Pluvial Flooding from Surface Water	6
4.7	Groundwater Flooding	7
4.8	Sewer Flooding	7
4.9	Flooding from Reservoirs, Canals or Other Artificial Sources	7
4.10	Flooding from Climate Change	7
5.0	DEVELOPMENT PROPOSALS AND DRAINAGE STRATEGY	9
5.1	Development Proposals	8
5.2	Proposed Surface Water Drainage Strategy	8
5.3	Proposed Foul Water Drainage Strategy	9
5.4	Flood Mitigation	10
5.5	Off-site Impact	10
5.6	Residual Risks	10
5.7	Flood Warning	10
6.0	CONCLUSIONS AND RECOMMENDATIONS	11

## FIGURES

Figure 3.1 — Site Location Plan	3
Figure 4.1 — Surface Water Flooding Map	6

## TABLES

Table 3.1 — BGS Geological Sequence	4
Table 5.1 —Storage Estimate	9

## APPENDICES

APPENDIX A: Topo survey and Indicative Drainage Plan 2022.171.001A

APPENDIX B: United Utilities Public Sewer Records

APPENDIX C: HR Wallingford UKSuDS Greenfield Runoff Estimate

APPENDIX D: Environment Agency Flood Map for Planning

APPENDIX E: Wastewater Predevelopment Enquiry and Response

## 1.0 EXECUTIVE SUMMARY

This following report has been prepared in accordance with <<gov.uk>>Guidance on Flood Risk and Coastal Change in support of development proposals to construct eleven substantial dwellings, with gardens and public amenity space, together with all associated highways and services infrastructure t.

Graham Schofield Associates Ltd has been appointed by Metacre Ltd to undertake this flood risk assessment and provide a drainage strategy for the proposed development.

This flood risk assessment has been undertaken with information compiled from Environment Agency and other sources. The assessment has concluded that the site lies within flood zone 1 with a risk of flooding less than 0.1% AEP

The area of the site is approximately 1.75 hectares and by reference to the EA published Flood Maps, lies in Flood Zone 1.

The development is determined as More Vulnerable and therefore compatible with a location in Flood Zone 1.

The site is considered to be at low risk of flooding from all assessed sources, therefore no special flood mitigation measures are considered necessary for reduction of flood risk in the proposed development.

If ground and local conditions permit, surface water from new roof and paved areas should be directed to local soakaway structures for disposal via infiltration.

Where ground conditions preclude the use of soakaways then surface water will be discharged to Sharoe Brook at a rate not exceeding  $Q_{BAR}$  for all rainfall events up to the critical 1.0% AEP storm with an allowance for a 50% increase in rainfall intensity caused by future climate change. For a drained area of 0.45 hectares (with an additional allowance of a 10% increase for future urban creep) this will be a pass forward flow of - 6.47 litres/sec. Cellular attenuation storage will be provided prior to outfall to watercourse.

Residual flood risks will be low and there will be no off-site impacts as a result of this development.

Domestic foul sewage will be discharged unrestricted to local public foul sewer and will be the subject of a S106 Water Industry Act 1991 sewer connection application to United Utilities.

## **2.0 INTRODUCTION**

Development proposals by Metacre Ltd comprise construction of eleven substantial dwellings, with gardens and public amenity space, together with all associated highways and services infrastructure. The proposals are shown on the plan attached at Appendix A.

Graham Schofield Associates Ltd has been appointed by Metacre Ltd to undertake a flood risk assessment (FRA) and drainage strategy for the proposed development in support of a planning application that fulfils the requirements of the Local Planning Authority (LPA), Lead Local Flood Authority (LLFA), Sewerage Undertaker (United Utilities – UU) and The Environment Agency (EA).

The National Planning Policy Framework (NPPF) and its Technical Guidance on Flood Risk requires that a site-specific FRA should be submitted for proposals of 1 hectare or greater in Flood Zone 1, all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the LPA by EA) and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

The area of the site is approximately 1.75 hectares and by reference to the EA published Flood Maps, lies in Flood Zone 1. Therefore, an FRA is required.

### 3.0 **SITE CHARACTERISATION**

#### 3.1 **Site Location**

The site is located to the South of Walker Lane, Ingol with a site-centred grid reference of 351762E, 432595N. It is land which was part of the golf course of the former Ingol Golf Club.

Preston City Council is LPA and Lancashire County Council is LLFA.

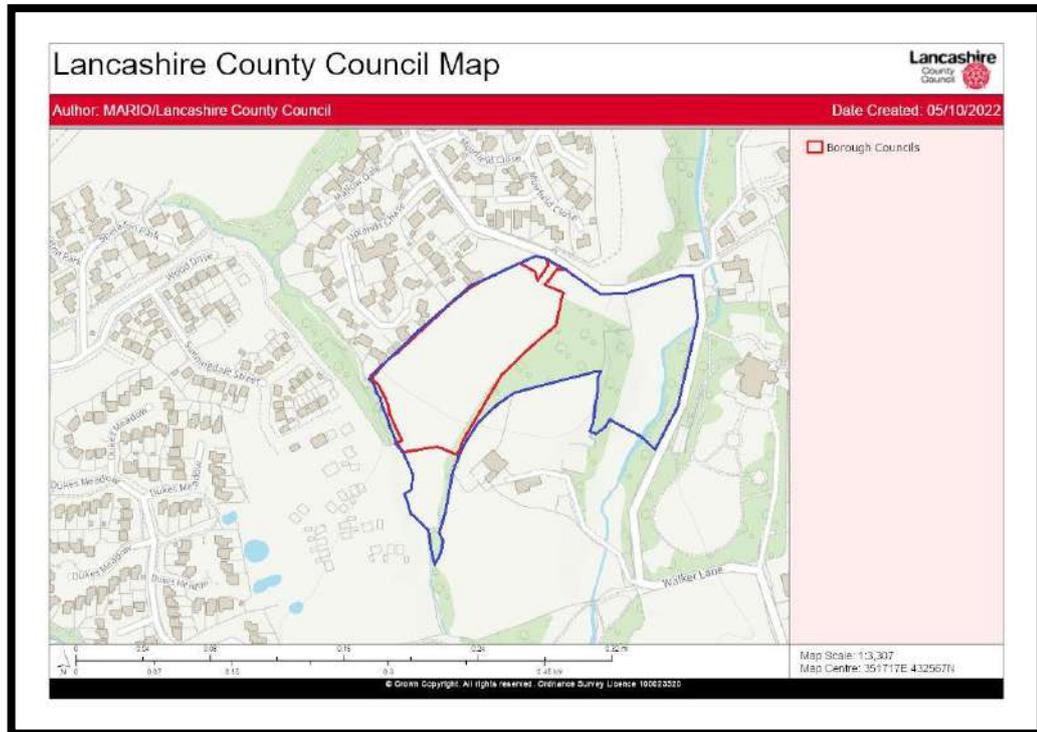


Fig 3.1 Site Location Plan

#### 3.2 **Site Description**

The development site is irregularly shaped in plan with a Planning Red Line site area of approximately 1.75 hectares. The Blue Line area of ownership is approximately 4.05 hectares. There is a general fall of over 10 metres across the site north to south, levels on site varying between 35.50m and 25.00m AOD.

As noted above the site is part of the former Ingol Golf Club course and is currently open grassed land with existing tree screening to the south west and east. There is residential development to the north west and access is from Walker Lane to the north.

There is a teardrop shaped pond on the site, which apparently is not part of the general land drainage network, suspected to be artificial related to the golf course.

Topographical survey of the site is attached at Appendix A also.

### 3.3 Geology

British Geological Survey (BGS) maps for the site indicate that the site is underlain by the following geological sequence:

<b>Geological Unit</b>	<b>Classification</b>	<b>Description</b>
<i>Bedrock</i>	<i>Sherwood Sandstone Group</i>	<i>Sandstone.</i>
<i>Superficial</i>	<i>Till - Devensian</i>	<i>Clay - silty, sandy, gravelly.</i>

Table 3.1 BGS Geological Sequence

### 3.4 Hydrogeology and Hydrology

Magic Mapping Groundwater Vulnerability Zone Maps show the site and surrounding area to have a Medium to Low groundwater vulnerability. Superficial deposit aquifers are classified as Secondary (undifferentiated) in Till and bedrock aquifers classified as Principal in Sandstone.

The site lies within the Sharoe Brook catchment, with Sharoe Brook ultimately discharging to the Ribble Estuary via Savick Brook and The Millenium Ribble Link.

An unnamed tributary to Sharoe Brook abuts the site to the south west.

### 3.5 Existing Drainage and Run-off

There are existing foul and combined sewers local to the site, although none passing through it. United Utilities public sewer records are attached at Appendix B.

Reference to the H R Wallingford UKSuDS Greenfield runoff tool has estimated existing runoff from the proposed development site area as follows:-

1 in 1 year	= 11.03 litres/sec
Q <sub>BAR</sub>	= 12.68 litres/sec
1 in 30 year	= 21.55 litres/sec
1 in 100 year	= 26.37 litres/sec
1 in 200 year	= 30.05 litres/sec

See Runoff estimation tool at Appendix C

## **4.0 ASSESSMENT OF FLOOD RISK**

### **4.1 Background**

The following FRA has been carried out in accordance with NPPF and its Technical Guidance. The broad aim of the guidance is to reduce the number of people and properties within the natural and built environment at risk of flooding. To achieve this aim, planning authorities are required to ensure that flood risk is properly assessed during the initial planning stages of any development.

Responsibility for this assessment lies with developers and they must demonstrate:

- Whether the proposed development is likely to be affected by flooding.
- Whether the proposed development will increase flood risk in other parts of the hydrological catchment.
- That the measures proposed to deal with any flood risk are sustainable.

The developer must demonstrate that the existing flood risk and the flood risk associated with the proposed development can be satisfactorily managed, by reviewing potential existing and future anticipated flood risks created by the development proposals.

### **4.2 Data Collection**

The following information has been referred to for this FRA:

- <<gov.uk>> Technical Guidance on Flood Risk and Coastal Change
- The EA Flood Map for planning covering the site and adjacent area, together with <gov.uk> mapping of surface water flooding.
- Lancashire County Council Strategic Flood Risk Assessment Level 1 (SFRA)
- Magic Mapping Groundwater maps
- BGS Groundwater Flooding Vulnerability classification
- United Utilities public sewer records
- Topographical Survey of the Site to Ordnance Datum
- The Developer's site layout plan

### 4.3 Environment Agency Flood Mapping

The EA's Flood Map for Planning (attached at Appendix D) has been reviewed to gain initial assessment of the flood risk for the area.

The flood map shows the site is at low risk of flooding, given less than a 0.1% (1 in 1000 year) Annual Exceedance Probability (AEP) of flooding from rivers or sea, categorized as Flood Zone 1.

### 4.4 Strategic Flood Risk Assessment

Lancashire County Council undertook their Central Lancashire SFRA in 2007.

This site lies within the Sharoe Brook catchment, part of the greater catchment of the River Ribble. The SFRA assessment of flood risk in this area concurs with the EA flood maps that the site is within Flood Zone 1.

### 4.5 Historic Flooding

The SFRA identifies incidences of previous flooding from various sources. There is no record of any flooding having occurred in this district.

### 4.6 Pluvial Flooding from Surface Water

The risk of flooding to the site from surface water depends on various factors, such as depressions on the site, overland flow routes and local drainage.

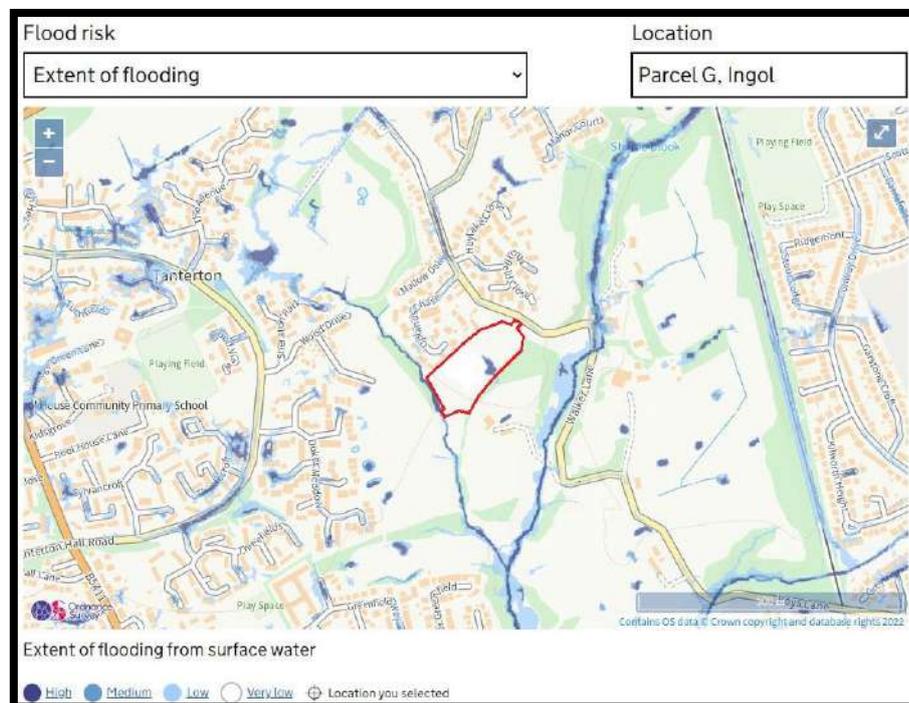


Fig 4.1 Surface Water Flood Map

The surface water flood map above indicates the site at a low risk of flooding, with only the existing pond feature being identified.

#### **4.7 Groundwater Flooding**

The SFRA observes that there are no recorded occurrences of groundwater flooding in the region. There is no evidence of any groundwater issues on the site.

#### **4.8 Sewer Flooding**

Existing local public sewers are unlikely to present a risk of flooding on site.

#### **4.9 Flooding from Reservoirs, Canals or Other Artificial Sources**

The existing pond on the site is not part of the existing drainage network and its catchment area is only local to the pond. This feature is unlikely to present any risk of site flooding. There are no reservoirs, canals or other artificial sources within the vicinity of the proposed site that present risk. Therefore there is not considered to be a risk of flooding to the site from these sources.

#### **4.10 Flooding caused by Climate Change**

Projections of future climate change indicate that more frequent short-duration, high-intensity rainfall and more frequent periods of long-duration rainfall are likely to occur over the next few decades in the UK. Sea levels are also predicted to continue to rise. These future changes will have implications for both fluvial and tidal flooding and also for local flash flooding. These factors will lead to increased and new risks of flooding within the lifetime of planned developments.

The true impact of climate change however is difficult to predict. The recommendations included in the Technical Guidance to NPPF will be followed in the design of site drainage features, adopting an anticipated increase in rainfall intensity up to 50% for rainfall events with a 1% annual exceedance.

## **5.0 DEVELOPMENT PROPOSALS AND DRAINAGE STRATEGY**

### **5.1 Development Proposals**

The development type falls within the More Vulnerable category under Table 2 of the Technical Guidance.

The proposals comprise construction of eleven substantial dwellings, with gardens and public amenity space, together with all associated highways and services infrastructure. Highways and shared drainage systems will be retained and maintained by the developers or their managing agent.

Proposed dwelling floor levels, road levels and external landscaping levels will be at grade and there are no intentions to alter general ground levels on site.

### **5.2 Proposed Surface Water Drainage Strategy**

Whilst geological indications are that ground conditions on site will be unsuitable, these will be investigated to assess the potential for surface water disposal by infiltration methods. In the event investigations prove ground conditions to be suitable, individual dwellings will be served by designed domestic soakaway structures to be located in gardens designed in accordance with Part H Building Regulations.

Shared highway areas will be drained either by individual gully soakaways or infiltrating filter drains.

Subject to ground investigation proving that infiltration disposal is not viable, collected surface water from all dwellings and drained pavings will be directed into Sharoe Brook via discharge at an attenuated rate (equivalent to existing greenfield rate  $Q_{BAR}$ ) into the unnamed tributary flowing in a southerly direction adjacent to the site.

The development site area is approximately 1.75 hectares and  $Q_{BAR}$  for this area has been estimated at 12.68 litres/sec. However, inspection of the proposed layout indicates that parts of the site will continue to drain naturally toward the watercourse after development (ie gardens to plots 1 to 7 inclusive).

Taking account also of the prospect of urban creep increasing future drained areas on site by as much as 10%, we have:-

<u>Site Area</u>	<u>1.75 ha</u>
A. Area continues to drain naturally	0.86 ha
B. Area affected by development	0.89 ha
C. Measured drained area	0.48 ha
B. Measured drained area + 10% urban creep	0.53 ha

Pro-rata  $Q_{BAR}$  for area A will be 6.21 litres/sec and target pass forward flow  $Q_{BAR}$  from the developed site will be reduced to  $12.68 - 6.21 = 6.47$  litres/sec

It is proposed that runoff from the site will be attenuated to this rate by the introduction of a designed flow control device and provision of attenuation storage located within site ownership, before discharge to the watercourse. This will be for all rainfall events up to the YR100 event (with an allowance for a 50% increase in rainfall intensity as a result of future climate change).

WinDes software has estimated the required attenuation storage volumes for disposal at not exceeding the rate above. Table 4.1 below sets out estimated attenuation volumes for three scenarios with:-

Effective impermeable area approximately 0.53 hectares

$$M5-60 = 18.5 \quad R = 0.328$$

Rainfall event	q (litres/sec)	V (cu.m)
YR1 (100%)	6.47	$30 < V < 58$
YR30 (3.33%)	ditto	$112 < V < 179$
YR100cc (1%+50%)	ditto	$285 < V < 425$

Table 5.1 Storage Estimate

Whilst any necessary attenuation storage to protect the site against flooding for all events up to and including the YR30 (3.33%) rainfall event must be provided below general ground level, additional attenuation storage up to the YR100 (1%) + climate change event may be provided on the surface of the site, on the proviso it does not present risk of flooding to buildings or other vulnerable areas or risk of overland flows from the site. However, general ground slopes on the site indicate that it will not be practicable to retain local surface flooding on site and therefore all attenuation storage will be provided underground.

This will be in the form of cellular storage located within the site ownership and with maintenance access before discharge through the flow control device to the watercourse. Responsibility for maintenance of all shared surface water drainage and SuDS structures will remain with the developer.

### 5.3 **Proposed Foul Water Drainage Strategy**

It is proposed that domestic sewage will be discharged to local public foul sewer at an unrestricted rate and this will be the subject of a S106 Water Industry Act 1991 sewer connection application to United Utilities.

Responsibility for maintenance of all shared foul drainage will remain with the developer.

#### **5.4 Flood Mitigation**

The risk of flooding from rivers and sea and reservoirs or canals is low and therefore it is considered that specific mitigation measures are not necessary in these respects.

With the site being within Flood Zone 1, above the 100-year flood level, there will always be clear uninterrupted pedestrian access to and from the site.

The probability of general surface water flooding is low, although any proposed paving depressions may attract surface ponding and where possible site levels will be designed to avoid flooding of dwellings, pedestrian routes and other sensitive areas on site. Setting finished floor level of all dwellings at least 150mm above surrounding external ground, shedding surface water away, will avoid the risk of damage or hazard as a result of overland flood flows around the site.

The design of surface water drainage will ensure that there are no uncontrolled overland flood flows created by the proposed development onto adjoining property or highways.

#### **5.5 Off-site Impacts**

All on-site roofs and pavings are to drain into the designed surface water system, thereby ensuring there will be no increase in off-site flood flows generated by the development.

There will be no significant off-site impacts as a result of this development.

#### **5.6 Residual Risks**

The risk of existing flood flows entering and leaving the site will remain after development. This risk will be reduced as far as possible because the drainage designs will be such that there will be no flooding during all rainfall events up to and including the critical YR30 storm and no overland flows from the site up to the critical YR100 storm.

#### **5.7 Flood Warning**

The EA is the lead organisation for flood forecasting and flood warnings and alerts in England and Wales.

The site is not located within a Flood Warning or Flood Alert area and EA does not issue warnings or alerts for this area.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

In consideration of the flood risk to the site the following conclusions and recommendations are made:

The EA Flood Map for Planning (see Appendix D) along with additional flood risk information has been reviewed to provide assessment of the level of flood risk for this site. The information shows that the site lies within Flood Zone 1 having less than a 0.1% (1 in 1000yr) AEP of flooding from rivers or sea.

The proposals comprise construction of eleven substantial dwellings, with gardens and public amenity space, together with all associated highways and services infrastructure. Highways and shared drainage systems will be retained and maintained by the developers or their managing agent.

The development is determined as More Vulnerable and therefore compatible with a location in Flood Zone 1.

In the event that ground conditions prove unsuitable for surface water disposal by SuDS infiltration, surface water from all new roof and paved areas should be directed to the local watercourse network at a rate not exceeding  $Q_{BAR}$  for all events up to the YR100cc (+50% increase for climate change) rainfall event

The site is considered to be at low risk of flooding from all assessed sources, therefore no special flood mitigation measures are considered necessary for reduction of flood risk in the proposed development, beyond incorporation of good practice in the setting of dwelling and paving levels and in the design of new surface water drainage.

APPENDIX A: Topo survey and Indicative Drainage Plan 2022.171.001A





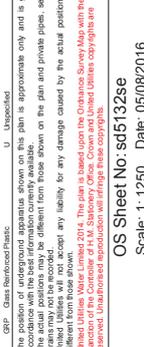
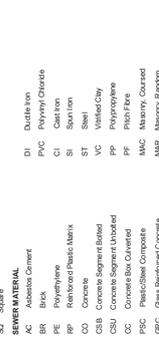
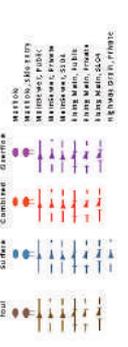
APPENDIX B: United Utilities Public Sewer Records







WASTE WATER SYMBOLOGY



Station	Cover	Flow	Invert	Run	Manhole	Length	Grade
6100	150	VC	48.1	51	88		
6101	150	VC	48.1	51	88		
6102	150	VC	48.1	51	88		
6103	150	VC	48.1	51	88		
6104	150	VC	48.1	51	88		
6105	150	VC	48.1	51	88		
6106	150	VC	48.1	51	88		
6107	150	VC	48.1	51	88		
6108	150	VC	48.1	51	88		
6109	150	VC	48.1	51	88		
6110	150	VC	48.1	51	88		
6111	150	VC	48.1	51	88		
6112	150	VC	48.1	51	88		
6113	150	VC	48.1	51	88		
6114	150	VC	48.1	51	88		
6115	150	VC	48.1	51	88		
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6119	150	VC	48.1	51	88		
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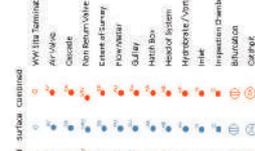
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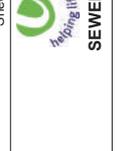
SEWER RECORDS

**WASTE WATER SYMBOLOGY**



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the information furnished to the Engineer by the City of San Jose. The actual positions may be different from those shown on the plan and private pipes, sewers or other structures are shown for information only. The City of San Jose and United Utilities Sewer Records Department will not accept any liability for any damage caused by the actual positions being different from those shown on this plan. This plan is based upon the City of San Jose Sewer Records Department's records. The City of San Jose and United Utilities Sewer Records Department are not responsible for any errors or omissions in this plan. All rights reserved. No part of this plan may be reproduced without the prior written permission of the City of San Jose and United Utilities Sewer Records Department.

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 Sheet 1 of 1



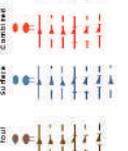
Node	Cover Code	Invert	Manhole/Structure Length	Code
6800		33.84	0.00	VC 13.71
6801		33.84	0.00	VC 13.71
6802		33.84	0.00	VC 13.71
6803		33.84	0.00	VC 13.71
6804		33.84	0.00	VC 13.71
6805		33.84	0.00	VC 13.71
6806		33.84	0.00	VC 13.71
6807		33.84	0.00	VC 13.71
6808		33.84	0.00	VC 13.71
6809		33.84	0.00	VC 13.71
6810		33.84	0.00	VC 13.71
6811		33.84	0.00	VC 13.71
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6997		33.84	0.00	VC 13.71
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6999		33.84	0.00	VC 13.71
7000		33.84	0.00	VC 13.71



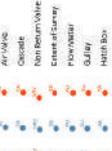




**WASTE WATER SYMBOLOLOGY**



**ABANDONED PIPE**



**MANHOLE FUNCTION**



**SEWER MATERIAL**



**LEGEND**



Point	Cover Elev	Invert Elev (Structure)	Length	Grade
8902	22.5	100	0	VC 1708
8903	22.5	100	0	VC 1708
8904	22.5	100	0	VC 1708
8905	22.5	100	0	VC 1708
8906	22.5	100	0	VC 1708
8907	22.5	100	0	VC 1708
8908	22.5	100	0	VC 1708
8909	22.5	100	0	VC 1708
8910	22.5	100	0	VC 1708
8911	22.5	100	0	VC 1708
8912	22.5	100	0	VC 1708
8913	22.5	100	0	VC 1708
8914	22.5	100	0	VC 1708
8915	22.5	100	0	VC 1708
8916	22.5	100	0	VC 1708
8917	22.5	100	0	VC 1708
8918	22.5	100	0	VC 1708
8919	22.5	100	0	VC 1708
8920	22.5	100	0	VC 1708
8921	22.5	100	0	VC 1708
8922	22.5	100	0	VC 1708
8923	22.5	100	0	VC 1708
8924	22.5	100	0	VC 1708
8925	22.5	100	0	VC 1708
8926	22.5	100	0	VC 1708
8927	22.5	100	0	VC 1708
8928	22.5	100	0	VC 1708
8929	22.5	100	0	VC 1708
8930	22.5	100	0	VC 1708
8931	22.5	100	0	VC 1708
8932	22.5	100	0	VC 1708
8933	22.5	100	0	VC 1708
8934	22.5	100	0	VC 1708
8935	22.5	100	0	VC 1708
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8939	22.5	100	0	VC 1708
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8942	22.5	100	0	VC 1708
8943	22.5	100	0	VC 1708
8944	22.5	100	0	VC 1708
8945	22.5	100	0	VC 1708
8946	22.5	100	0	VC 1708
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8950	22.5	100	0	VC 1708
8951	22.5	100	0	VC 1708
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8954	22.5	100	0	VC 1708
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8958	22.5	100	0	VC 1708
8959	22.5	100	0	VC 1708
8960	22.5	100	0	VC 1708
8961	22.5	100	0	VC 1708
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8963	22.5	100	0	VC 1708
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8965	22.5	100	0	VC 1708
8966	22.5	100	0	VC 1708
8967	22.5	100	0	VC 1708
8968	22.5	100	0	VC 1708
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8970	22.5	100	0	VC 1708
8971	22.5	100	0	VC 1708
8972	22.5	100	0	VC 1708
8973	22.5	100	0	VC 1708
8974	22.5	100	0	VC 1708
8975	22.5	100	0	VC 1708
8976	22.5	100	0	VC 1708
8977	22.5	100	0	VC 1708
8978	22.5	100	0	VC 1708
8979	22.5	100	0	VC 1708
8980	22.5	100	0	VC 1708
8981	22.5	100	0	VC 1708
8982	22.5	100	0	VC 1708
8983	22.5	100	0	VC 1708
8984	22.5	100	0	VC 1708
8985	22.5	100	0	VC 1708
8986	22.5	100	0	VC 1708
8987	22.5	100	0	VC 1708
8988	22.5	100	0	VC 1708
8989	22.5	100	0	VC 1708
8990	22.5	100	0	VC 1708
8991	22.5	100	0	VC 1708
8992	22.5	100	0	VC 1708
8993	22.5	100	0	VC 1708
8994	22.5	100	0	VC 1708
8995	22.5	100	0	VC 1708
8996	22.5	100	0	VC 1708
8997	22.5	100	0	VC 1708
8998	22.5	100	0	VC 1708
8999	22.5	100	0	VC 1708
9000	22.5	100	0	VC 1708





**WASTE WATER SYMBOLS**

Symbol	Material
(Blue circle)	Cast Iron
(Red circle)	Steel
(Green circle)	Aluminum
(Purple circle)	Concrete
(Orange circle)	Plastic
(Yellow circle)	Unspecified

**ABANDONED PIPE**

Symbol	Material
(Blue dashed line)	Cast Iron
(Red dashed line)	Steel
(Green dashed line)	Aluminum
(Purple dashed line)	Concrete
(Orange dashed line)	Plastic
(Yellow dashed line)	Unspecified

**MANHOLE FUNCTION**

Symbol	Function
(Circle with 'S')	Sanitary
(Circle with 'V')	Vent
(Circle with 'C')	Combined
(Circle with 'E')	Electric
(Circle with 'F')	Flow
(Circle with 'R')	Rising Main
(Circle with 'H')	Highway Drain
(Circle with 'S')	Sludge Basin

**MANHOLE MATERIAL**

Symbol	Material
(Circle with 'D')	Ductile Iron
(Circle with 'P')	Polypropylene
(Circle with 'S')	Steel
(Circle with 'V')	Vitrified Clay
(Circle with 'P')	Polypropylene
(Circle with 'F')	Fiberglass
(Circle with 'M')	Masonry
(Circle with 'C')	Concrete
(Circle with 'U')	Unspecified

**MANHOLE SHAPE**

Symbol	Shape
(Circle)	Circle
(Square)	Square
(Triangle)	Triangle
(Rectangle)	Rectangle
(Hexagon)	Hexagon
(Octagon)	Octagon
(Star)	Star

**MANHOLE FINISH**

Symbol	Finish
(Circle with 'T')	Throated
(Circle with 'A')	Arch
(Circle with 'B')	Barrel
(Circle with 'H')	Horizontal
(Circle with 'U')	Unspecified

**MANHOLE SIZE**

Symbol	Size
(Circle with '18')	18" Diameter
(Circle with '24')	24" Diameter
(Circle with '30')	30" Diameter
(Circle with '36')	36" Diameter
(Circle with '42')	42" Diameter
(Circle with '48')	48" Diameter
(Circle with '54')	54" Diameter
(Circle with '60')	60" Diameter
(Circle with '66')	66" Diameter
(Circle with '72')	72" Diameter
(Circle with '78')	78" Diameter
(Circle with '84')	84" Diameter
(Circle with '90')	90" Diameter
(Circle with '96')	96" Diameter
(Circle with '102')	102" Diameter
(Circle with '108')	108" Diameter
(Circle with '114')	114" Diameter
(Circle with '120')	120" Diameter
(Circle with '126')	126" Diameter
(Circle with '132')	132" Diameter
(Circle with '138')	138" Diameter
(Circle with '144')	144" Diameter
(Circle with '150')	150" Diameter
(Circle with '156')	156" Diameter
(Circle with '162')	162" Diameter
(Circle with '168')	168" Diameter
(Circle with '174')	174" Diameter
(Circle with '180')	180" Diameter
(Circle with '186')	186" Diameter
(Circle with '192')	192" Diameter
(Circle with '198')	198" Diameter
(Circle with '204')	204" Diameter
(Circle with '210')	210" Diameter
(Circle with '216')	216" Diameter
(Circle with '222')	222" Diameter
(Circle with '228')	228" Diameter
(Circle with '234')	234" Diameter
(Circle with '240')	240" Diameter
(Circle with '246')	246" Diameter
(Circle with '252')	252" Diameter
(Circle with '258')	258" Diameter
(Circle with '264')	264" Diameter
(Circle with '270')	270" Diameter
(Circle with '276')	276" Diameter
(Circle with '282')	282" Diameter
(Circle with '288')	288" Diameter
(Circle with '294')	294" Diameter
(Circle with '300')	300" Diameter

**MANHOLE LOCATION**

Symbol	Location
(Circle with '1')	1st Class
(Circle with '2')	2nd Class
(Circle with '3')	3rd Class
(Circle with '4')	4th Class
(Circle with '5')	5th Class
(Circle with '6')	6th Class
(Circle with '7')	7th Class
(Circle with '8')	8th Class
(Circle with '9')	9th Class
(Circle with '0')	0th Class

**LEGEND**

Control Kink  
Unspecified

Station	Material	Size	Length	Depth	Flow	Notes
1+00	Cast Iron	18"	100'	4'	100	
1+100	Cast Iron	18"	100'	4'	100	
1+200	Cast Iron	18"	100'	4'	100	
1+300	Cast Iron	18"	100'	4'	100	
1+400	Cast Iron	18"	100'	4'	100	
1+500	Cast Iron	18"	100'	4'	100	
1+600	Cast Iron	18"	100'	4'	100	
1+700	Cast Iron	18"	100'	4'	100	
1+800	Cast Iron	18"	100'	4'	100	
1+900	Cast Iron	18"	100'	4'	100	
2+000	Cast Iron	18"	100'	4'	100	
2+100	Cast Iron	18"	100'	4'	100	
2+200	Cast Iron	18"	100'	4'	100	
2+300	Cast Iron	18"	100'	4'	100	
2+400	Cast Iron	18"	100'	4'	100	
2+500	Cast Iron	18"	100'	4'	100	
2+600	Cast Iron	18"	100'	4'	100	
2+700	Cast Iron	18"	100'	4'	100	
2+800	Cast Iron	18"	100'	4'	100	
2+900	Cast Iron	18"	100'	4'	100	
3+000	Cast Iron	18"	100'	4'	100	
3+100	Cast Iron	18"	100'	4'	100	
3+200	Cast Iron	18"	100'	4'	100	
3+300	Cast Iron	18"	100'	4'	100	
3+400	Cast Iron	18"	100'	4'	100	
3+500	Cast Iron	18"	100'	4'	100	
3+600	Cast Iron	18"	100'	4'	100	
3+700	Cast Iron	18"	100'	4'	100	
3+800	Cast Iron	18"	100'	4'	100	
3+900	Cast Iron	18"	100'	4'	100	
4+000	Cast Iron	18"	100'	4'	100	
4+100	Cast Iron	18"	100'	4'	100	
4+200	Cast Iron	18"	100'	4'	100	
4+300	Cast Iron	18"	100'	4'	100	
4+400	Cast Iron	18"	100'	4'	100	
4+500	Cast Iron	18"	100'	4'	100	
4+600	Cast Iron	18"	100'	4'	100	
4+700	Cast Iron	18"	100'	4'	100	
4+800	Cast Iron	18"	100'	4'	100	
4+900	Cast Iron	18"	100'	4'	100	
5+000	Cast Iron	18"	100'	4'	100	
5+100	Cast Iron	18"	100'	4'	100	
5+200	Cast Iron	18"	100'	4'	100	
5+300	Cast Iron	18"	100'	4'	100	
5+400	Cast Iron	18"	100'	4'	100	
5+500	Cast Iron	18"	100'	4'	100	
5+600	Cast Iron	18"	100'	4'	100	
5+700	Cast Iron	18"	100'	4'	100	
5+800	Cast Iron	18"	100'	4'	100	
5+900	Cast Iron	18"	100'	4'	100	
6+000	Cast Iron	18"	100'	4'	100	
6+100	Cast Iron	18"	100'	4'	100	
6+200	Cast Iron	18"	100'	4'	100	
6+300	Cast Iron	18"	100'	4'	100	
6+400	Cast Iron	18"	100'	4'	100	
6+500	Cast Iron	18"	100'	4'	100	
6+600	Cast Iron	18"	100'	4'	100	
6+700	Cast Iron	18"	100'	4'	100	
6+800	Cast Iron	18"	100'	4'	100	
6+900	Cast Iron	18"	100'	4'	100	
7+000	Cast Iron	18"	100'	4'	100	
7+100	Cast Iron	18"	100'	4'	100	
7+200	Cast Iron	18"	100'	4'	100	
7+300	Cast Iron	18"	100'	4'	100	
7+400	Cast Iron	18"	100'	4'	100	
7+500	Cast Iron	18"	100'	4'	100	
7+600	Cast Iron	18"	100'	4'	100	
7+700	Cast Iron	18"	100'	4'	100	
7+800	Cast Iron	18"	100'	4'	100	
7+900	Cast Iron	18"	100'	4'	100	
8+000	Cast Iron	18"	100'	4'	100	
8+100	Cast Iron	18"	100'	4'	100	
8+200	Cast Iron	18"	100'	4'	100	
8+300	Cast Iron	18"	100'	4'	100	
8+400	Cast Iron	18"	100'	4'	100	
8+500	Cast Iron	18"	100'	4'	100	
8+600	Cast Iron	18"	100'	4'	100	
8+700	Cast Iron	18"	100'	4'	100	
8+800	Cast Iron	18"	100'	4'	100	
8+900	Cast Iron	18"	100'	4'	100	
9+000	Cast Iron	18"	100'	4'	100	
9+100	Cast Iron	18"	100'	4'	100	
9+200	Cast Iron	18"	100'	4'	100	
9+300	Cast Iron	18"	100'	4'	100	
9+400	Cast Iron	18"	100'	4'	100	
9+500	Cast Iron	18"	100'	4'	100	
9+600	Cast Iron	18"	100'	4'	100	
9+700	Cast Iron	18"	100'	4'	100	
9+800	Cast Iron	18"	100'	4'	100	
9+900	Cast Iron	18"	100'	4'	100	
10+000	Cast Iron	18"	100'	4'	100	
10+100	Cast Iron	18"	100'	4'	100	
10+200	Cast Iron	18"	100'	4'	100	
10+300	Cast Iron	18"	100'	4'	100	
10+400	Cast Iron	18"	100'	4'	100	
10+500	Cast Iron	18"	100'	4'	100	
10+600	Cast Iron	18"	100'	4'	100	
10+700	Cast Iron	18"	100'	4'	100	
10+800	Cast Iron	18"	100'	4'	100	
10+900	Cast Iron	18"	100'	4'	100	
11+000	Cast Iron	18"	100'	4'	100	
11+100	Cast Iron	18"	100'	4'	100	
11+200	Cast Iron	18"	100'	4'	100	
11+300	Cast Iron	18"	100'	4'	100	
11+400	Cast Iron	18"	100'	4'	100	
11+500	Cast Iron	18"	100'	4'	100	
11+600	Cast Iron	18"	100'	4'	100	
11+700	Cast Iron	18"	100'	4'	100	
11+800	Cast Iron	18"	100'	4'	100	
11+900	Cast Iron	18"	100'	4'	100	
12+000	Cast Iron	18"	100'	4'	100	
12+100	Cast Iron	18"	100'	4'	100	
12+200	Cast Iron	18"	100'	4'	100	
12+300	Cast Iron	18"	100'	4'	100	
12+400	Cast Iron	18"	100'	4'	100	
12+500	Cast Iron	18"	100'	4'	100	
12+600	Cast Iron	18"	100'	4'	100	
12+700	Cast Iron	18"	100'	4'	100	
12+800	Cast Iron	18"	100'	4'	100	
12+900	Cast Iron	18"	100'	4'	100	
13+000	Cast Iron	18"	100'	4'	100	
13+100	Cast Iron	18"	100'	4'	100	
13+200	Cast Iron	18"	100'	4'	100	
13+300	Cast Iron	18"	100'	4'	100	
13+400	Cast Iron	18"	100'	4'	100	
13+500	Cast Iron	18"	100'	4'	100	
13+600	Cast Iron	18"	100'	4'	100	
13+700	Cast Iron	18"	100'	4'	100	
13+800	Cast Iron	18"	100'	4'	100	
13+900	Cast Iron	18"	100'	4'	100	
14+000	Cast Iron	18"	100'	4'	100	
14+100	Cast Iron	18"	100'	4'	100	
14+200	Cast Iron	18"	100'	4'	100	
14+300	Cast Iron	18"	100'	4'	100	
14+400	Cast Iron	18"	100'	4'	100	
14+500	Cast Iron	18"	100'	4'	100	
14+600	Cast Iron	18"	100'	4'	100	
14+700	Cast Iron	18"	100'	4'	100	
14+800	Cast Iron	18"	100'	4'	100	
14+900	Cast Iron					

APPENDIX C: HR Wallingford UKSuDS Greenfield Runoff Estimate

Print

Close Report



# Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

**Site Details**

Latitude:

Longitude:

Reference:

Date:

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

Runoff estimation approach

### Site characteristics

Total site area (ha):

### Methodology

QBAR estimation method:

SPR estimation method:

### Soil characteristics

Default Edited

SOIL type:

HOST class:

SPR/SPRHOST:

### Hydrological characteristics

Default Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

### Notes

#### (1) Is QBAR < 2.0 l/s/ha?

When QBAR is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

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

#### (3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates	Default	Edited
QBAR (l/s):	<input type="text" value="12.68"/>	<input type="text" value="12.68"/>
1 in 1 year (l/s):	<input type="text" value="11.03"/>	<input type="text" value="11.03"/>
1 in 30 years (l/s):	<input type="text" value="21.55"/>	<input type="text" value="21.55"/>
1 in 100 year (l/s):	<input type="text" value="26.37"/>	<input type="text" value="26.37"/>
1 in 200 years (l/s):	<input type="text" value="30.05"/>	<input type="text" value="30.05"/>

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://www.uksuds.com). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at [www.uksuds.com/terms-and-conditions.htm](http://www.uksuds.com/terms-and-conditions.htm). The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX D: Environment Agency Flood Map for Planning

# Flood map for planning

Your reference  
**Parcel G, Ingol**

Location (easting/northing)  
**351762/432595**

Created  
**30 Sep 2022 13:37**

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

## Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

## Flood map for planning

Your reference  
**Parcel G, Ingol**

Location (easting/northing)  
**351762/432595**

Scale  
**1:2500**

Created  
**30 Sep 2022 13:37**



-  Selected area
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



## APPENDIX E: Wastewater Predevelopment Enquiry and Response

# Wastewater pre-development enquiry

Getting water for your new development initial planning stage



This form is for all first time enquiries you may have when planning your development.

If your enquiry relates to advice on **connection points and discharge rates**, please complete all sections, providing as much information as you have available. You will notice some fields are marked as optional, all other fields are mandatory.

For **all other enquiries**, please complete Sections 1, 2, 7 and 8.

When answering the yes/no questions please mark an 'x' in the appropriate box.

**All enquiries must be accompanied by a site location plan, clearly identifying the site boundary.**

Once completed, please return this form by email to [WastewaterDeveloperServices@uuplc.co.uk](mailto:WastewaterDeveloperServices@uuplc.co.uk) or post to United Utilities, Developer Services and Planning, Warrington North Wastewater Treatment Works, Gatewarth Industrial Estate, Off Liverpool Road, Warrington, WA5 1DS.

We aim to respond to enquiries within 15 working days from receipt of your completed enquiry form.

Section 1: About you							
	Applicant			Agent (if applicable)			
Name							
Company's name							
Home or company address (including postcode)							
Contact telephone number (a mobile number is fine)							
Email							
What is your enquiry							
Who should we send the enquiry response to?	Applicant	<input type="checkbox"/>	Agent	<input type="checkbox"/>	Both	<input type="checkbox"/>	
Section 2: About your site							
Site name							
Site Address (or nearest main road)							
Site grid reference (mid point)	X:		Y:				
Approx. number of dwellings							
Total site area (hectares)							
Site name							
Development area (hectares) (Optional)							
Estimated onsite date (Optional)							
Estimated first occupation (Optional)							
Does the site have planning permission	Full	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Application submitted	<input type="checkbox"/>	Planning ref (if applicable)	
	Outline	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Application submitted	<input type="checkbox"/>	Planning ref (if applicable)	
Have you approached us about this site previously?	Yes <input type="checkbox"/>		No <input type="checkbox"/>		If yes, please provide Ref No. and/or contact details		

### Section 3: Your site drainage strategy

Type of site	GREENFIELD (Go to Q 3.1) <input type="checkbox"/>	BROWNFIELD (Go to Q 3.2) <input type="checkbox"/>
<b>3.1 Greenfield site (Optional)</b>	Confirmed attachment:	
Please provide full calculations to show existing greenfield run off rates	Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>3.2 Brownfield site (Optional)</b>	Confirmed attachment:	
Please provide a plan showing existing foul water drainage from this site to the public sewer network (including location of existing drains, pipe sizes and points of connection)	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Please provide a plan showing the existing surface water drainage from this site to the public sewer network, including location of existing drains, pipe sizes and points of connection	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Will this development produce trade effluent?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
If yes, have you applied for a trade effluent consent from United Utilities?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Do you intend to discharge highways drainage to the public sewer network?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
If yes, to which sewer?		

### Section 4: Foul water connection

Are you proposing to use an existing connection to the public sewer?	Yes <input type="checkbox"/> No <input type="checkbox"/>
If <b>Yes</b> , please provide manhole number or grid reference number If <b>no</b> , please provide the proposed flow rate and connection points (litres per second)	
Is the foul water discharge to be pumped?	Yes <input type="checkbox"/> No <input type="checkbox"/>

### Section 5: Surface water connection

If you are proposing to connect surface water to a public sewer, please attach evidence that all options for Sustainable Urban Drainage Systems (SUDs) have been explored in accordance with part H of the Building Regulations 2010.

Details of SUDs can be found at [http://www.ciria.com/sudsdesign\\_guidance.htm](http://www.ciria.com/sudsdesign_guidance.htm)

How do you propose to drain surface water from the site?	SUDs (Go to Section 6) <input type="checkbox"/>	Discharge to public sewer (Go to Q5.1) <input type="checkbox"/>
<b>5.1</b> Does the site have existing surface water connections to the public sewer?	Yes (Go to Q5.2) <input type="checkbox"/>	No (Go to Q5.3) <input type="checkbox"/>
<b>5.2</b> Proposed surface water discharging to public sewer via <b>existing connection</b>		
Are you proposing to use an existing connection?	Yes <input type="checkbox"/>	No (Go to Q5.3) <input type="checkbox"/>
If <b>yes</b> , please provide manhole number or grid reference number & proposed flow rates		
<b>5.3</b> Proposed surface water discharging to public sewer via a <b>new connection</b>		
Have you completed a flood risk assessment in support of your planning application?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is the surface water to be controlled? (Optional)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is the surface water to be pumped?(Optional)	Yes <input type="checkbox"/>	No <input type="checkbox"/>

### Section 6: Development details (Optional)

Is the development part of a larger site that will be developed in phases or will be subject to separate planning applications? If <b>yes</b> , please provide details below.	Yes <input type="checkbox"/> No <input type="checkbox"/>						
<b>Phase number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Start date on site							
Anticipated date of first occupation							
Anticipated completion date							
No. of dwellings							
Sustainability code for dwellings							
Public houses and/or restaurants	No. of seats						
	Floor space (m <sup>2</sup> )						
Hotels: Total No. of beds							
Schools: Total No. of pupils							
Hospitals: Total No. of beds							
Retail units: Total No. of units							
Office space: Total No. of units							
Industrial / manufacturing: Total No. of units							
Other: Foul water (litres per second)							

**Section 7: Supporting information**

Please confirm you have included all supporting information in relation to your enquiry

Site location plan	<input type="checkbox"/> Yes <input type="checkbox"/> No
Site boundary	<input type="checkbox"/> Yes <input type="checkbox"/> No
Proposed drainage layout plan <i>(optional)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Indicative layout plan <i>(optional)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Calculations in support of proposed flow rates or run off rates <i>(optional)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Flood risk assessment <i>(if appropriate)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Section 8: Declaration**

I understand that the submission of this form is to be treated as a preliminary enquiry and the information may be subject to change. In particular, I understand that the information United Utilities Water Limited provides in response is valid only in conjunction with the information provided in relation to this enquiry, any changes to regulation or development layout will invalidate our response.

Name		Signature	
Company		Date	<input type="text" value="D"/> <input type="text" value="D"/> <input type="text" value="M"/> <input type="text" value="M"/> <input type="text" value="Y"/> <input type="text" value="Y"/> <input type="text" value="Y"/> <input type="text" value="Y"/>

**UU use only**

Date received	<input type="text" value="D"/> <input type="text" value="D"/> <input type="text" value="M"/> <input type="text" value="M"/> <input type="text" value="Y"/> <input type="text" value="Y"/> <input type="text" value="Y"/> <input type="text" value="Y"/>	UUW Ref No	\
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**About us**

United Utilities is the North West's water company. We keep the taps flowing and toilets flushing for seven million customers every day. From Crewe to Carlisle, we work hard behind the scenes to help your life flow smoothly.