

HOLLYMOUNT FARM, GREENMOUNT, BURY

SUSTAINABLE DRAINAGE STRATEGY

Job Number: FRA 22 1030

Date: April 2022

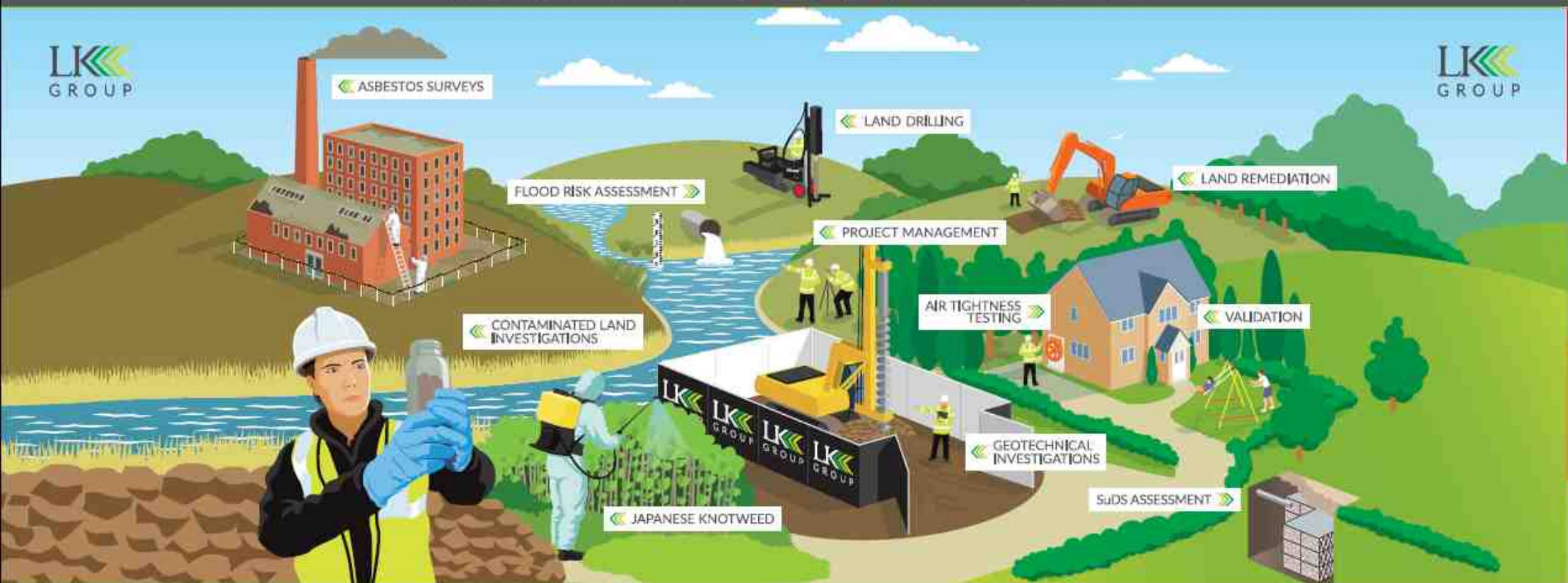
Client: Keystone Projects (Hawkshaw) Ltd



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LK Consult			
Document Verification			
Site Address	Hollymount Farm, Hollymount Lane, Greenmount, Bury, Greater Manchester, BL8 4HP		
Report Title	Sustainable Drainage Strategy		
Job Number	FRA 22 1030	Document Ref.	FRA 22 1030 - R0
Date Issued	April 2022	Report Version	R0
Prepared By	Jenna Lowe – Graduate Flood Risk Assessor	Reviewed By	Anna Mierzejewska – Environmental Scientist

Revision Record			
Revision No.	Date	Nature of Revision	Approved By

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EXECUTIVE SUMMARY

Scope and Background

This Sustainable Drainage (SuDS) Strategy has been undertaken by LK Consult Ltd (LKC) to support a planning application for the development of land at Hollymount Farm, Greenmount, Bury. The development comprises residential properties with associated gardens and soft landscaping.

LKC has prepared this SuDS Strategy in line with the NPPF and Technical Guidance where appropriate.

Consultations

Bury Metropolitan Borough Council – Lead Local Flood Authority and United Utilities have been contacted during preparation of this report.

The Environment Agency (EA) website has been utilised to assess if there are any limitations that may affect the form of SuDS that may be appropriate to this site. The records show that the site is within Flood Zone 1.

Drainage Strategy

Ground conditions beneath the site are recorded as Till, Devensian Superficial Deposits to the northwest and River Terrace Deposits (Sand and Gravel) to the southeast of the site over Pennine Lower Coal Measures Formation (Mudstone, Siltstone and Sandstone) Bedrock which have been confirmed by BGS records.

The site slopes down from the northwest to the south. From the south there is a steeper decline down towards the watercourse (Kirklees Brook). The site has an existing connection of the surface water drainage to the watercourse and a foul connection to the local public sewers.

The outline drainage strategy considers the use of infiltration-based SuDS not to be feasible given the underlying geology and the site constraints. It is assumed that surface water runoff arising from the development will discharge into the watercourse to the south of the site.

The most effective strategy, in line with the SuDS management train, would be to have a detention facility located within the site boundary.

The flows from the site should be restricted to an acceptable level to the Lead Local Flood Authority and the EA considering that this is classed as a Main River.

A significant area of the proposed development will replace current hard surfacing with soft landscaping and gardens. Therefore, the proposed development will decrease the proportion of the site covered by impermeable surfaces and will therefore generate less runoff. Attenuation will be required to allow for climate change and restrictions placed upon the proposed development due to planning requirements.

The estimated volume can be stored within the site boundary.

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1 Introduction

1.1 Background

LK Consult Ltd (LKC) were commissioned by Keystone Projects (Hawkshaw) Ltd to carry out a Sustainable Drainage Strategy for land at Hollymount Farm, Greenmount, Bury. The report was undertaken in support of a planning application to redevelop the site for residential use.

The report will consider the impact of the development on surface water runoff accounting for climate change. The sustainable drainage assessment in Section 4 will provide an overview of the SuDS techniques which could be considered on the site.

This preliminary SuDS assessment complies with the principles presented in the Draft National Standards for Sustainable Drainage Systems (Defra, 2015)¹ and the Planning Practice Guidance (PPG) March 2014². The sustainable drainage assessment is presented with reference to the hydrological and hydrogeological context of the development.

The report findings are based upon professional judgement and are summarised below. The report includes baseline data from the Environment Agency (EA), rainfall data from the Wallingford Studies and Hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

Drainage on the site has been assessed by considering the following key constraints:

- » Topography of the site.
- » Local water features and hydrological context.
- » Underlying geology, soil types and permeability.
- » Layout and geometry of the proposed development.

¹ Non-statutory Technical Standards for Sustainable Drainage Systems – DEFRA March 2015

² Planning Practice Guidance – Department for Communities and Local Government July 2021

1.2 Site Details

A summary of the general site details is presented in Table 1-1. Plans, Drawings and Figures are provided in Appendix A. Figure 1 indicates the site location and boundary. Figure 2 indicates the proposed development.

Site Details	
Location	Hollymount Farm, Hollymount Lane, Greenmount, Bury, Greater Manchester, BL8 4HP. Centred at approximate National Grid Reference 377280E, 414000N.
Area	Approximately 0.55 Ha.
Topography	Approximately 137.73 metres above ordnance datum (AOD) in the north and 136.71m AOD in the south. The site is 136.75m AOD to the east and 141.03m AOD to the northwest. Towards the pastureland south of the site and adjacent to the watercourse it is 135.20m AOD. The site is sloping down from the northwest towards the south.
Current Land Use	<u>Site</u> The site is a former farm site consisting of residential properties, a farm stead, and outbuildings. The ground is predominantly hardstood with small areas of rough grasslands throughout. A maintained grassland area with associated trees is located to the northern boundary. <u>Surrounding Area/ Boundary Treatment</u> North: Hollymount Lane and Greenmount Golf Course beyond. Residential property to the northwest. East: Hollymount Lane and Pastureland. South: Pastureland and the Kirklees Brook. West: Pastureland.
Proposed Development	Residential houses with associated gardens and soft landscaping. Access will not change and will be from Hollymount Lane.

Table 1-1: Summary of site details.

2 Site Setting

2.1 Environmental Setting

LKC has undertaken a review of public domain information including British Geological Survey data, Environment Agency data, historical mapping, and aerial photography to provide a summary of the environmental setting of the site. This is summarised in Table 2-1 below.

Summary of the Environmental Setting			
Geology	Superficial		Till (Diamicton) in the northwest of the site. River Terrace Deposits (Sand and Gravel) in the southeast of the site.
	Bedrock		Pennine Lower Coal Measures Formation (Mudstone, Siltstone And Sandstone).
	BGS Boreholes		No borehole records within the vicinity of the site.
	Defra Soilscape Mapping		Type 17 - Slowly permeable seasonally wet acid loamy and clayey soils.
	Aquifer Designation	Superficial	Secondary (Undifferentiated) Aquifer to the northwest of the site. Secondary A Aquifer to the southeast of the site.
		Bedrock	Secondary A Aquifer.
	Source Protection Zone (SPZ)		Site not within an SPZ.
Flood Zone (EA)	The site is within Fluvial Flood Zone 1. Very Low risk, with annual probability of flooding from rivers and the sea of less than 0.1% (1 in 1000).		
Hydrology	All adjacent and internal surface water	Kirklees Brook is located approximately 85m south of the site and flows in a south-easterly direction towards the River Irwell. This is mapped as a Main River on the EA mapping website. An ordinary watercourse is located approximately 85m east of the site adjacent to Greenmount Golf Course which flows in a southerly direction and feeds into Kirklees Brook. This is partially culverted underneath Holly Mount Lane. A cluster of reservoirs and millponds are located approximately 550m to the southeast of the site adjacent to Kirklees Brook. There are two existing connections from the site towards the watercourse to the south.	
Site History	Historical mapping indicates that the site has consisted of a farm (Lower Buckley Fold) since at least 1850 and the surrounding ground has remained pasturelands. Kirklees Brook has also been present since at least 1850. A reservoir was located approximately 110m to the southwest of the site from 1850 until 1982 when it was likely infilled. Greenmount Golf Course has been present since 1931 mapping and is laden with 'sinks' which flow towards the north of the site boundary and Kirklees Brook. A stream is also located in the golf course to the east and flows in a southerly direction into Kirklees Brook.		

Table 2-1: Summary of the Environmental Setting.

2.2 Site Reconnaissance

A site reconnaissance was undertaken in March 2022. Relevant features identified on site are summarised below:

- » The site is accessible off Hollymount Lane.
- » The west of the site is currently used for residential use. Several buildings (farmstead) are located to the centre including barns, a canopy building and farming equipment. Several storage containers are located within the yard and in the northwest of the site.
- » Compacted sub-base gravel is present to the east. The remainder of the site predominantly consists of tarmac, with small areas of soft landscaping/grassed and paved areas.
- » A stone wall is present along the site access road above which a landscaped area with trees and shrubs is present.
- » The site is observed to have positive drainage with connections to the watercourse.
- » Surface water drainage of the properties and access road to the north is observed to drain towards a drainage pipe running between the property and the yard and flows further to the south.
- » Several gullies and manholes are noted across the former farm areas, which drain to the south. A manhole cover is located within the boundary towards the south of the site which connects to a further manhole cover located south of the property within the pastureland. Water was observed flowing through this towards the brook.
- » A drainage outlet into the brook was observed. The topographical survey indicates there are two outfalls into the brook.
- » A combined sewer is observed running through the west of the site.
- » Adjacent to the southern boundary is pastureland and the Kirklees Brook which flows from the west to the east of the site.

Relevant photographs are provided in Plate 2-1.

	
Photograph 1: Site access road (Hollymount Lane).	Photograph 2: Drainage gullies to the northern boundary.
	
Photograph 3: Stone wall to the northern boundary adjacent to the disused outbuilding.	Photograph 4: Further drainage gullies to the north within the paved area.
	
Photograph 5: Roof downpipes from one of the dwellings.	Photograph 6: Gutters on one of the barns to the eastern central area.

Plate 2-1: Site photographs.

	
Photograph 7: Manhole cover located to the southern site boundary adjacent to the pastureland.	Photograph 8: Manhole cover located further south outside of the site boundary.
	
Photograph 9: View of the site sloping down towards the south and Kirklees Brook.	Photograph 10: View of the site from the south facing northwards.
	
Photograph 11: One of two drainage outfalls from the site to Kirklees Brook.	Photograph 12: View of Kirklees Brook to the south of the site.

Plate 2-1: Site photographs (continued).

2.3 Site Levels

A topographic survey of the site has been undertaken to OS GPS datum, and information is included on the drawings in Appendix B. The site falls from the northwest towards the south. The elevation ranges from 141.03m AOD in the northwest to approximately 136.71m AOD in the south. From the southern boundary the adjacent area slopes down towards the watercourse reaching an elevation of 135.20m AOD.

3 Consultation

Information from consultees is summarised in Table 3-1 below.

Relevant correspondence / information is provided in Appendix C.

Source	Details	
Bury Metropolitan Borough Council (LLFA)	No information provided at the time of writing from Bury Council. Bury Council would normally require that Non-statutory technical standards for SuDS were followed.	
United Utilities (UU)	Sewer Map	No public surface water sewers within the vicinity of the site. There is a 150mm diameter combined sewer running through the site from the northern boundary towards the south which feeds into a 300mm diameter combined sewer for the remainder of the site boundary. This joins a further 300mm diameter combined sewer adjacent to the watercourse to the south of the site and runs in an easterly direction.
	Likely conditions for connecting into their sewerage system	UU would request conditions for a separate system with only foul draining to foul / combined sewers and surface water draining to soakaway/SuDS, watercourse, or surface water sewer. UU Wastewater Developer Services was contacted regarding sewer flooding history for the site. UU confirmed that they did not have any record of internal or external sewer flooding of properties in the vicinity of the site as a result of overloaded sewers. All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80 of the National Planning Practice Guidance. Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible. If infiltration or a connection into a waterbody is not feasible, UU will consider a connection to the 150mm diameter public combined sewer located within the site boundary at a pass forward flow to be agreed by the Lead Local Flood Authority. UU request that any agreed rate does not exceed 6l/s. Foul flow from the site will be allowed to drain into the public combined sewer system. UU's preferred point of discharge would be to the 150mm diameter public combined sewer on site at an unrestricted rate. UU will require unrestricted access to the public combined sewer recorded on site for maintenance purposes. They asked for a minimum clearance of 6m which is measured 3m from the centre line of the pipe.

Table 3-1: Summary of Consultee Information.

4 Sustainable Drainage Strategy

4.1 Introduction

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS), this being complementary to the control of development within the floodplain.

SuDS will not alleviate flooding in an area prone to flooding; however, properly designed SuDS have the potential to prevent the surface water runoff from new development worsening the flood risk. The effective disposal of surface water from development is a material planning consideration in determining proposals for the development and use of land.

The accepted principles are that surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

The Building Regulations Requirement H3³ stipulates that rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following, listed in order of priority:

- an adequate soakaway or other adequate infiltration system,
- a watercourse or, where that is not practicable,
- a sewer.

The concept of a sustainable drainage system has been incorporated into the outline drainage strategy for the study area in order to comply with the Flood and Water Management Act 2010⁴.

Suitability of different SuDS will be governed by prevailing site conditions, such as the type and scale of development, topography, ground conditions (soil permeability, ground stability, depth to water table), local hydrogeology and risk of groundwater contamination (presence of sensitive aquifers and source protection zones) etc.

³ Building Regulations part H3 2010: Approved Document, Drainage and Waste Disposal.

⁴ Flood and Water Management Act 2010: UK Government.

4.2 Sustainable Drainage Hierarchy

4.2.1 Infiltration

The Groundwater Source Protection Zone mapping from the EA website shows that the site is not within any identified protection zones.

A summary of the British Geological Survey superficial and bedrock aquifer descriptions and classifications is shown in Table 4-1 below:

Classification	Description	Aquifer Classification	Recorded Water Table Depth	Soakaway Potential
Till (Devensian) to the northwest of the site	Diamicton	Secondary (Undifferentiated)	N/A	Poor
River Terrace Deposits to the southeast of the site	Sand and Gravel	Secondary A	N/A	Limited
Pennine Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Secondary A	N/A	Poor

Table 4-1: Geological and Hydrogeological Setting.

Infiltration methods such as soakaways are not likely to be feasible given the potential for groundwater flooding at the surface (BGS Mapping). There may be a continuity of the ground water table with the watercourse to the south within the sand and gravel, the proximity to the adjacent highway (where Sand and Gravel is anticipated) and the topography to the south of the site. However, this may be investigated further at the detailed design stage, if required.

There is a slope over the site and surrounding area which indicates that any groundwater in the vicinity of the site would likely drain towards the south.

4.2.2 Watercourses

There is an open watercourse running adjacent to the site that currently collects surface water. It is located to the south of the site.

4.2.3 Public Sewer

There is a combined sewer running through the site to the south which connects to a further combined sewer which runs in an easterly direction.

4.2.4 Other Sewers

There are private connections of the surface water drainage from the site to the watercourse.

4.3 Surface Water Drainage Strategy

Following the assessment of the site settings and existing constraints to the development. The drainage options relating to the final discharge of surface water for this section of the site are listed in Table 4-2 in order of priority within the NPPF:

Option No:	Drainage Solution	Most feasible solution	Reasoning
a	Soakaway/Infiltration	3	Soakaways are not likely to be feasible given the ground conditions and potential shallow water table beneath the site and the topography.
b	Connection to Watercourse	1	The most feasible solution would be to discharge water via the existing connection from the site into the Kirklees Brook located south of the site. Would require the LLFA and EA approval.
c	Discharge into a sewer	2	A connection into the 150mm diameter combined sewer on site would be possible – subject to approval from LLFA and connection consent from UU.

Table 4-2: Drainage options.

Table 4-3 provides a summary of the SuDS options appraisal with consideration of CIRIA C697 (The SUDS Manual)⁵ for the development:

SuDS Option	Appropriate to Development	Comments
Soakaways	X	Due to the nature of the ground conditions, the use of infiltration systems may not be feasible.
Infiltration basin	X	Depressions that store and dispose of water via infiltration. May not be appropriate given the ground conditions.
Sand filter	✓	Treatment devices using sand beds as filter media.
Filter drains	✓	Linear trenches filled with a permeable granular material, often with a perforated pipe in the base of the trench.
Detention basin	✓	Dry depressions designed to hold water for a specific retention time.
Swales	✓	Swales are shallow grass-lined channels that provide capacity for conveying flows at a controlled rate into ponds and watercourses.
Rainwater harvesting	*	Rainwater harvesting collects the rain which falls onto roofs, then stores it in a tank until required for a non-potable use. In the process, a volume of water is kept out of the storm-water management system, thereby helping to reduce flooding risks.
Green roofs	*	Green roof installations can help to reduce surface water runoff from roof areas depending on the system specified. Green roofs are not currently included in the development proposals.
Geo-cellular storage systems	✓	Modular block systems can be used to provide an underground storage facility. Any geo-cellular storage systems should be lined with a geo-membrane to provide attenuation storage.
Permeable Pavements – with granular and geo-cellular storage systems	✓	Permeable pavements allow inflow of rainwater into underlying construction. Any geo-cellular storage systems would have to be lined with an impermeable membrane to provide storage rather than infiltration for runoff from highways.
Ponds	✓	Attenuation ponds can be used to offset the increase in surface water flows attributable to increased area of hard standing, in order to minimise the risk of flooding to and from the proposed development. Ponds will attenuate the surface water flow prior to discharging to the public surface water sewers. The storage volume afforded by these features should not include any permanent water in the pond.
Oversized Pipes	✓	Oversizing the pipes that make up the on-site drainage network is a cost-effective method for providing attenuation storage within the network. Such systems could be considered on the parts of the development where gradients are relatively flat.
Tanks	✓	Prefabricated underground tanks could be considered at the detailed design stage in order to provide storage to attenuate surface water runoff.
Flow control devices	✓	The peak flow rates will be controlled by flow control devices e.g. hydrobrake style flow control systems, and restricted orifices. Flow control devices enable the discharge to be restricted to a constant rate from the development.

Table 4-3: Summary of the SuDS options appraisal.

Notes

✓ Suitable for use given the nature and scale of the development

* Possibly suitable for use – not included in the client and architect design proposal at present

X Not suitable

⁵ CIRIA C697 - The SUDS Manual. London 2015

4.4 Surface Water Attenuation Requirements

In line with the Non-Statutory technical guidance for SuDS, the flow from this previously developed site should be reduced by the minimum of 50% from the existing runoff rates for estimating the attenuation volumes required.

It is estimated from the supplied plan (see Appendix A) that the site will have the following designated areas (Table 4-4).

Designated Areas	Plot Area
Total area (ha)	0.5500
Existing Impermeable Area (ha)	0.5100
Green Infrastructure (ha)	0.0400
Proposed Catchment	
Catchment Area (ha)	0.5500
Impermeable Area (ha)	0.2135
Permeable Area (ha)	0.3365

Table 4-4: Assumed plot areas.

Table 4-4 shows the assumed areas included within the calculations.

It can be seen that there is a decrease in impermeable area from the existing usage to the proposed. This is likely to require attenuation to reduce the proposed flow off site to a level which is acceptable to the LLFA, including an allowance for climate change.

4.4.1 Attenuation Estimate

Surface water storage and brownfield runoff estimations based on the HR Wallingford procedure have been undertaken for the development and the output report is presented in Appendix D.

Q _{bar} :	64.20 l/s
1 in 1-year runoff rate:	45.90 l/s
1 in 30-year runoff rate:	112.30 l/s
1 in 100-year runoff rate:	141.70 l/s

This reduced by 50% would give the following rates:

Q _{bar} :	32.10 l/s
1 in 1-year runoff rate:	22.95 l/s
1 in 30-year runoff rate:	56.15 l/s
1 in 100-year runoff rate:	70.85 l/s

For the contributing catchment an estimate has been produced assuming a roof and hardstanding area of 0.2135ha and a garden / soft landscaped area of 0.3365ha from the 0.5500ha plot. The following attenuation has been estimated for the development using the brownfield reduced runoff rate and utilises the FSR methodology⁶ as:

- Attenuation storage volume: **2.9 m³** (1 in 30-year event)
- Retention on site volume: **7.1 m³** (1 in 100 year + 20% Climate Change)
- Retention on site volume: **11.6 m³** (1 in 100 year + 40% Climate Change)

⁶ Flood Studies Report Wallingford NERC 1975.

Attenuation storage aims to limit the peak rate of runoff from the development to the corresponding reduced brownfield runoff for a range of annual flow rate probabilities before discharging to the watercourse. As the flow from the development would be reduced there should be little change in the flows that enter the watercourse and thus the risk of flooding and the level of erosion created as a result from the development should not increase the risk of flooding off-site.

The attenuation required for a 1 in 30-year storm event, requires a storage volume of **2.9 m³** and for the 1 in 100-year event, a storage capacity of between **7.1 m³** and **11.6 m³** will be required from on-site storage as well as SuDS systems. All volumes can be stored within the site boundary and discharges will be limited by flow control devices to the adjacent watercourse.

4.5 Site Specific SuDS

The use of attenuation SuDS are deemed to be the most feasible and practical option for the development. The attenuation basin, pond or similar will provide the required storage volume to limit peak runoff arising from the development.

Utilising of the flow control device at the end of the system will control the peak flow rates.

There are areas where conveyance systems such as swales may be utilised to intercept overland flow arising from the north and to convey any water to the existing watercourse in the south. This will provide an effective pre-treatment of suspended solids through filtration and sedimentation and will also provide ecological and amenity benefits.

The use of permeable paving may be viable dependant on the detailed design of the proposed development. If this drainage technique is considered to be feasible then it will reduce the requirement for attenuation as it will reduce the contributing impermeable area. The permeable paving will also provide some level of water treatment reducing effects of pollution in runoff on the environment.

Assuming that the outline drainage strategy is acceptable to the Local Authority, a more detailed design can be presented and agreed with the appropriate regulatory bodies during the detailed design phase.

4.6 Foul Drainage

The foul water could be discharged by gravity into the 150mm diameter combined sewer within the site boundary as relative levels indicate that this will be feasible in terms of fall. The manhole (no 2902) within the south of the site would be feasible as a potential point of discharge from the onsite foul drainage. The nearest recorded invert level was within manhole no 2901 located off site. The invert level is 132.66m AOD.

5 Conclusion

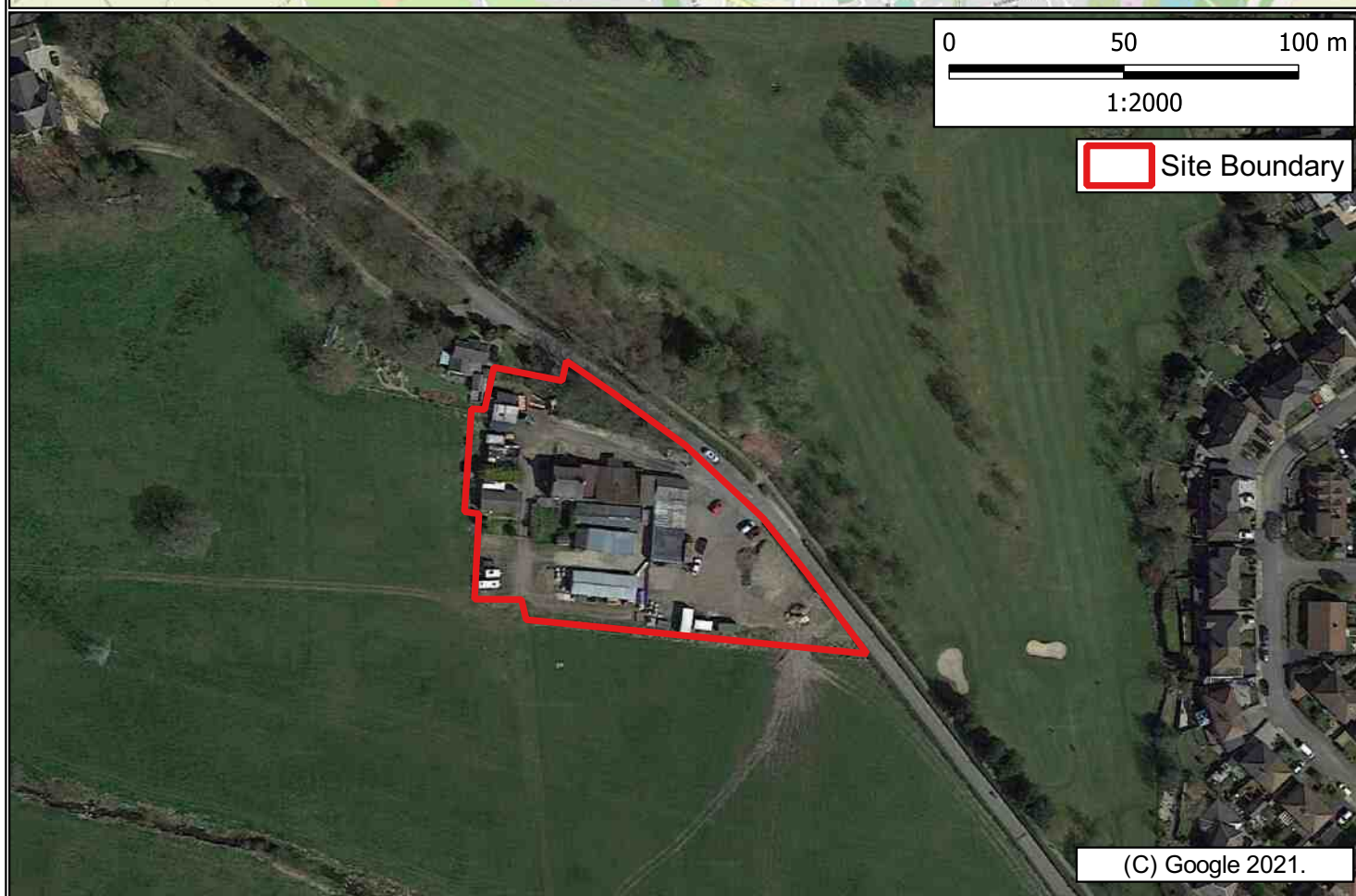
The site is a former farm and currently consists of residential properties with associated outbuildings (farm stead) and a yard to the east. The proposal is to develop residential properties with gardens and soft landscaping.

An assessment of the site settings and existing constraints in conjunction with the development proposals have resulted in the following recommendations for the safe development of the site:

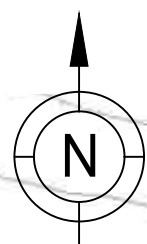
- » The recorded geology on site, sloping topography and close proximity of the highway would indicate that infiltration may not be feasible. This may be investigated at the detailed design stage by means of undertaking permeability testing, if required.
- » Surface water flow will probably need to be attenuated to the reduced runoff rate or a rate agreed with the LLFA.
- » The attenuation required for a 1 in 30-year storm event, requires a storage volume of **2.9 m³** and for the 1 in 100-year event, a storage capacity of between **7.1 m³** and **11.6 m³** will be required from on-site storage as well as SuDS systems.
- » The use of the existing connection into the adjacent watercourse has been deemed feasible. This is subject to approval from LLFA and EA, given the brook's status as a Main River.
- » Foul sewage from the development could be discharged into the onsite combined sewer.

APPENDIX A

FIGURES, PLANS AND DRAWINGS



Client: Keystone Projects Ltd				Title: Site Location & Boundary Plan			
Site: Hollymount Farm, Greenmount, Bury				Scale (see scale bar): 1:25,000 & 1:2,000 @ A4			
Job No.: FRA 22 1030	Drawn By: JL	Checked By: AM	Drawn: Mar 2022	Figure: 1	Revision:		



Extract from: Hawthorn Design Partnership
Drawing Ref: Proposed Site Plan, No.107 (March 2022)

KEY

-  Site Boundary
-  STRUCTURE REMOVED
-  EXISTING STRUCTURE
-  NEW STRUCTURE

Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



Client:		Keystone Projects Ltd		
Site:		Hollymount Farm, Bury		
Title:		Proposed Development Plan		
Job No.:	FRA 22 1030	Scale (See Scale Bar):	1:500 @ A3	Figure:
Drawn By:	AC	Checked By:	AM	2
		Drawn:	Apr 2022	Revision:

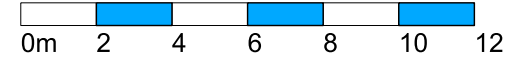
APPENDIX B

SITE INFORMATION

SITE SPECIFIC HAZARDS

IN ACCORDANCE WITH THE REQUIREMENTS OF THE CON REGULATIONS 2015 THE FOLLOWING SIGNIFICANT RESIDUAL HAZARDS HAVE NOT BEEN DERIVED OUT OF THIS PROJECT AND MUST BE TAKEN INTO CONSIDERATION BY CONTRACTORS PLANNING TO UNDERTAKE THE WORKS SHOWN ON THIS DRAWING

SCALE 1:200



REV. DATE NOTES INT.

CLIENT / PROJECT
J.BUCKLEY PROPERTIES
HOLLYMOUNT FARM
GREENMOUNT

DRAWING TITLE
EXISTING SITE PLAN

STATUS
PLANNING

DATE
MAR 22

DRAWN
SSS

SCALE @ A1
1:200

PROJECT NUMBER
PLAN / BUILD TYPE NUMBER REVISION LETTER

DRAWING NO.

107 PLN L 01 -

Site Location Plans L GA Plans P Elevations E
Sections S Details D Profile Colour C

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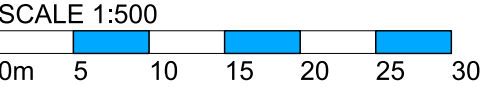
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SITE SPECIFIC HAZARDS

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TOTAL HIGHLIGHTED AREA 1301.5 SQM



REV.	DATE	NOTES	INIT.
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CLIENT / PROJECT
J.BUCKLEY PROPERTIES
HOLLYMOUNT FARM
GREENMOUNT

DRAWING TITLE
SITE SURVEY
AREA STUDY

STATUS
PLANNING

DATE NOV 21	DRAWN	SCALE @ A3 1:500
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PROJECT NUMBER	PLAN / BUILD	TYPE	NUMBER	REVISION LETTER
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DRAWING NO.
107 PLN L 02 -

Site Location Plans	L	GA Plans	P	Elevations	E
Sections	S	Details	D	Prefix: Colour	C

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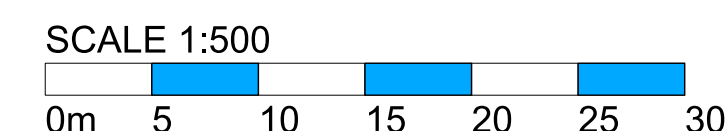
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CLIENT / PROJECT
J.BUCKLEY PROPERTIES
HOLLYMOUNT FARM
GREENMOUNT

DRAWING TITLE

PROPOSED ACCESS PLAN

STATUS **PLANNING**

107	PLN	L	03	-
Site Location Plans	L	GA Plans	P	Elevations
Sections	S	Details	D	Profile Colour

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Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Not Supplied - Holocene
	WMGR	Infilled Ground	Artificial Deposit	Not Supplied - Holocene
	WGR	Worked Ground (Undivided)	Void	Not Supplied - Holocene
	SLIP	Landslide Deposit	Unknown/Unclassified Entry	Not Supplied - Quaternary

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Not Supplied - Holocene
	TILLD	Till, Devensian	Diamicton	Not Supplied - Devensian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Not Supplied - Quaternary
	HEAD	Head	Diamicton	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	PLCM	Pennine Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	HER	Helpet Edge Rock	Sandstone	Not Supplied - Westphalian
	GAS	Great Arc Sandstone	Sandstone	Not Supplied - Westphalian
	MLRS	Milnrow Sandstone	Sandstone	Not Supplied - Westphalian
	ON	Ousel Nest Grit	Sandstone	Not Supplied - Westphalian
	WH	Woodhead Hill Rock	Sandstone	Not Supplied - Westphalian
	GNR	Ganister Rock	Sandstone	Not Supplied - Westphalian
	OL	Old Lawrence Rock	Sandstone	Not Supplied - Westphalian
	PLCM	Pennine Lower Coal Measures Formation	Sandstone	Not Supplied - Westphalian

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	CAR	Cannel Rock (South Lancashire)	Sandstone	Not Supplied - Westphalian
	ROSSE	Rosendale Formation	Mudstone and Siltstone	Not Supplied - Namurian
	RR	Rough Rock	Sandstone	Not Supplied - Namurian
	LH	Lower Haslingden Flags	Sandstone	Not Supplied - Namurian
	UH	Upper Haslingden Flags	Sandstone	Not Supplied - Namurian
	MARSD	Marsden Formation	Mudstone and Siltstone	Not Supplied - Namurian
	BBS	Brooksbottoms Grit	Sandstone	Not Supplied - Namurian
	HLBG	Holcombe Brook Grit	Sandstone	Not Supplied - Namurian
		Faults		
		Rock Segments		



Geology 1:50,000 Maps

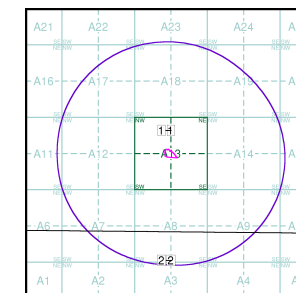
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	2	Map ID:	1
Map Sheet No:	085	Map Sheet No:	076
Map Name:	Manchester	Map Name:	Rochdale
Map Date:	2010	Map Date:	2008
Bedrock Geology:	Available	Bedrock Geology:	Available
Superficial Geology:	Not Available	Superficial Geology:	Available
Artificial Geology:	Not Available	Artificial Geology:	Available
Faults:	Not Supplied	Faults:	Not Supplied
Landslip:	Not Available	Landslip:	Available
Rock Segments:	Not Supplied	Rock Segments:	Not Supplied

Geology 1:50,000 Maps - Slice A

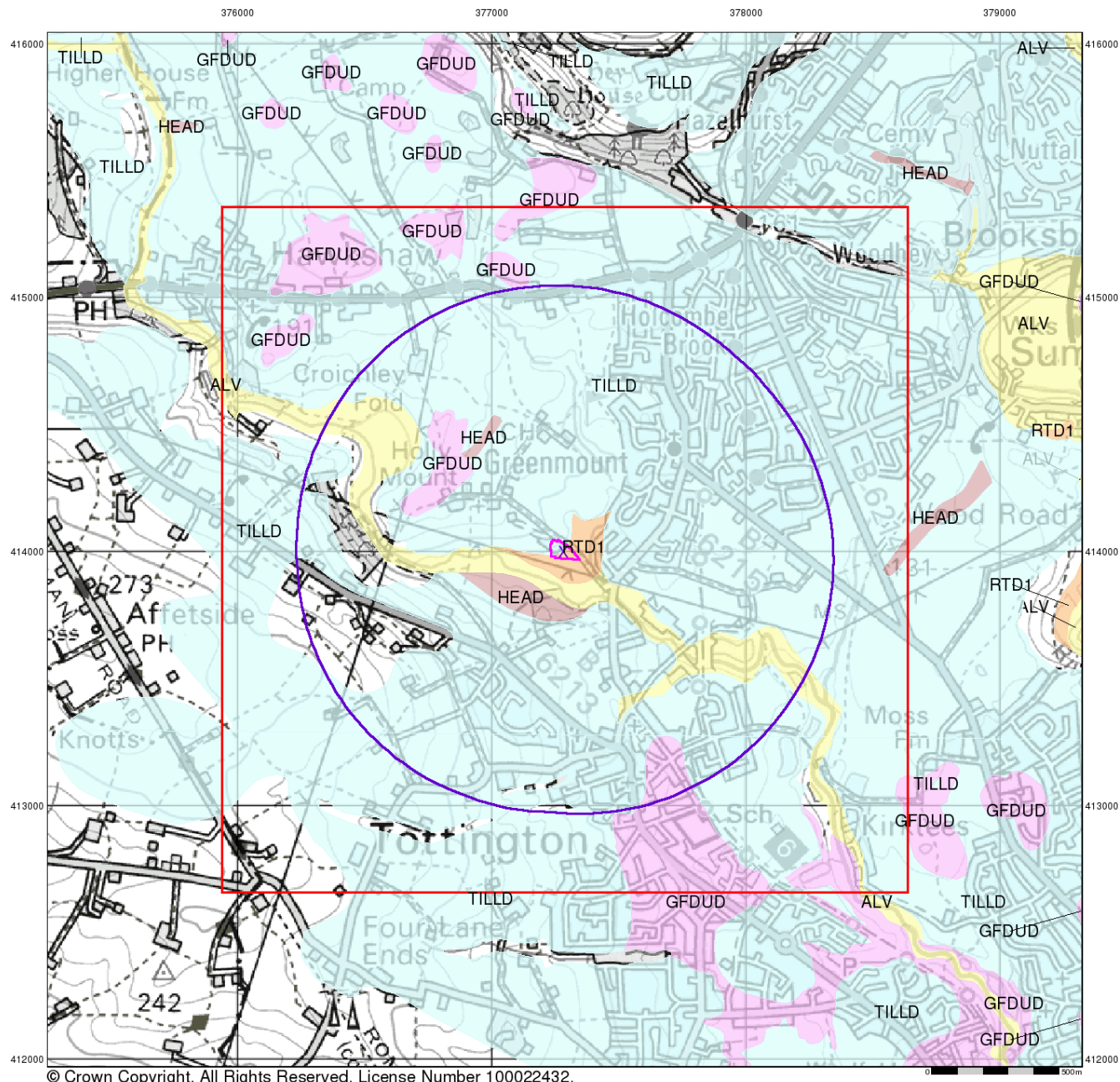


Order Details:

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Customer Reference:	LKC 22 1142
National Grid Reference:	377280, 414000
Slice:	A
Site Area (Ha):	0.55
Search Buffer (m):	1000

Site Details:

Hollymount Farm, Hollymount Lane, Greenmount, BURY, BL8 4HP



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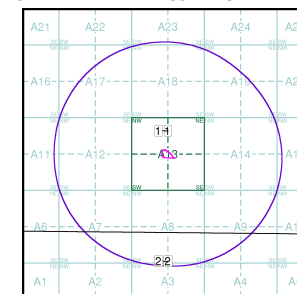
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



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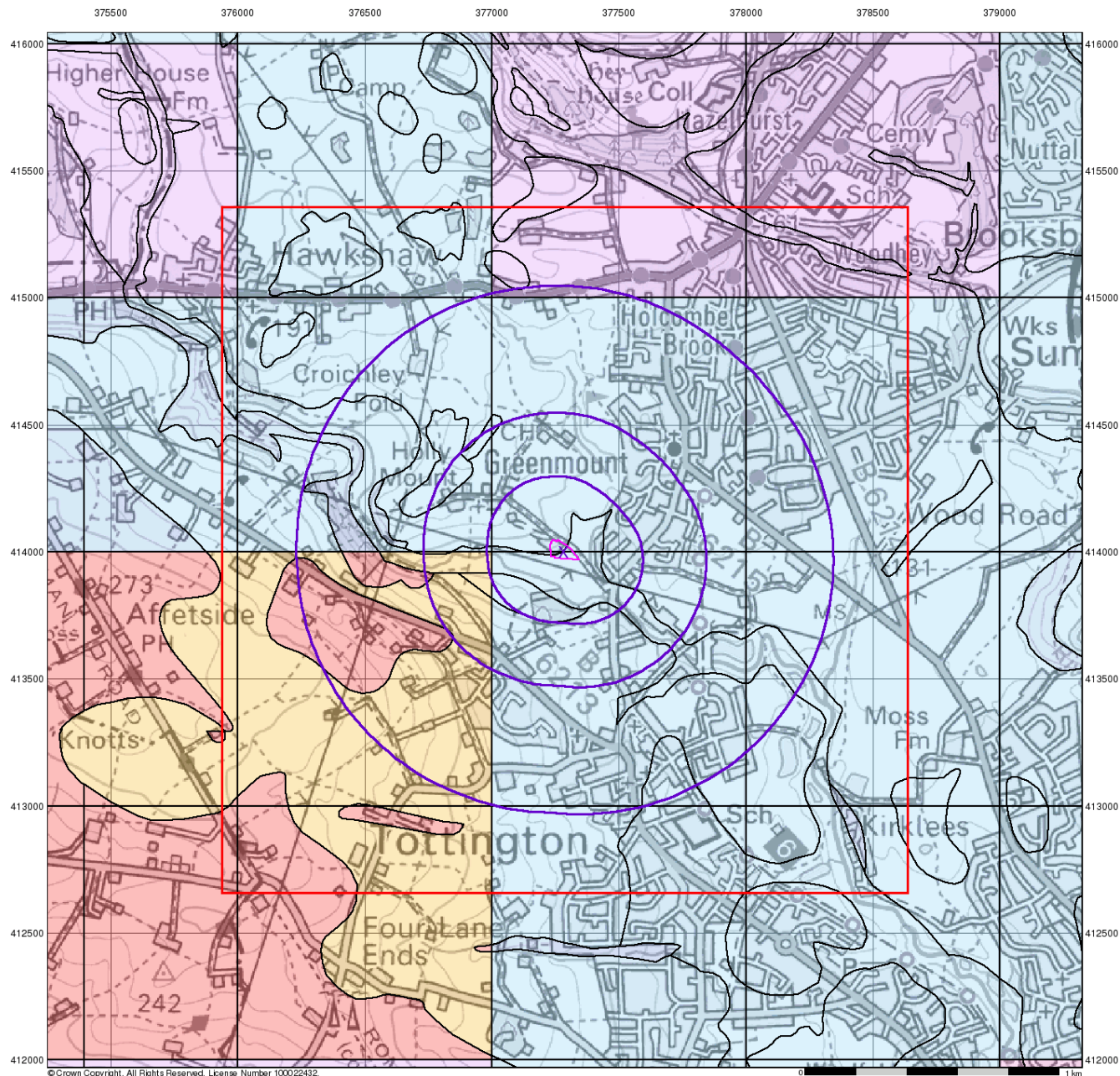
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 Slice: A
 Site Area (Ha): 0.55
 Search Buffer (m): 1000

Site Details:

Hollymount Farm, Hollymount Lane, Greenmount, BURY, BL8 4HP



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0 1 km



GROUP

Groundwater Vulnerability

General

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

Agency and Hydrological

Bedrock Aquifers

- High Vulnerability, Principal Aquifer
- High Vulnerability, Secondary Aquifer
- Medium Vulnerability, Principal Aquifer
- Medium Vulnerability, Secondary Aquifer
- Low Vulnerability, Principal Aquifer
- Low Vulnerability, Secondary Aquifer

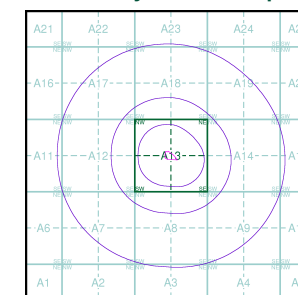
Superficial Aquifers

- High Vulnerability, Principal Aquifer
- High Vulnerability, Secondary Aquifer
- Medium Vulnerability, Principal Aquifer
- Medium Vulnerability, Secondary Aquifer
- Low Vulnerability, Principal Aquifer
- Low Vulnerability, Secondary Aquifer

Unproductive Aquifer

Soluble Rock

Site Sensitivity Context Map - Slice A



Order Details

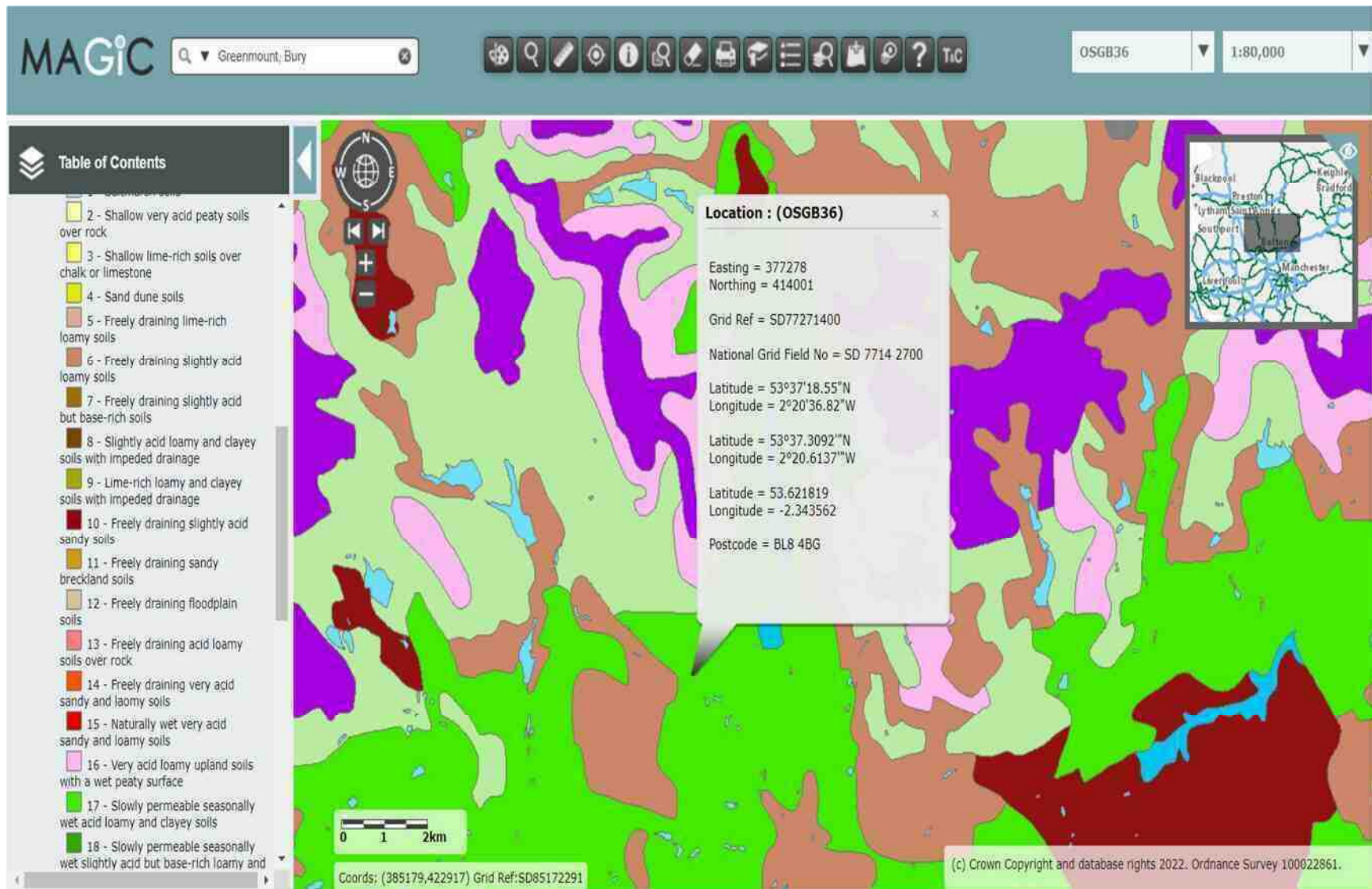
Order Number: 291938962_1_1
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