



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Applied geoscience for our
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Infiltration SuDS Map

Dr. Rachel Dearden

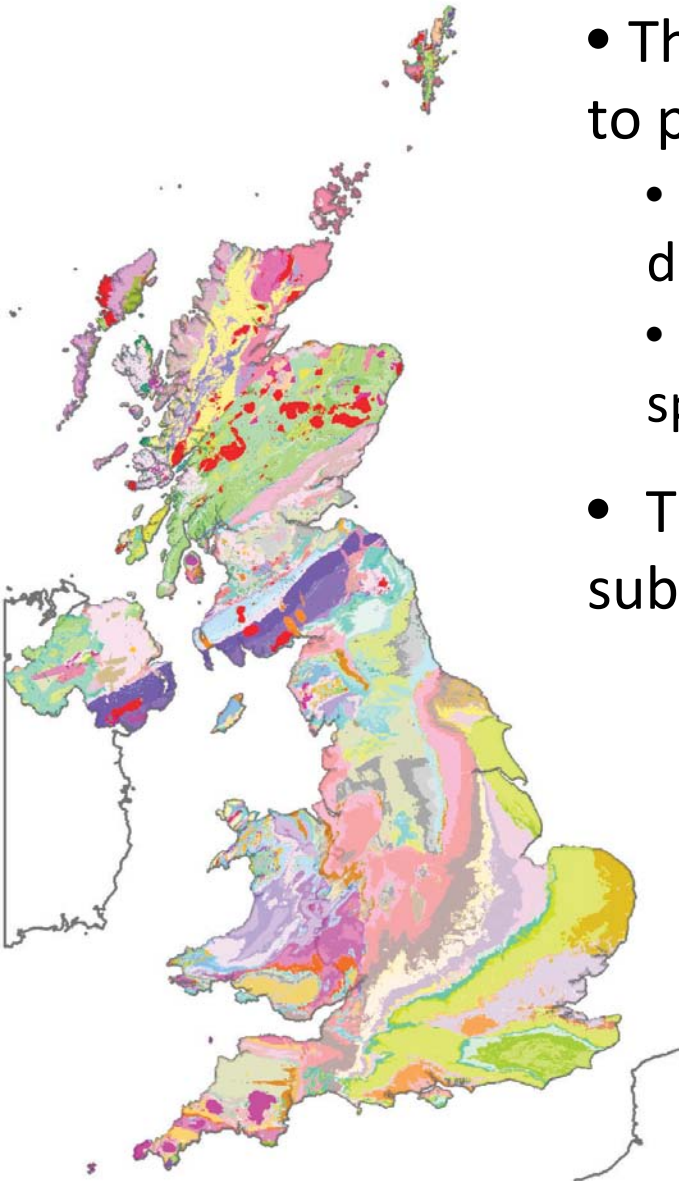
Hydrogeologist
and
NERC Knowledge Exchange Fellow



Infiltration SuDS Map

A national map that provides the information necessary to assess the suitability of the subsurface for infiltration SuDS

Overview



- The *Infiltration SuDS Map* has been developed to provide:
 - data necessary for preliminary local-scale decision-making
 - an overview of infiltration-suitability over wide spatial areas
- The *Map* brings together a wide range of subsurface GIS datasets:
 - Made ground
 - Susceptibility to groundwater flooding
 - Superficial deposit permeability
 - Superficial deposit thickness
 - Bedrock permeability
 - Depth to water table
 - Geo. indicators of flooding
 - Soluble rocks
 - Landslides
 - Shallow mining (non-coal)
 - Collapsible ground
 - Compressible ground
 - Running sand
 - Swelling clays
 - Predominant aquifer flow mechanism
 - Groundwater source protection zones
- Each dataset has been revised specifically for this application

Who is it for?

- For those involved with the assessment of the ground for infiltration SuDS (developers, planners, consultants)
- For local authority SuDS Approval Bodies

Soakaway



Wetland



Infiltration basin



Permeable paving



Which would you choose?



Infiltration SuDS and ground compatibility



Key questions...



1. Are there any significant constraints that should be considered?
2. What is the drainage potential of the ground?
3. Are there any ground stability considerations?
4. Is groundwater likely to be susceptible to a deterioration in quality?



Infiltration SuDS Map structure

Step 1

Infiltration constraints

- Soluble rocks
- Landslide hazards
- Shallow mining
- Shallow groundwater
- Made ground

Infiltration constraints
summary

Step 2

Drainage

- Depth to water table
- Superficial permeability
- Superficial thickness
- Bedrock permeability
- Geological indicators of flooding

Drainage summary

Step 3

Stability

- Soluble rocks
- Landslide hazards
- Mining hazards
- Compressible ground
- Swelling clays
- Running sand
- Collapsible ground

Ground stability summary

Step 4

Groundwater protection

- Groundwater Source Protection zones
- Aquifer predominant flow mechanism
- Made ground

Groundwater protection
summary



Infiltration SuDS Map: Detailed

Intended for use at a local scale to determine the suitability of the subsurface for infiltration SuDS

Infiltration SuDS Map GIS window

GIS window

☐ Step 1: Infiltration constraints

☐ Summary map

☐ Soluble rocks

☐ Landslides

☐ Made ground

☐ Mining hazards

☐ Shallow groundwater

☐ Step 2: Will it drain?

☐ Summary map

☐ Depth to water table

☐ Superficial thickness

☐ Superficial permeability

☐ Bedrock permeability

☐ Geological indicators of flooding

☐ Step 3: Will it be stable?

☐ Summary map

☐ Soluble rocks

☐ Landslides

☐ Compressible ground

☐ Collapsible ground

☐ Shrink-swell clays

☐ Shallow (non-coal) mining

☐ Step 4: Groundwater quality

☐ Summary map

☐ Source protection zone class

☐ Predominant flow mechanism

☐ Made ground

Summary map for spatial assessment

Component maps provide data on specific subsurface properties

Map window

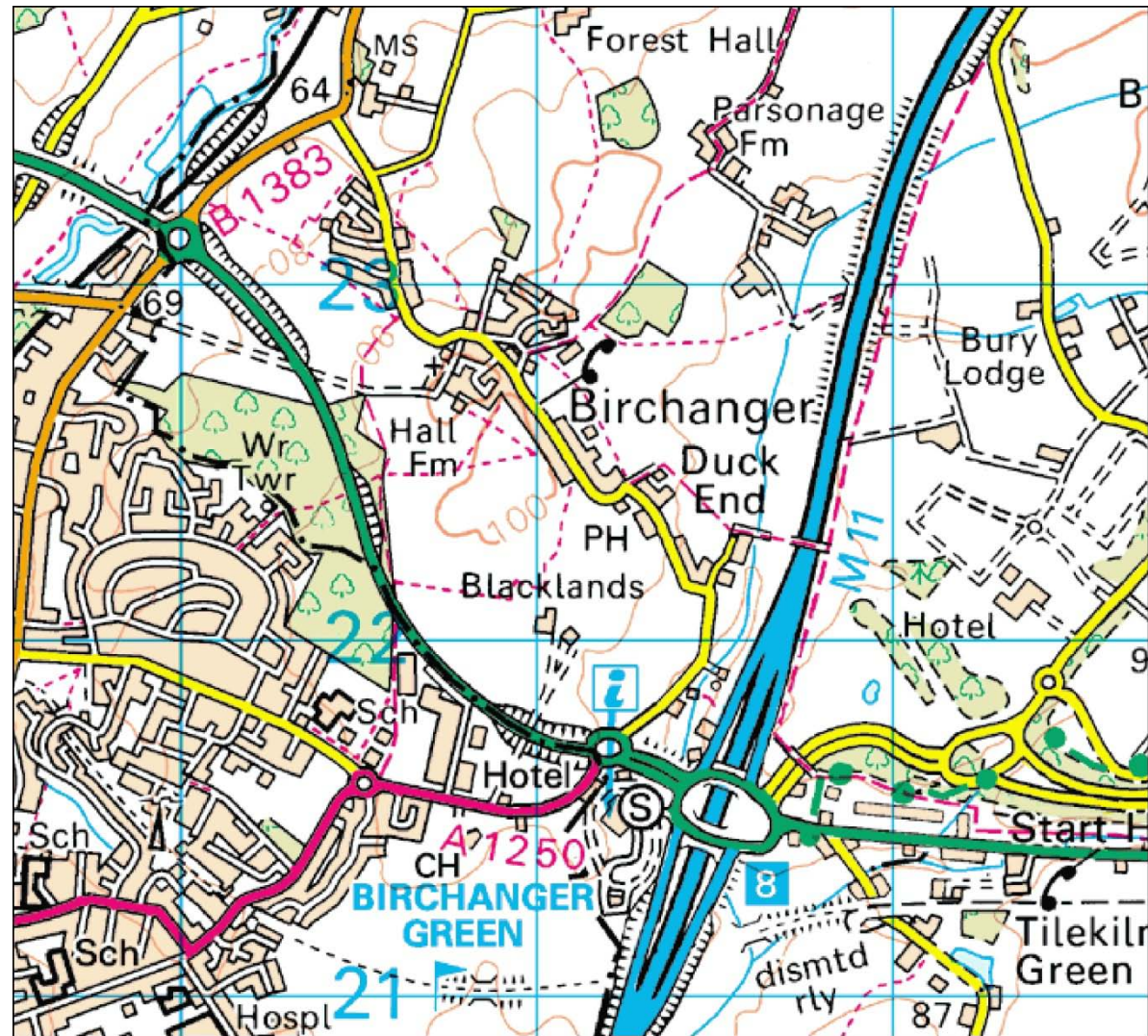
Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

Infiltration constraints summary

Soluble rock constraints

Landslide constraints

Shallow mining constraints

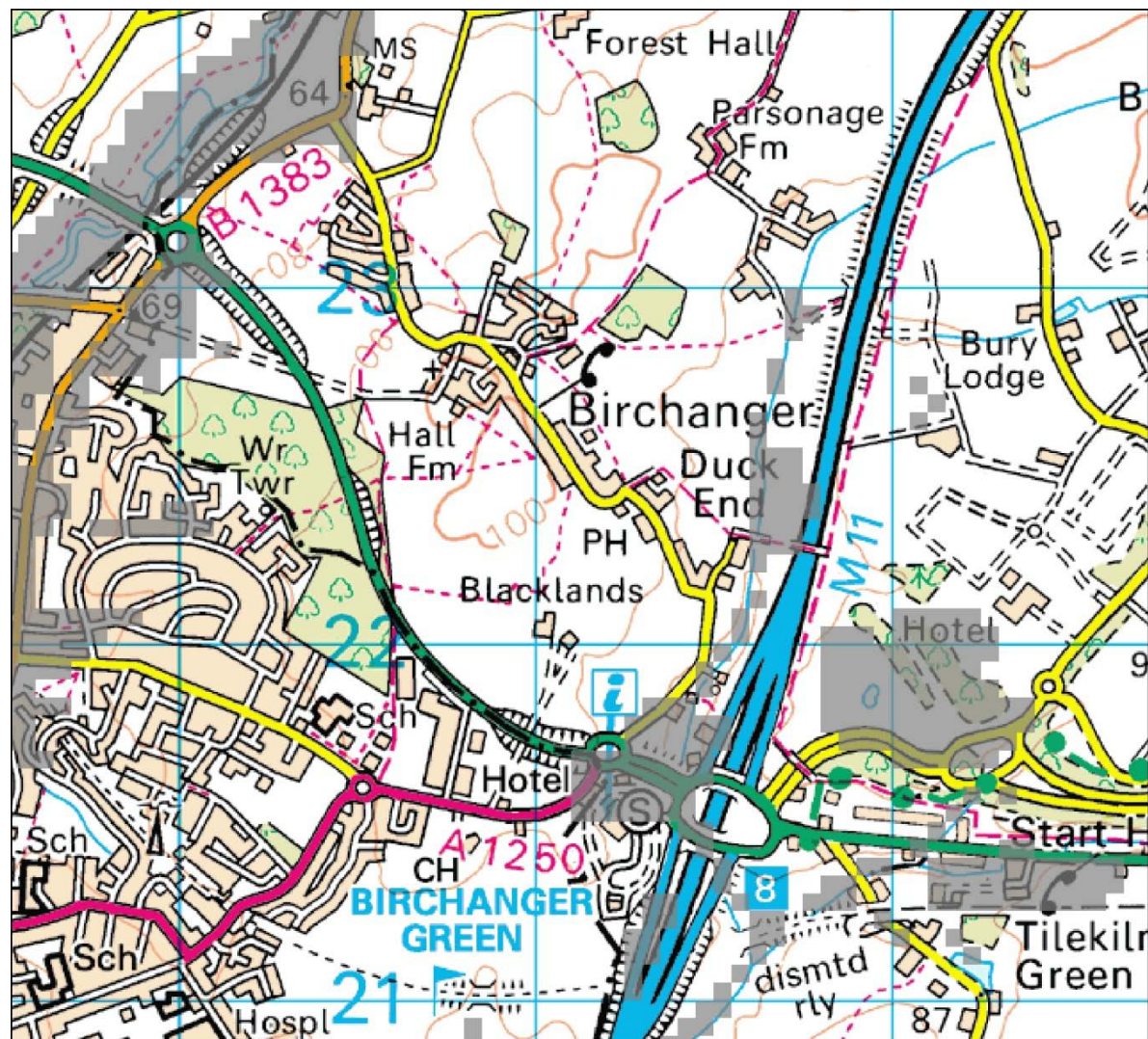
Shallow gw constraints

Made ground constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Very significant constraints
are indicated



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration constraints summary

Soluble rock constraints

Landslide constraints

Shallow mining constraints

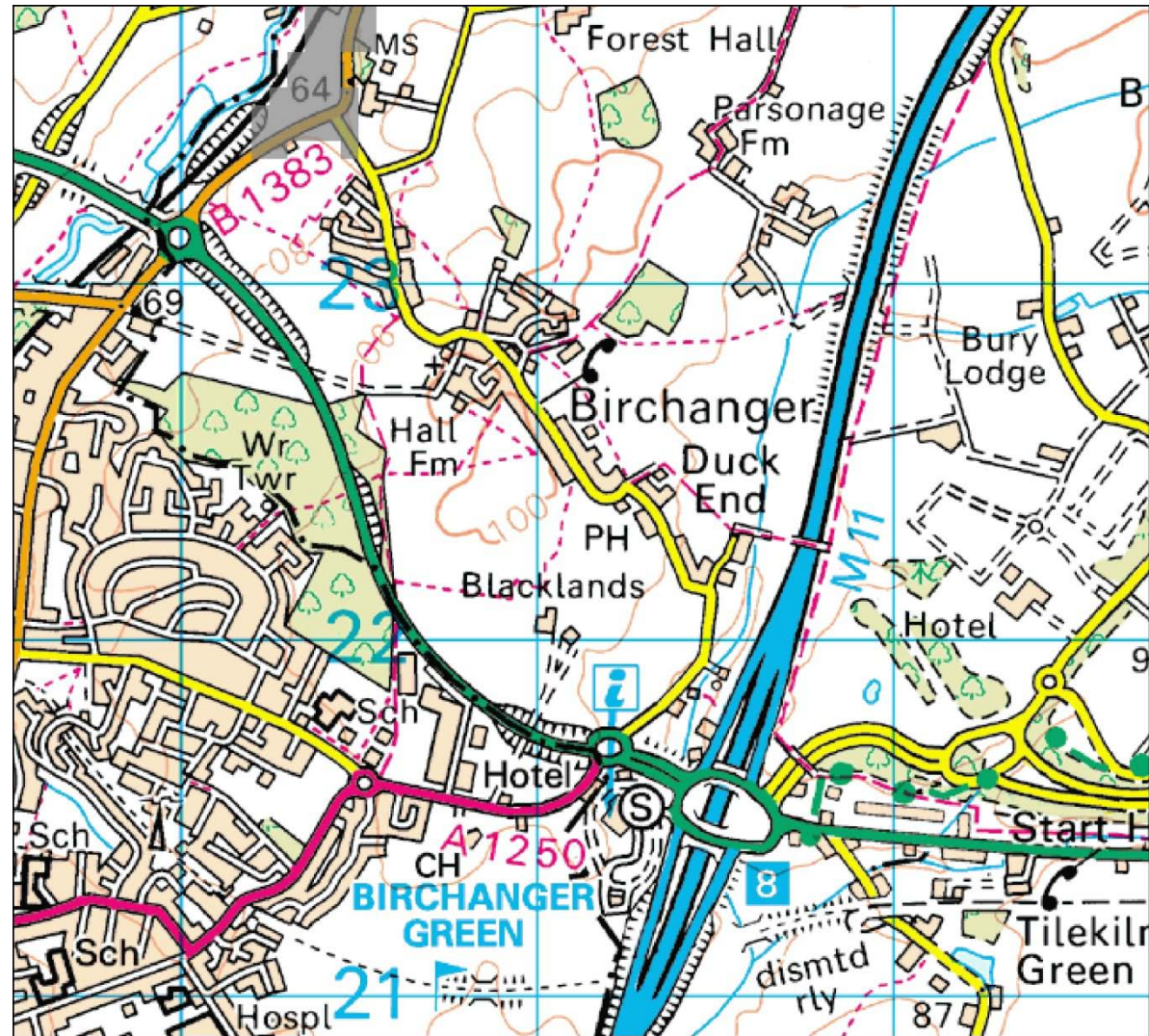
Shallow gw constraints

Made ground constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



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Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration constraints summary

Soluble rock constraints

Landslide constraints

Shallow mining constraints

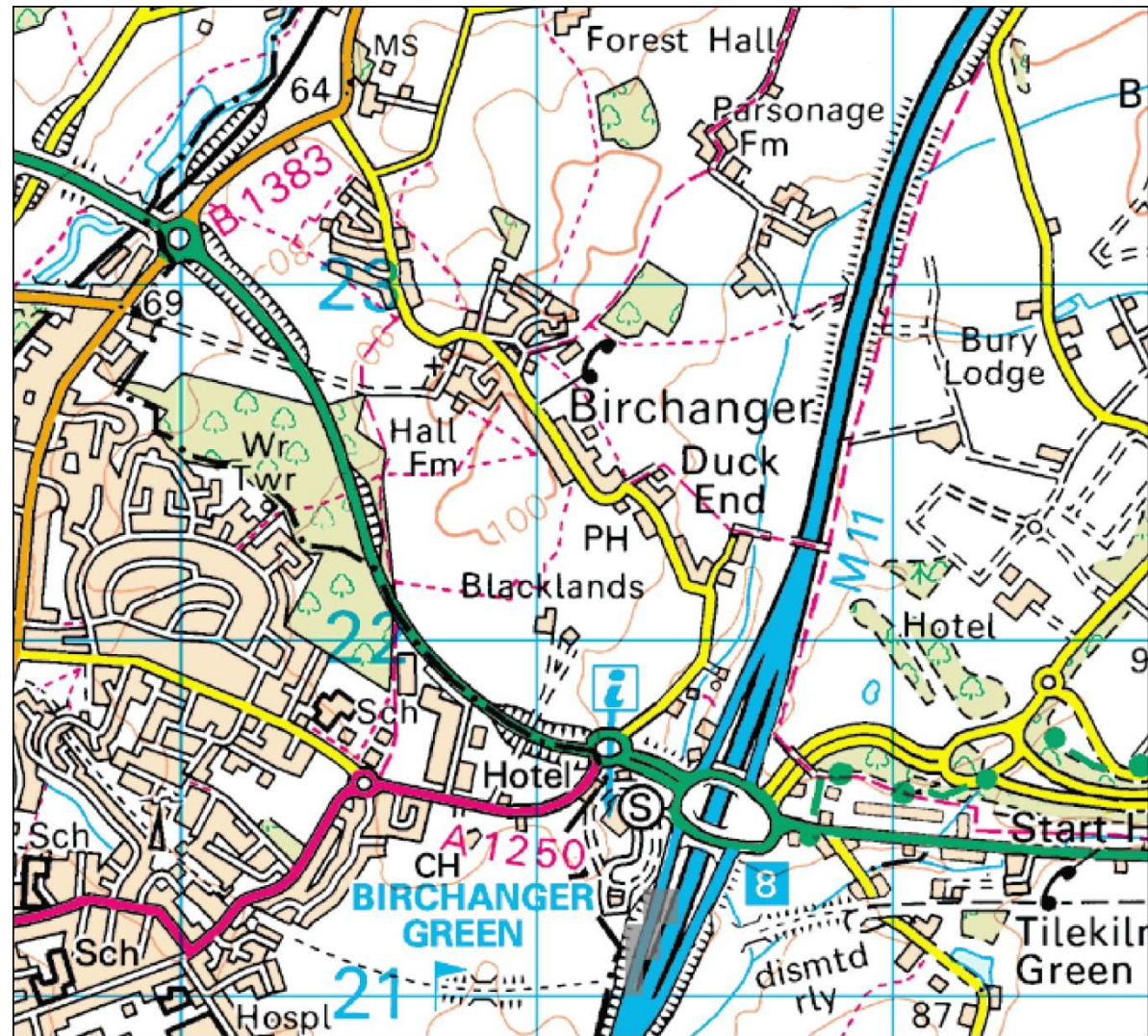
Shallow gw constraints

Made ground constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration constraints summary

Soluble rock constraints

Landslide constraints

Shallow mining constraints

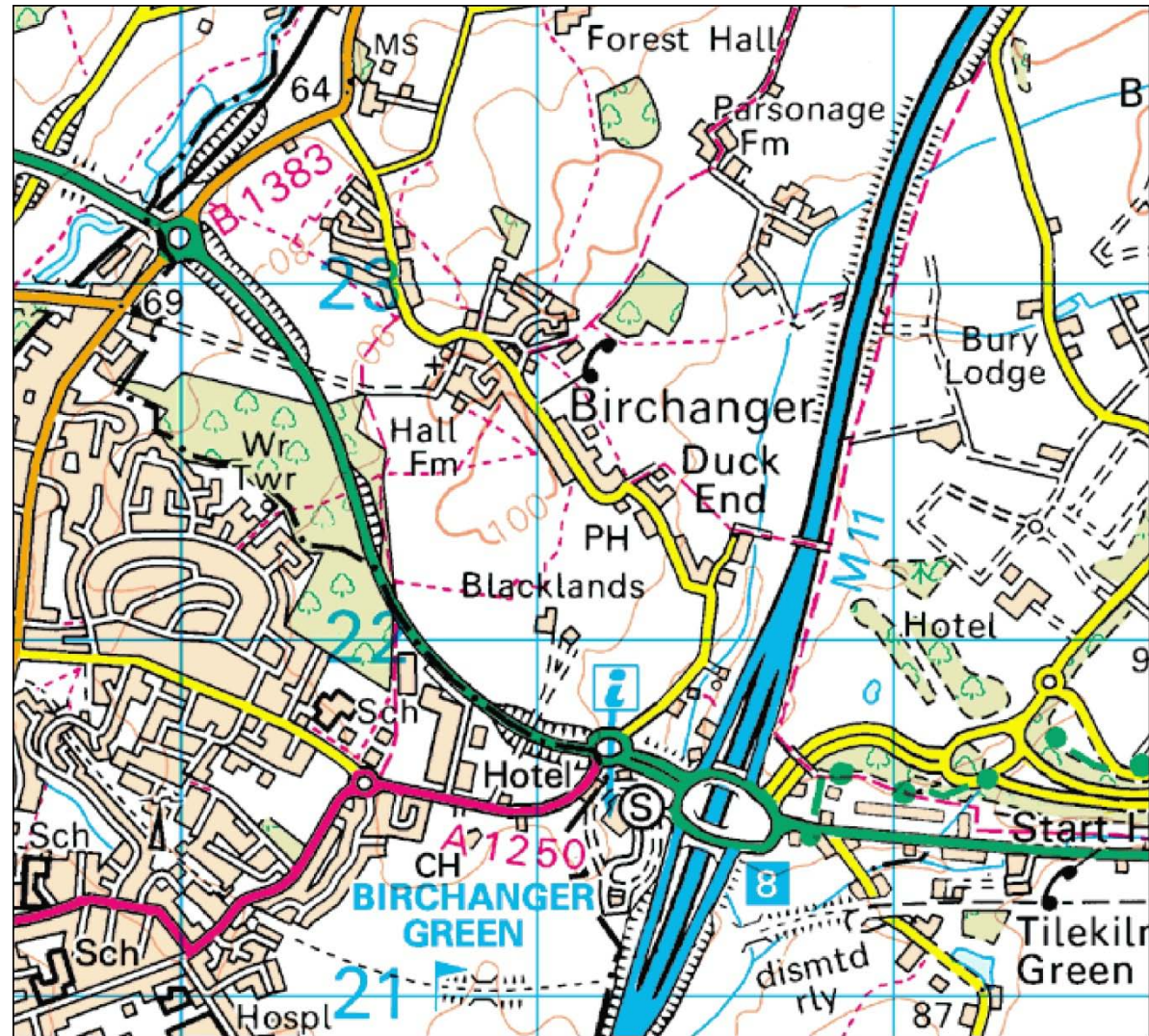
Shallow gw constraints

Made ground constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration constraints summary

Soluble rock constraints

Landslide constraints

Shallow mining constraints

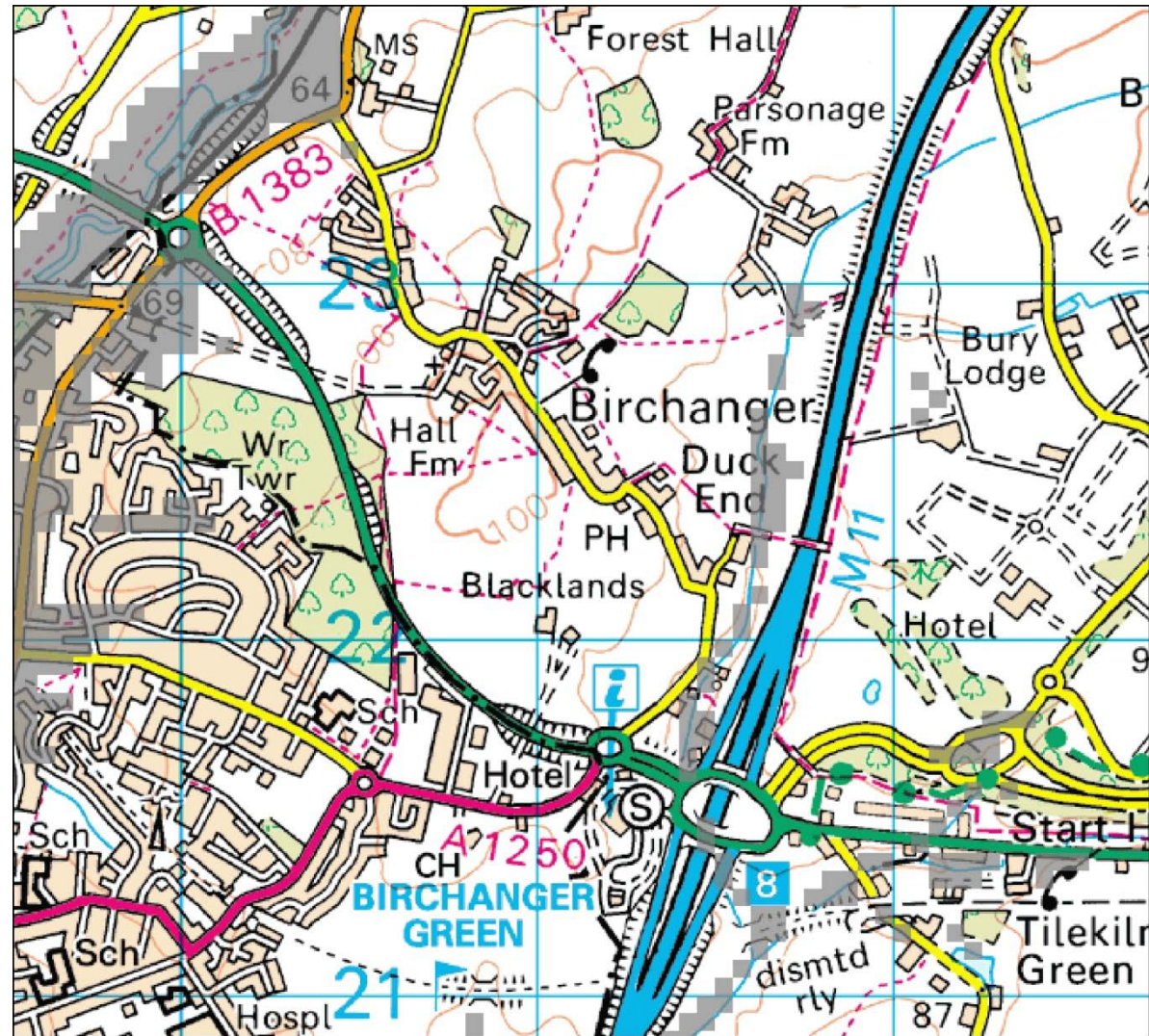
Shallow gw constraints

Made ground constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration constraints summary

Soluble rock constraints

Landslide constraints

Shallow mining constraints

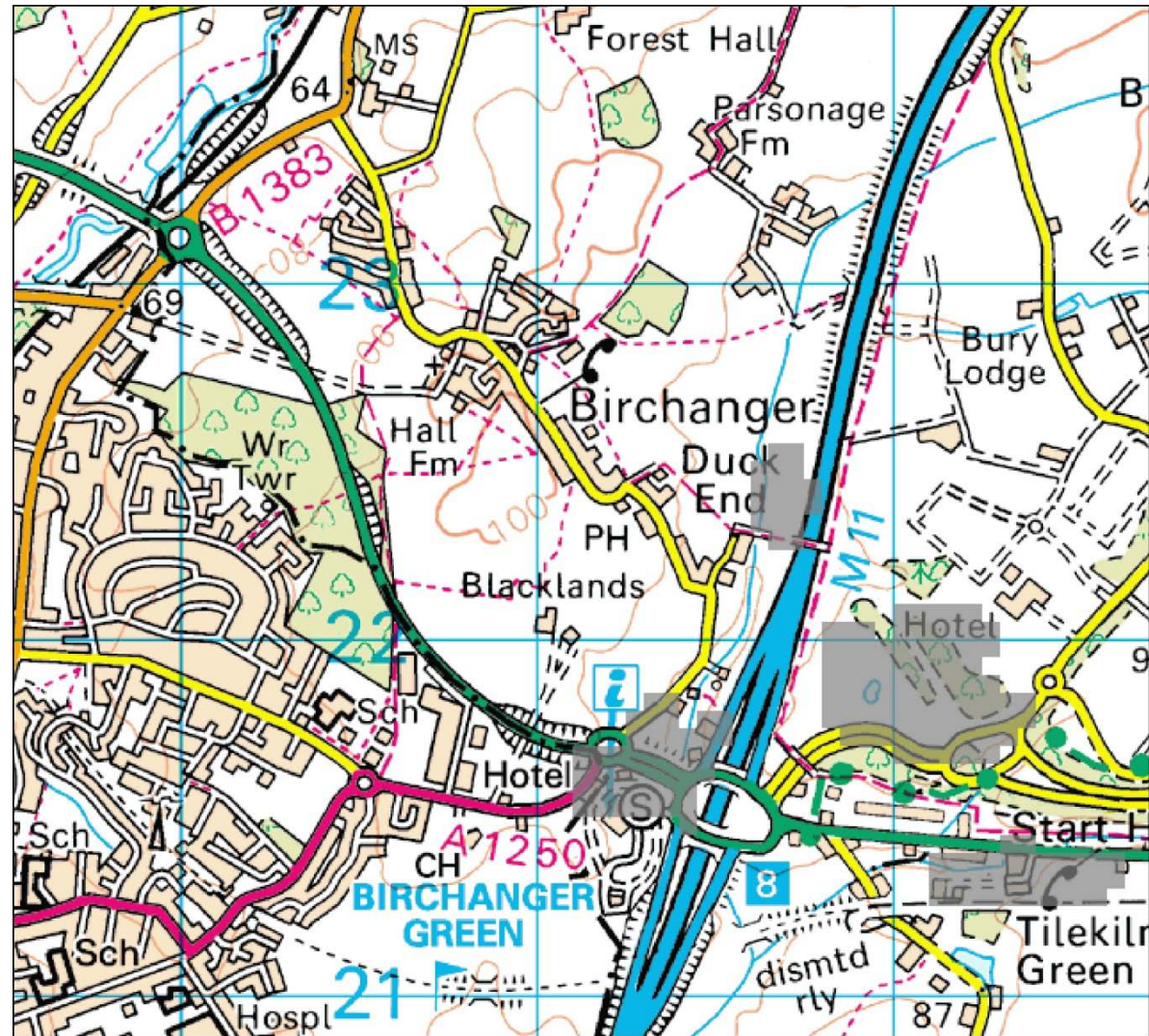
Shallow gw constraints

Made ground constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Drainage summary

Depth to groundwater

Sup. deposit permeability

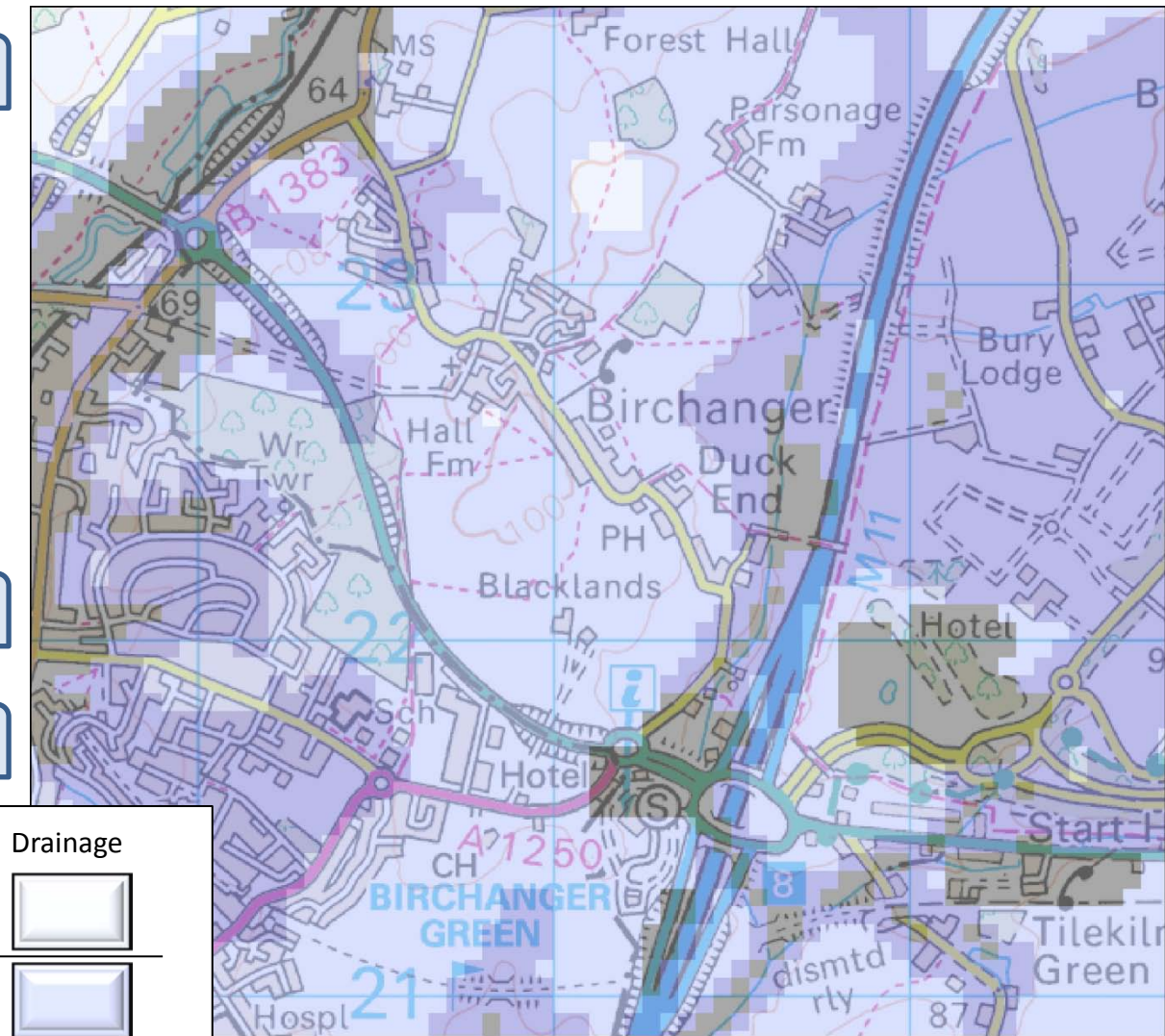
Sup. deposit thickness

Bedrock permeability

Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Drainage

Highly compatible for infiltration SuDS



Probably compatible for infiltration SuDS



Opportunities for bespoke infiltration SuDS



Very significant constraints are indicated



Infiltration SuDS constraints

Infiltration SuDS Drainage

Drainage summary

Depth to groundwater

Sup. deposit permeability

Sup. deposit thickness

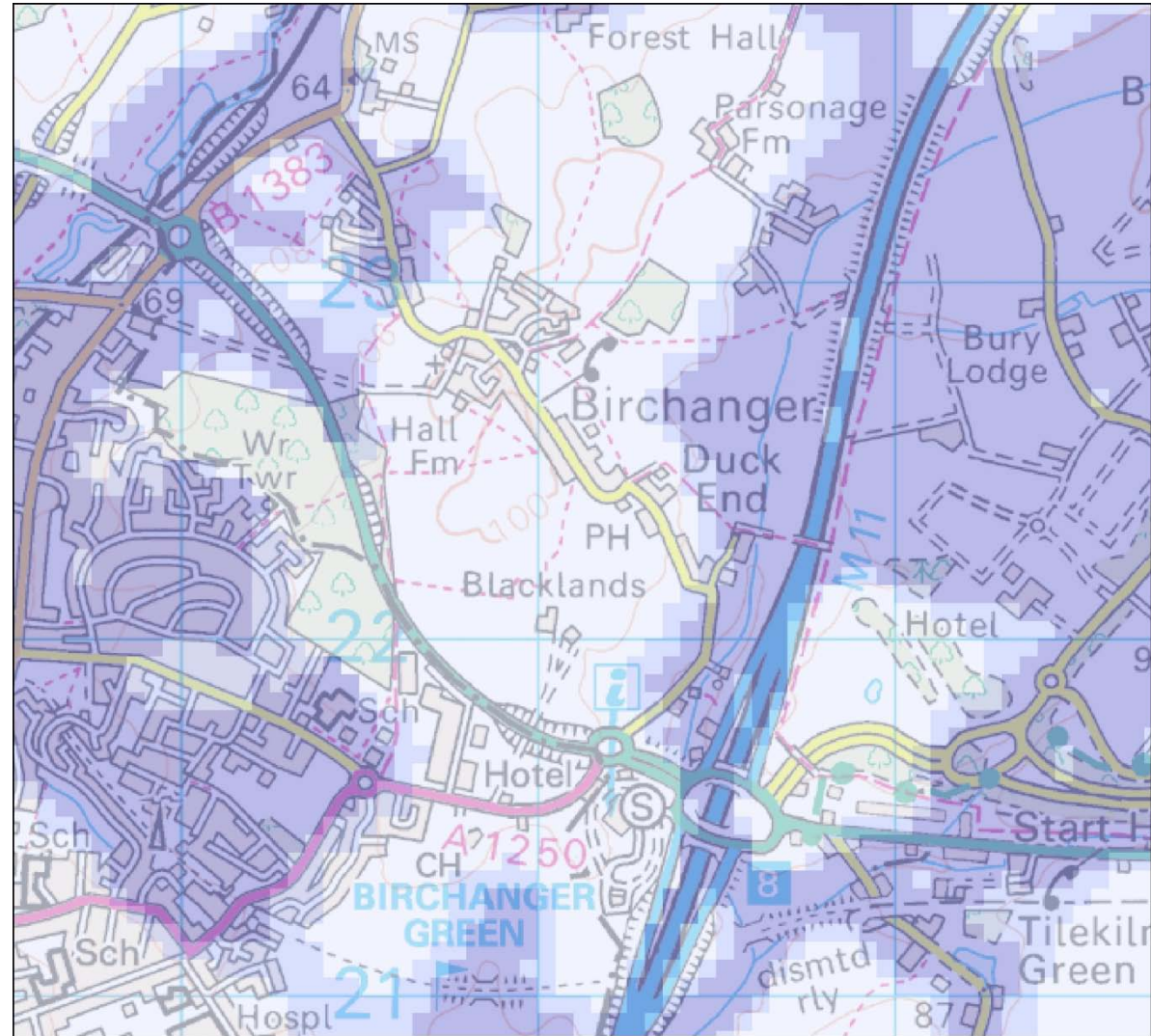
Bedrock permeability

Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

Infiltration SuDS Drainage

Drainage summary

Depth to groundwater

Sup. deposit permeability

Sup. deposit thickness

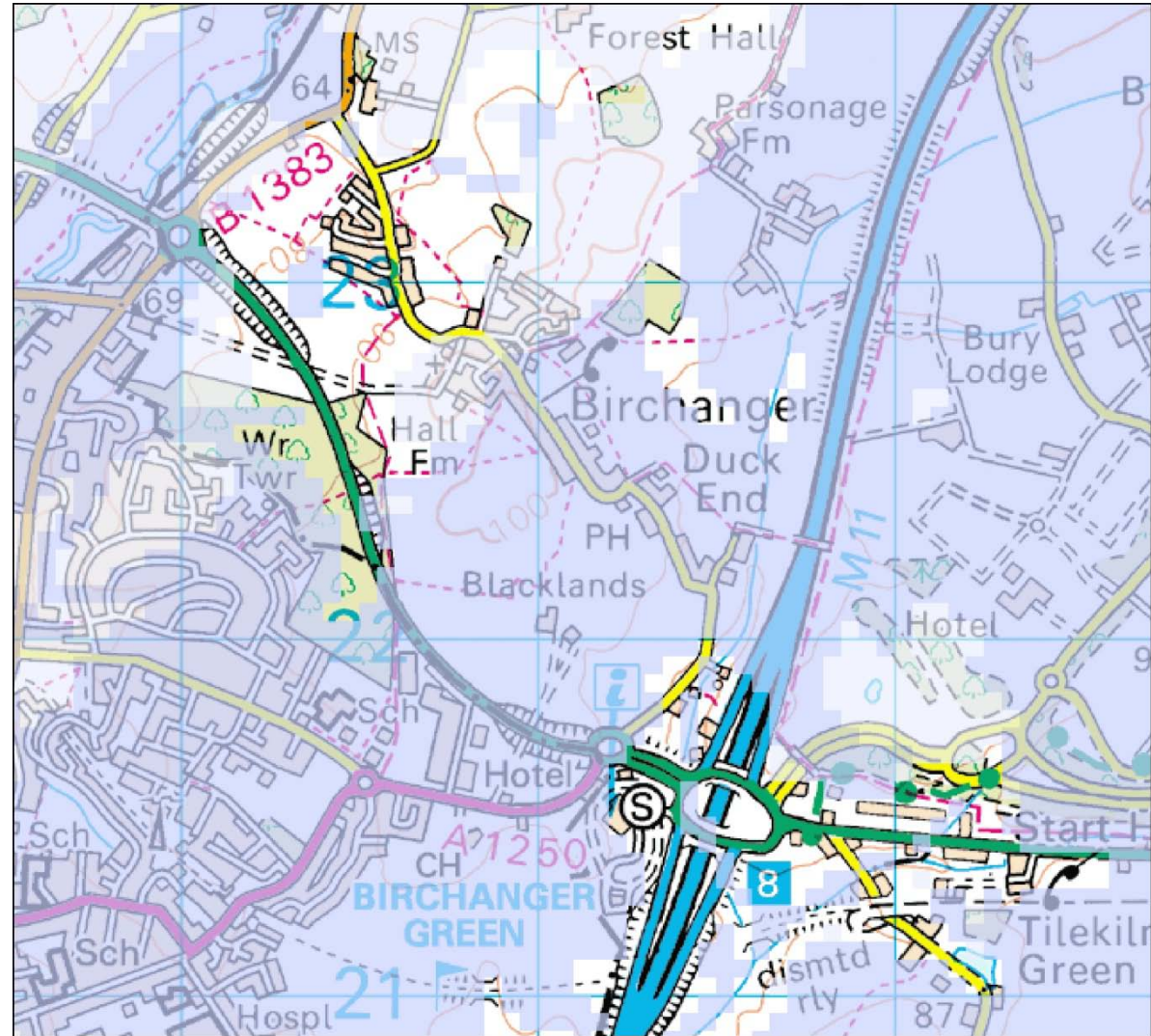
Bedrock permeability

Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

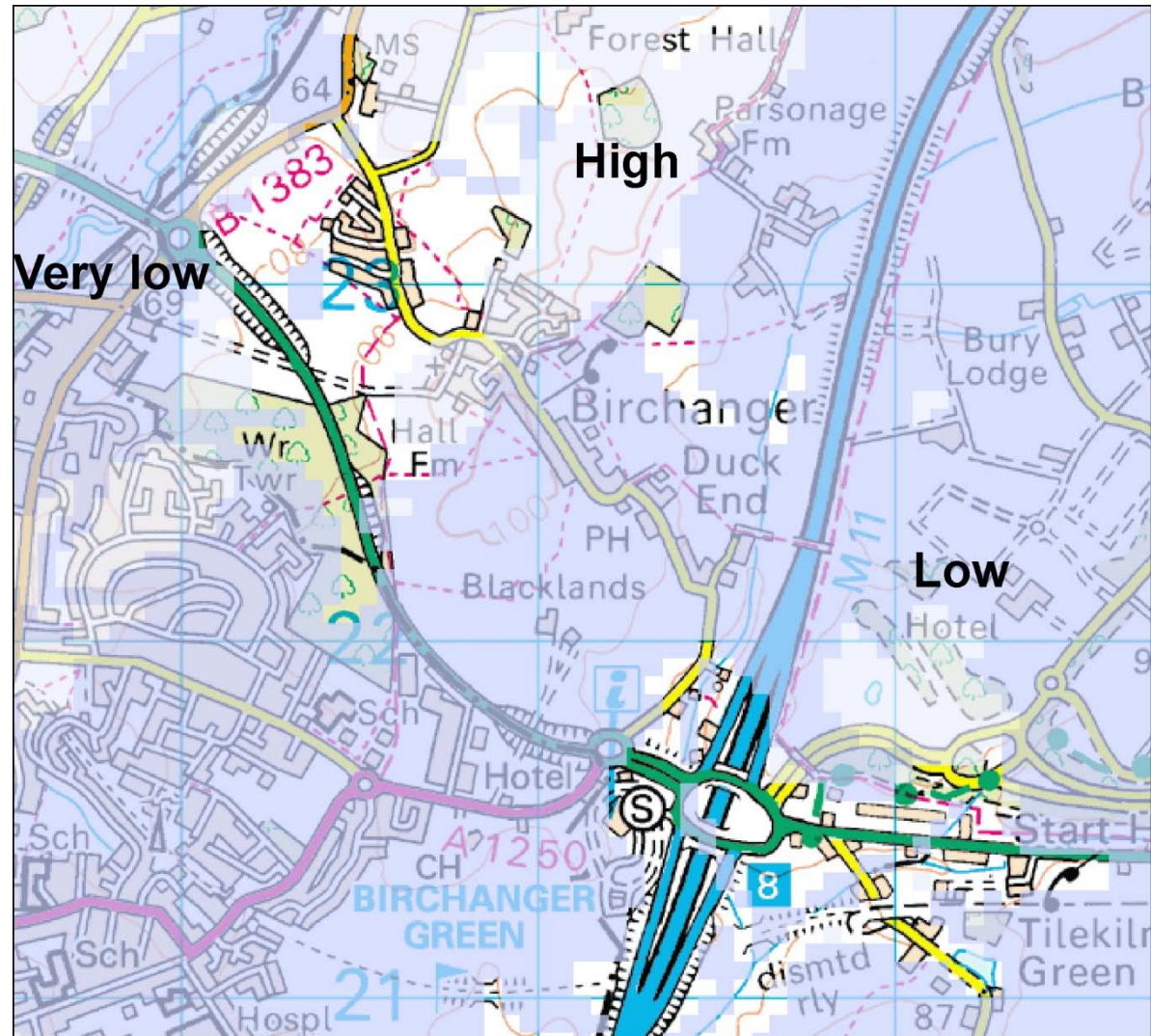
Infiltration SuDS Drainage

- Drainage summary
- Depth to groundwater
- Sup. deposit permeability
- Sup. deposit thickness
- Bedrock permeability
- Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

Infiltration SuDS Drainage

Drainage summary

Depth to groundwater

Sup. deposit permeability

Sup. deposit thickness

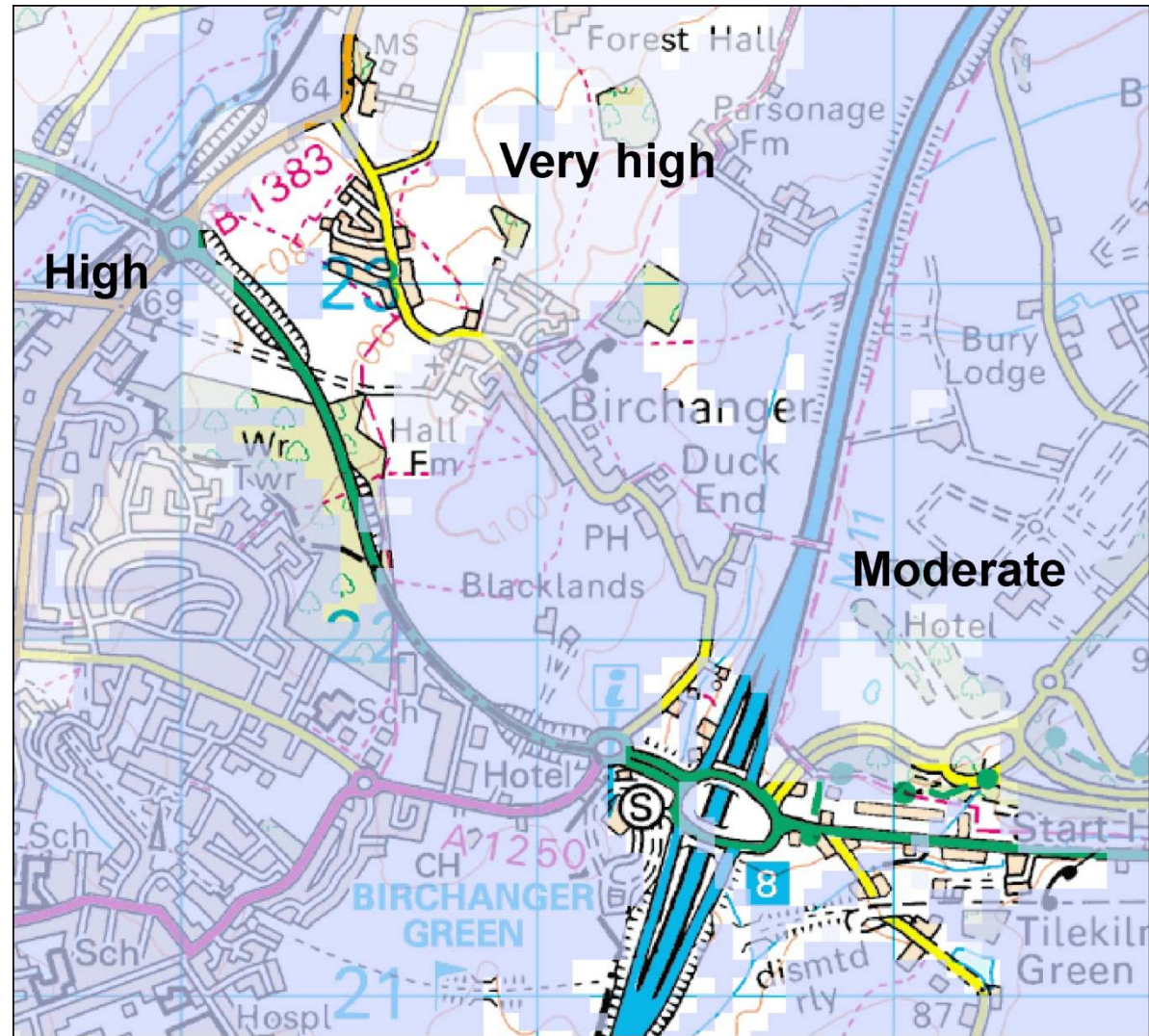
Bedrock permeability

Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

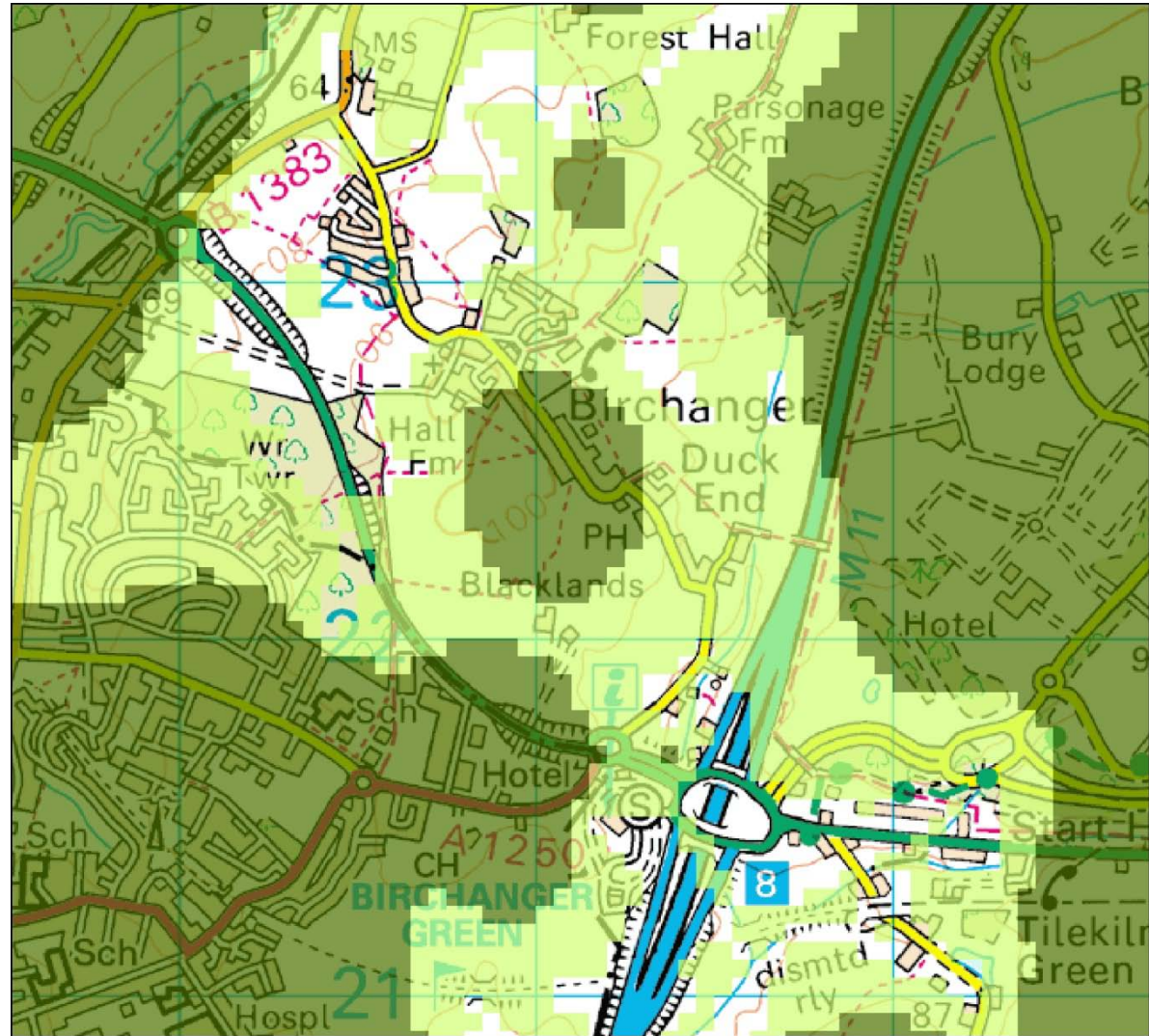
Infiltration SuDS Drainage

- Drainage summary
- Depth to groundwater
- Sup. deposit permeability
- Sup. deposit thickness
- Bedrock permeability
- Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

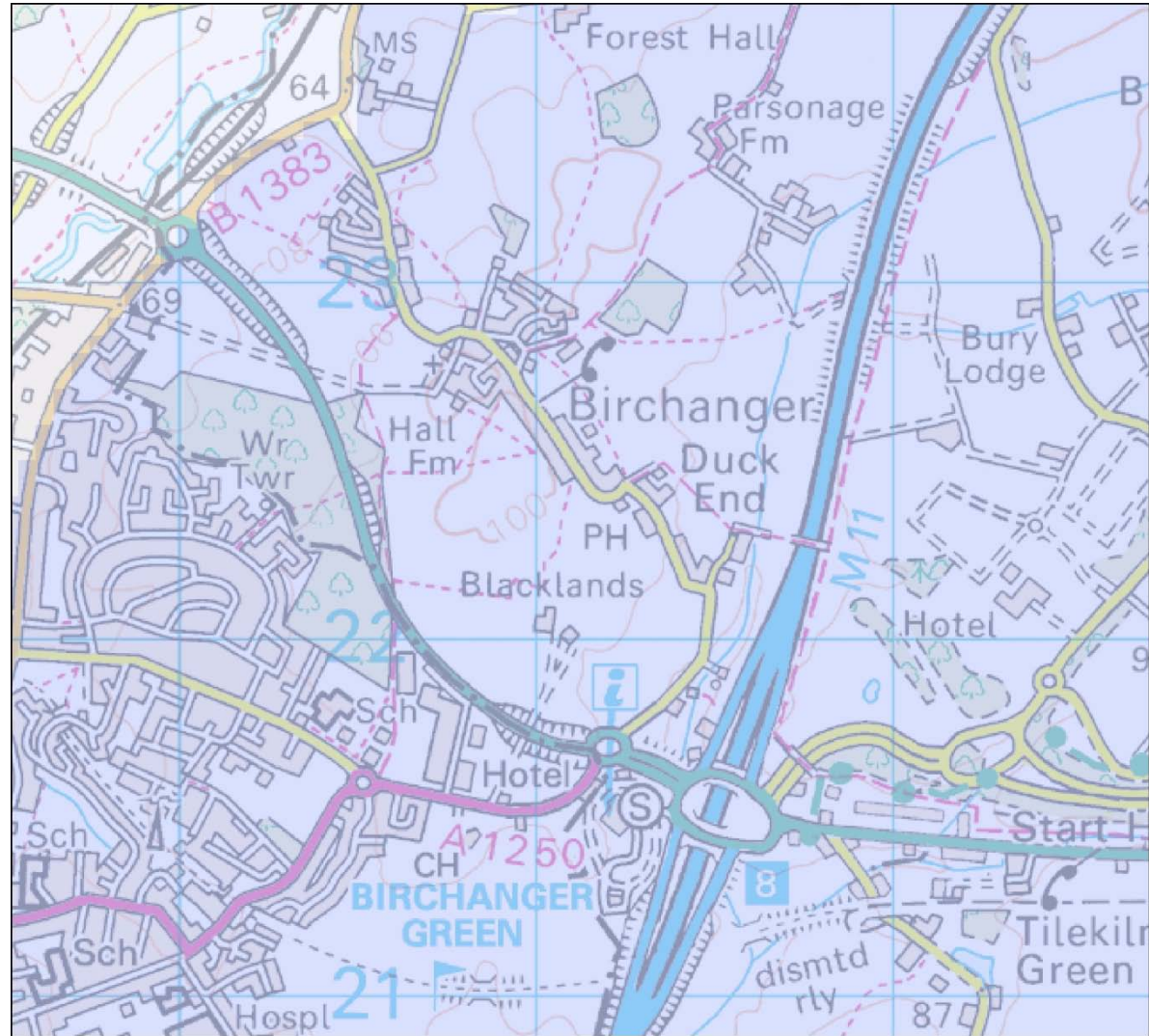
Infiltration SuDS Drainage

- Drainage summary
- Depth to groundwater
- Sup. deposit permeability
- Sup. deposit thickness
- Bedrock permeability
- Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

Infiltration SuDS Map: Detailed

Infiltration SuDS Drainage

Drainage summary

Depth to groundwater

Sup. deposit permeability

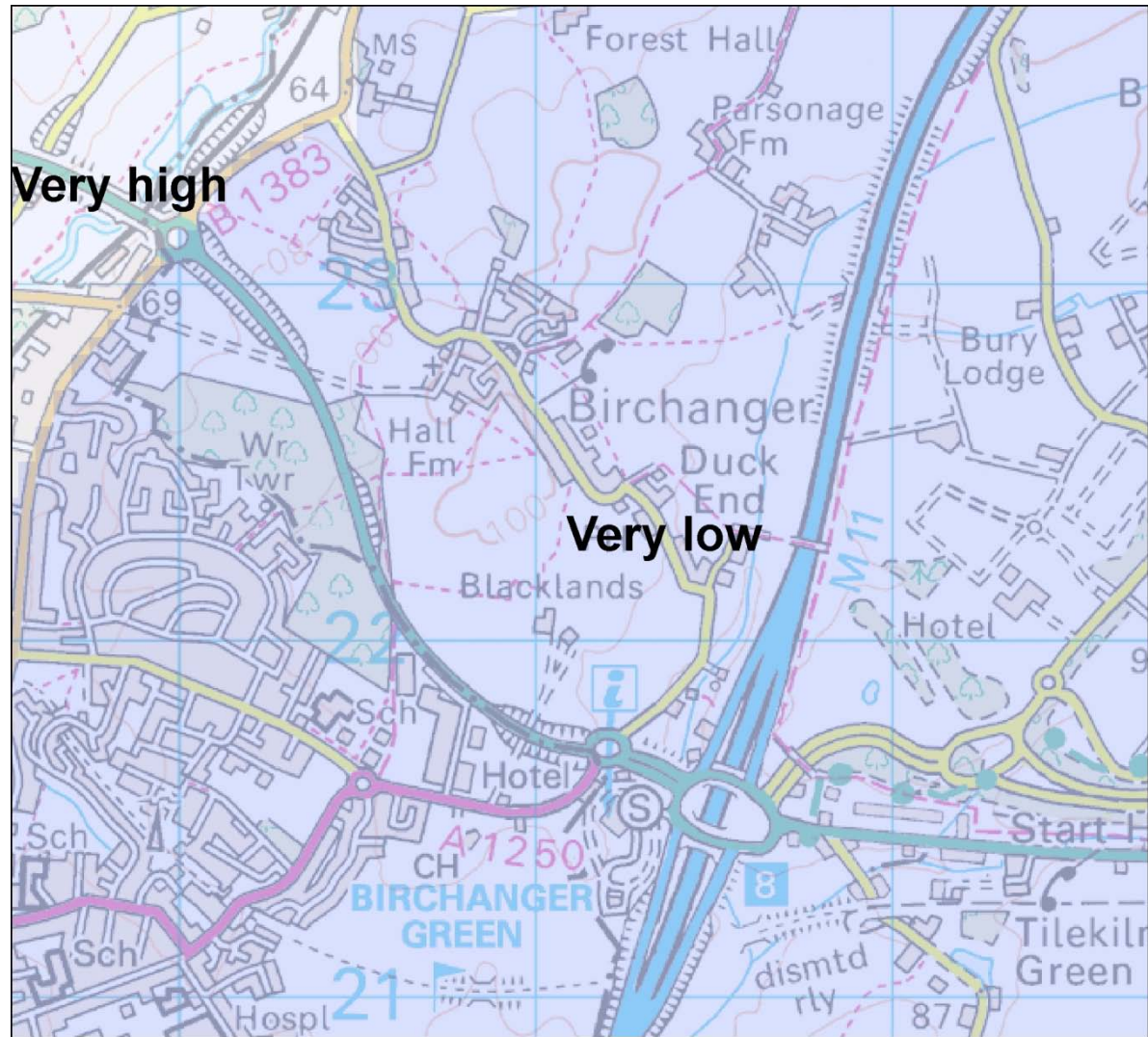
Sup. deposit thickness
D = 0.8 mm

Bedrock permeability

Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection



Infiltration SuDS constraints

Infiltration SuDS Drainage

Drainage summary

Depth to groundwater

Sup. deposit permeability

Sup. deposit thickness

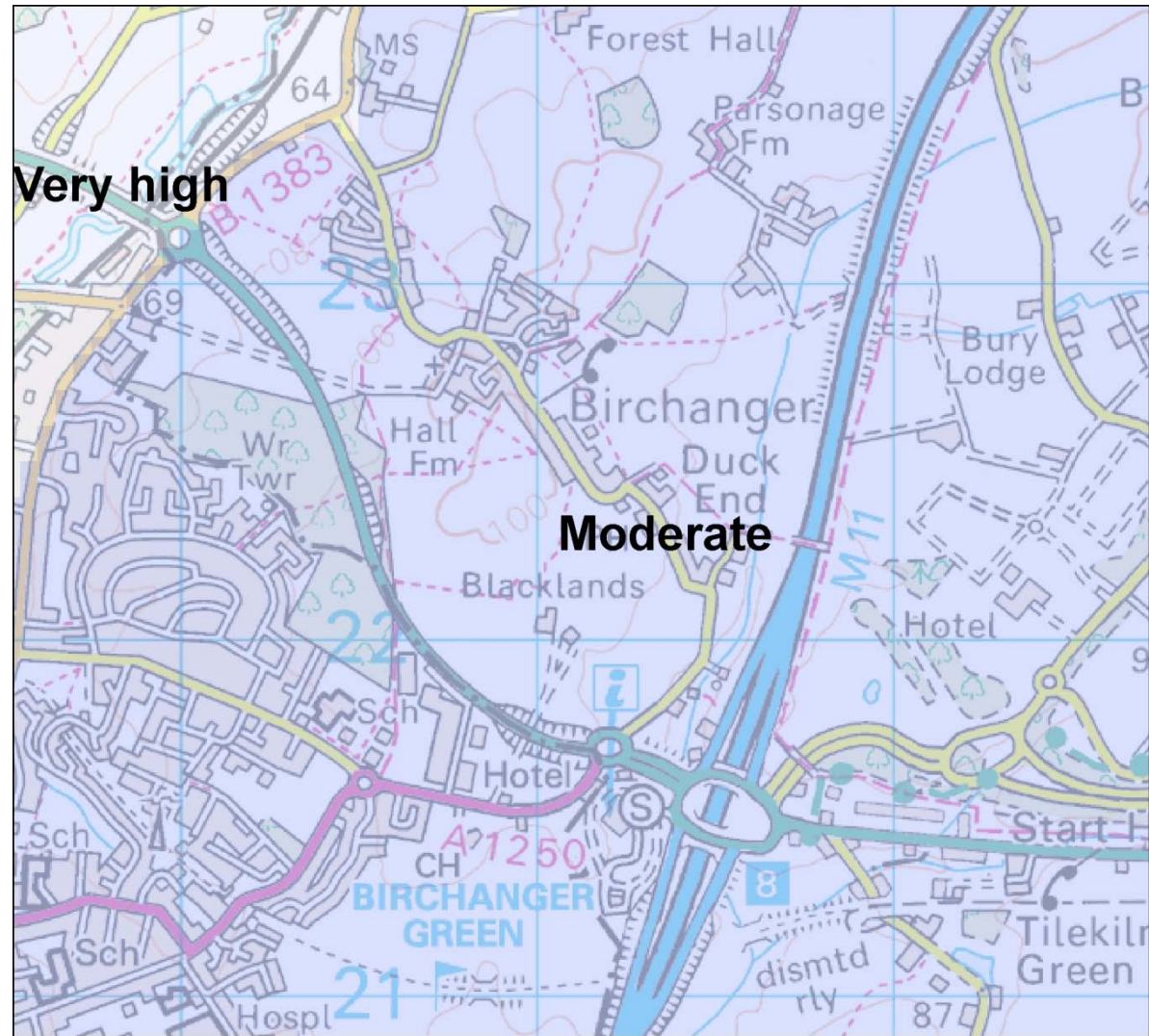
Bedrock permeability

Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



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Infiltration SuDS constraints

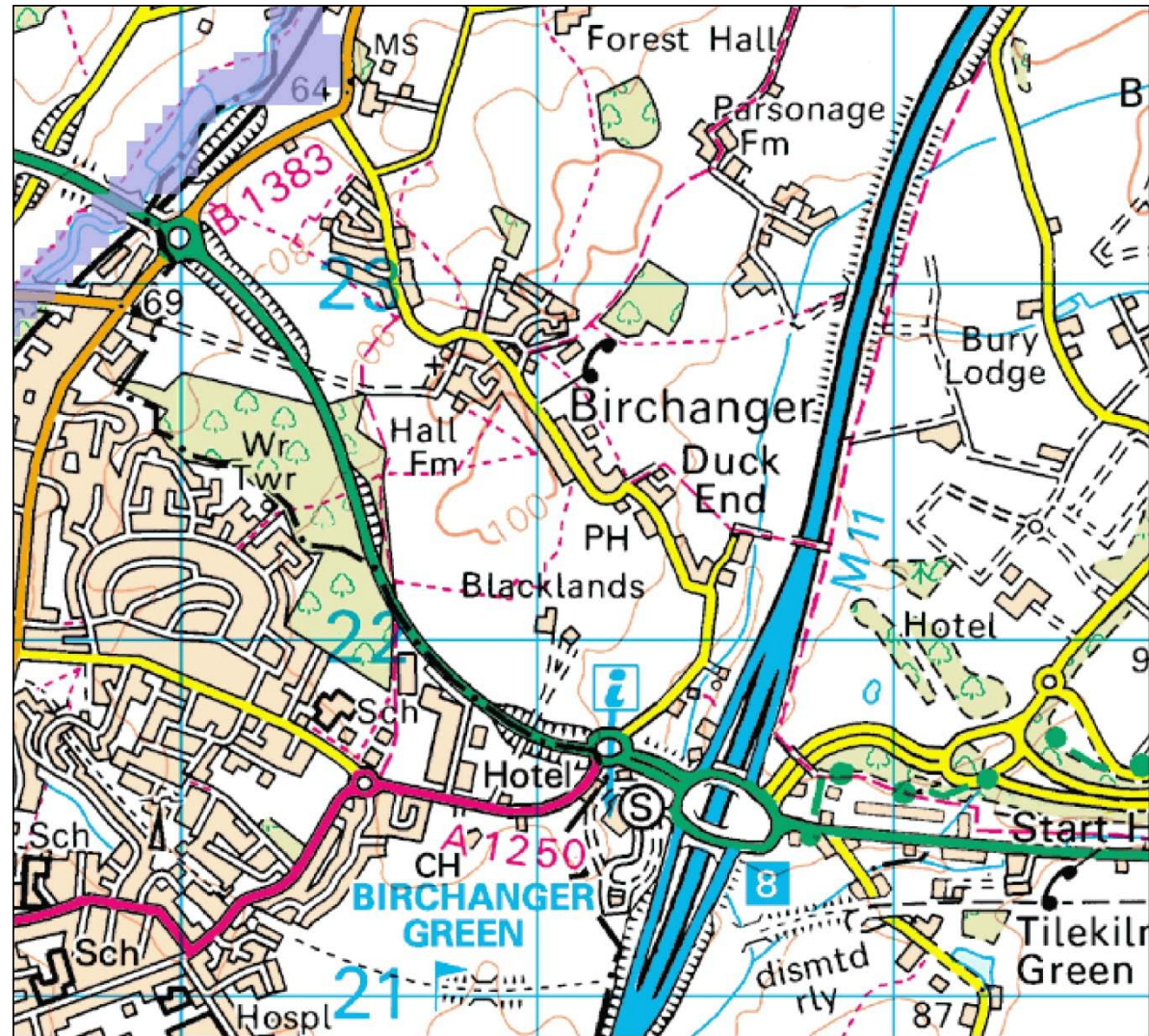
Infiltration SuDS Drainage

- Drainage summary
- Depth to groundwater
- Sup. deposit permeability
- Sup. deposit thickness
- Bedrock permeability
- Geo indicators of flooding

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

Running sand

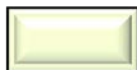
Compressible ground

Collapsible ground

Swelling clays

Ground stability

Geohazard unlikely



Potential for geohazard



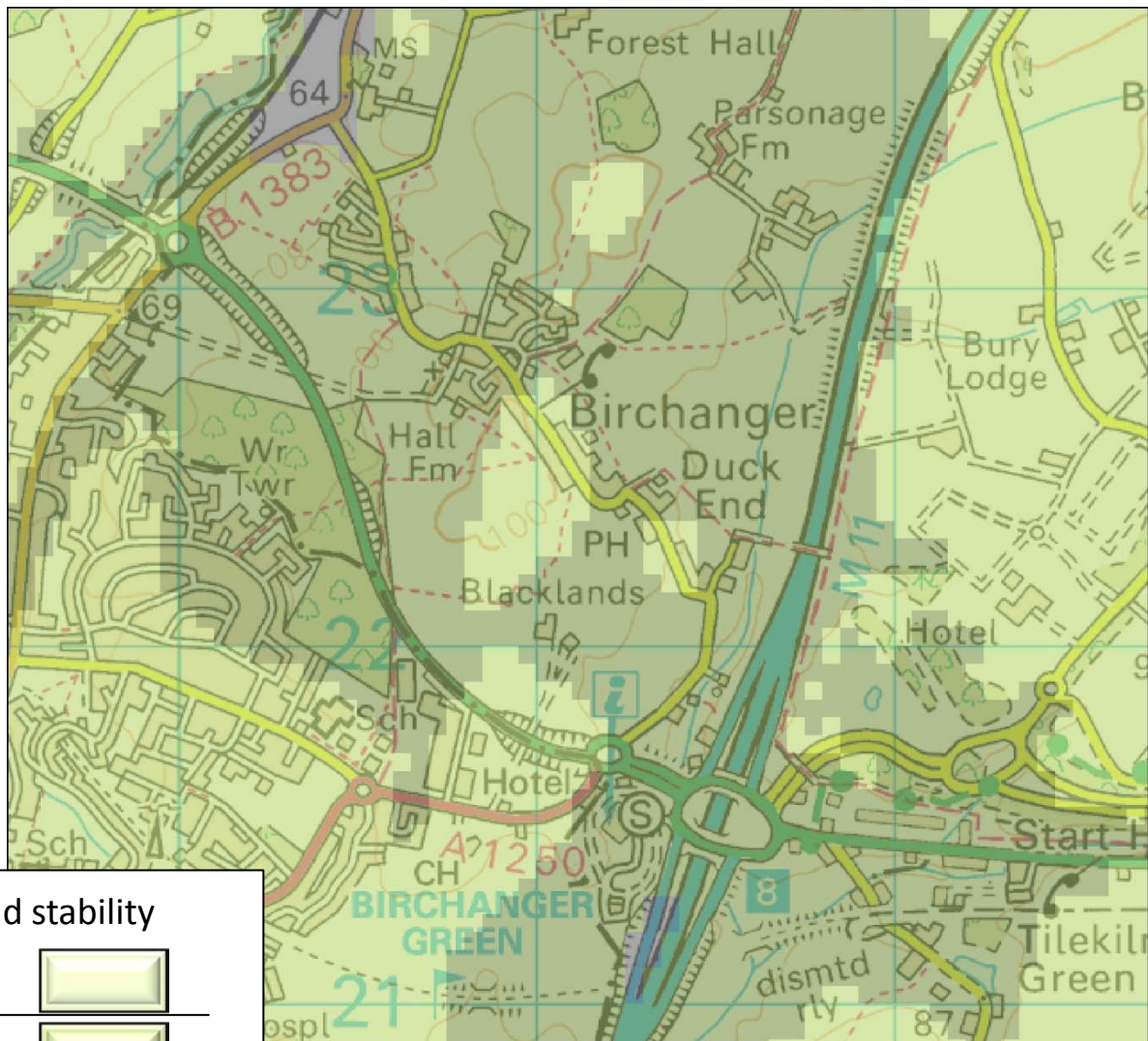
Significant potential for geohazard



Very significant constraints are indicated



Infiltration SuDS Map: Detailed



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

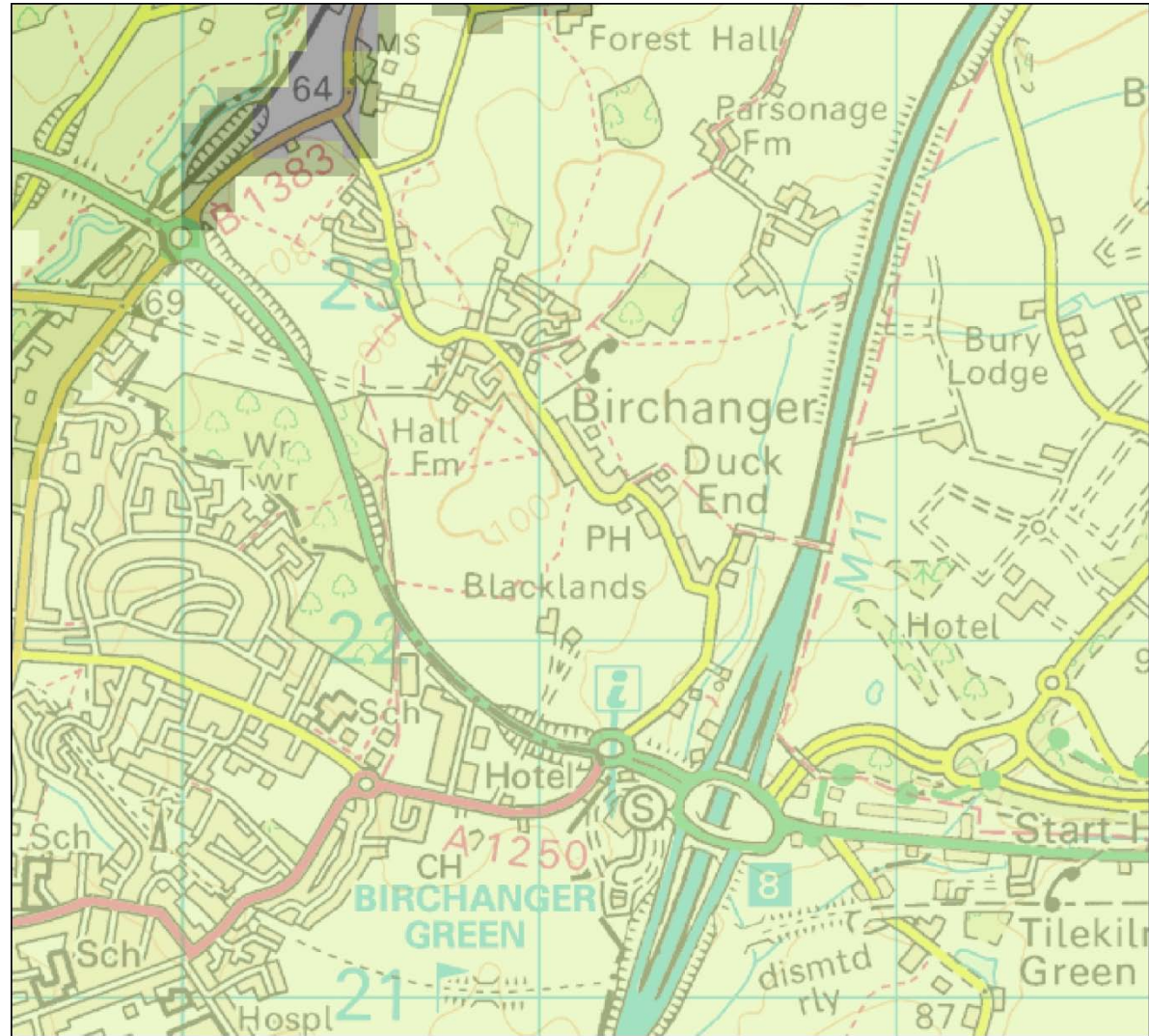
Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

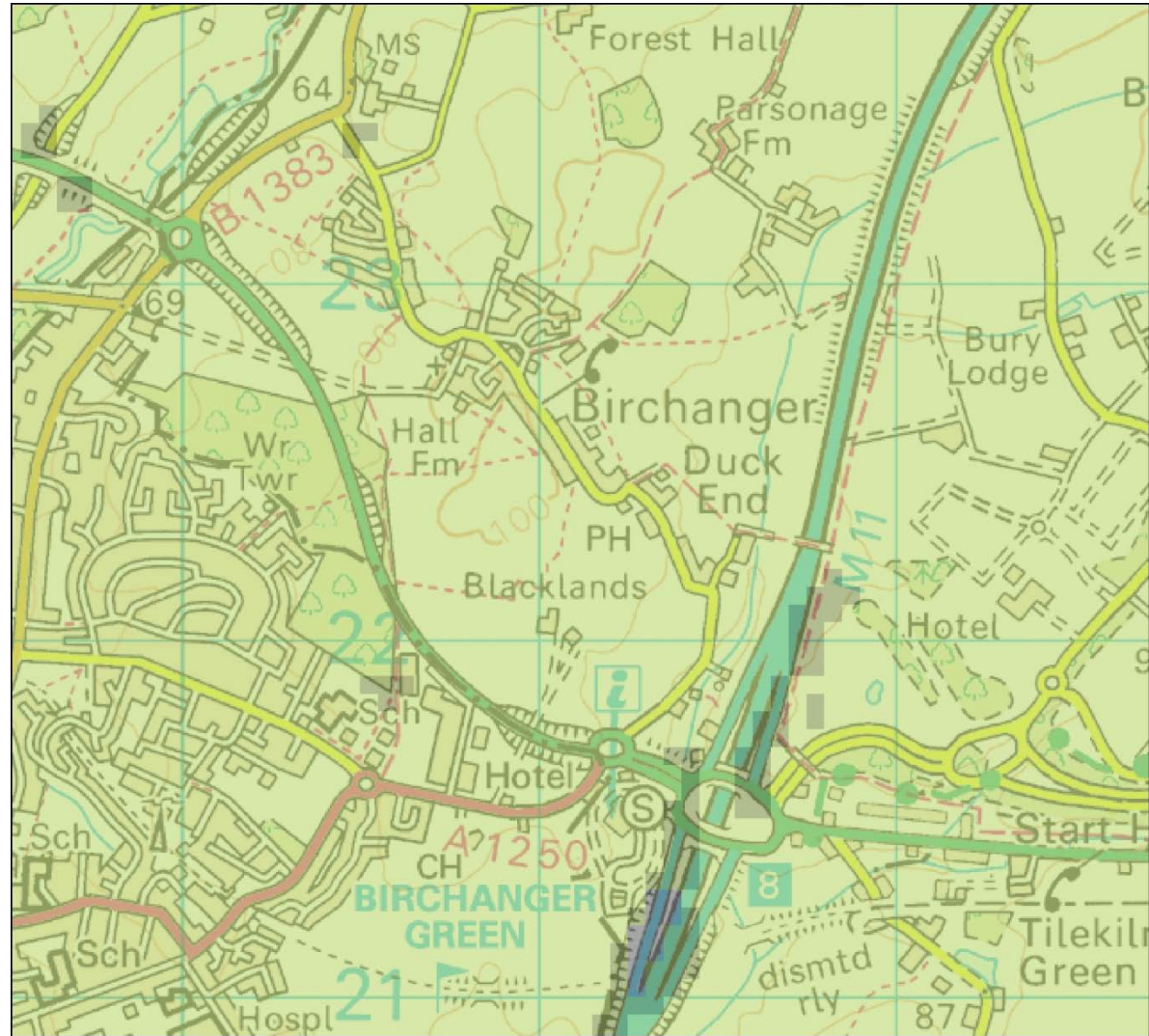
Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

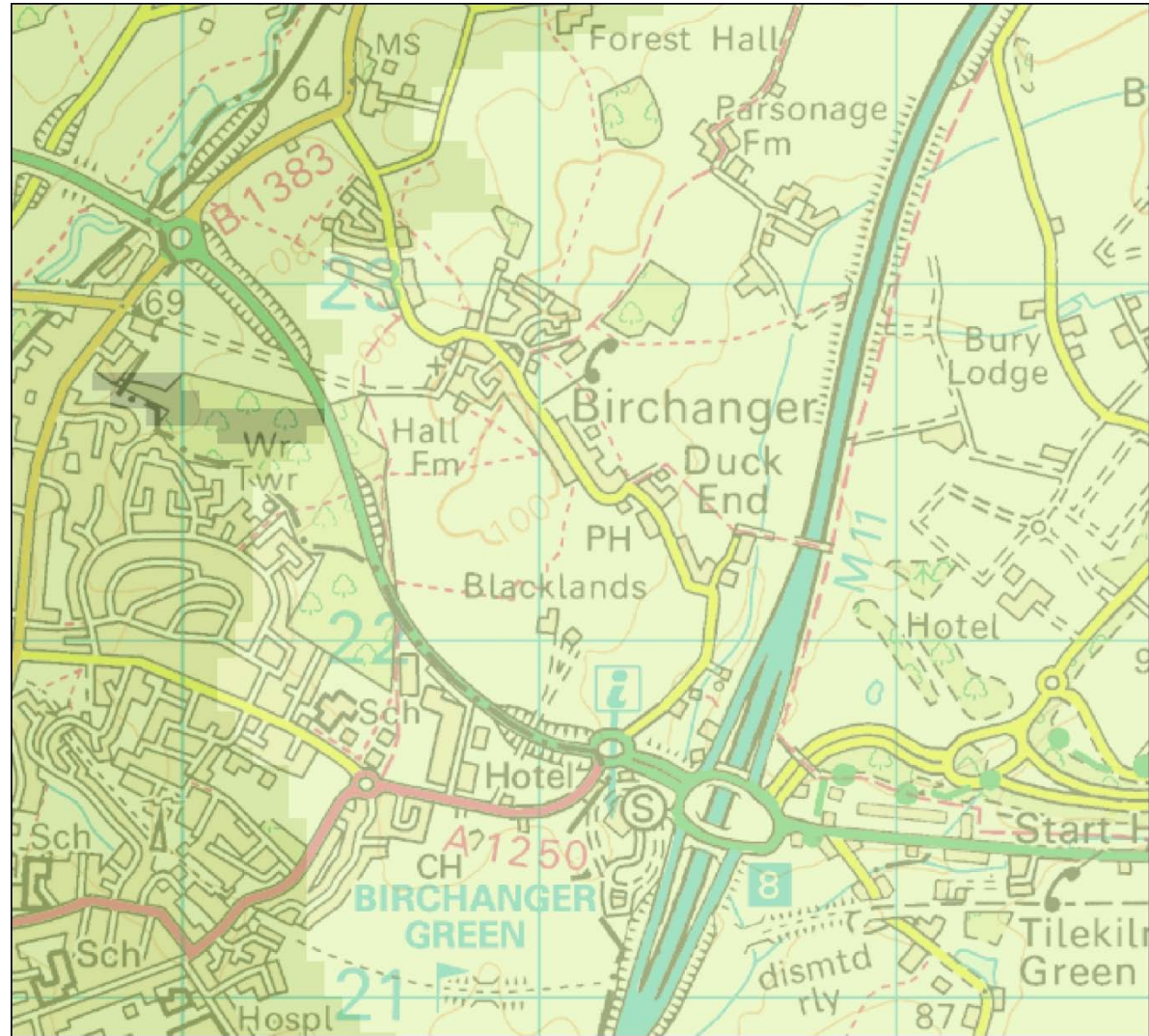
Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection



Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection

Infiltration SuDS Map: Detailed



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

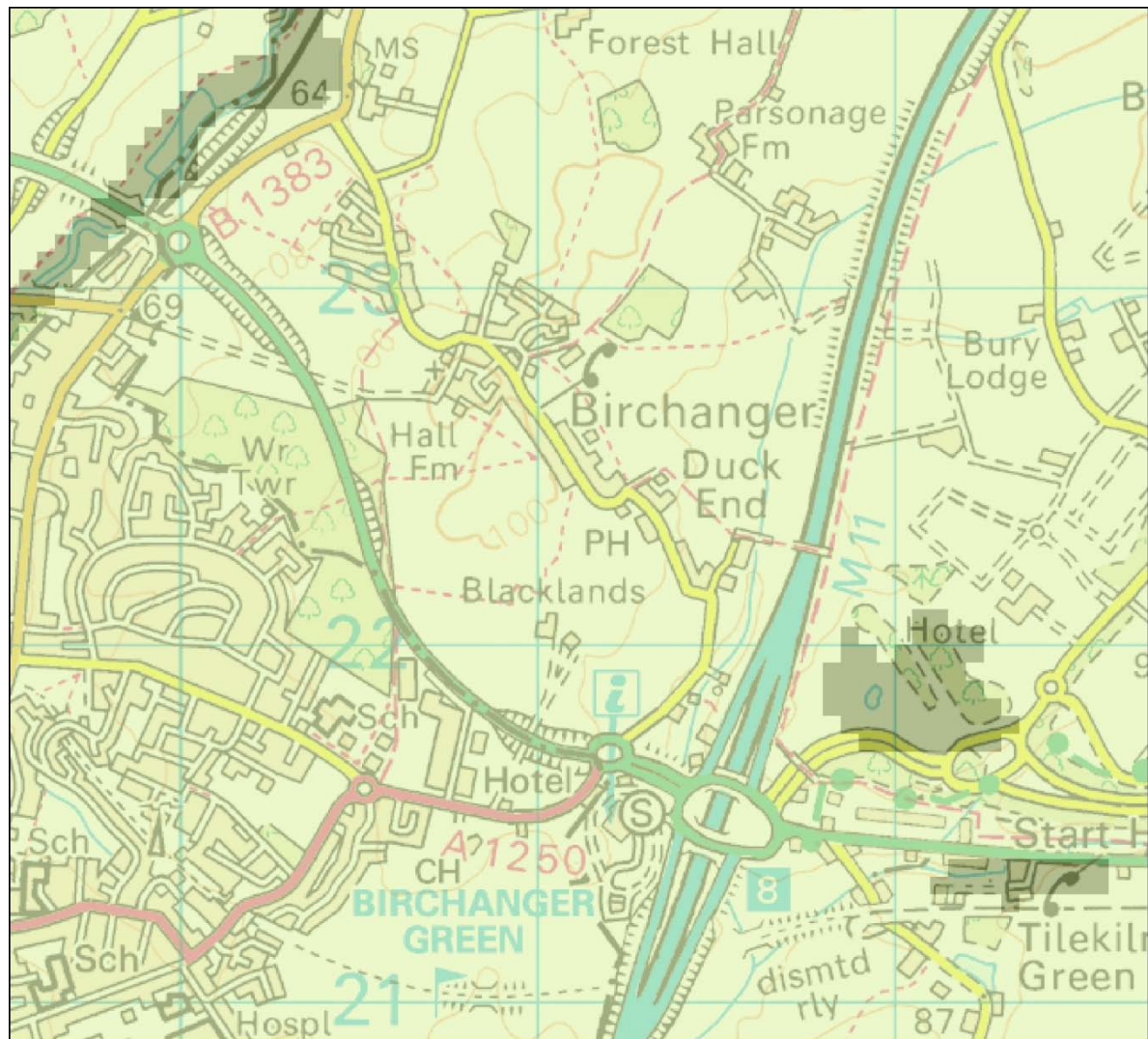
Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

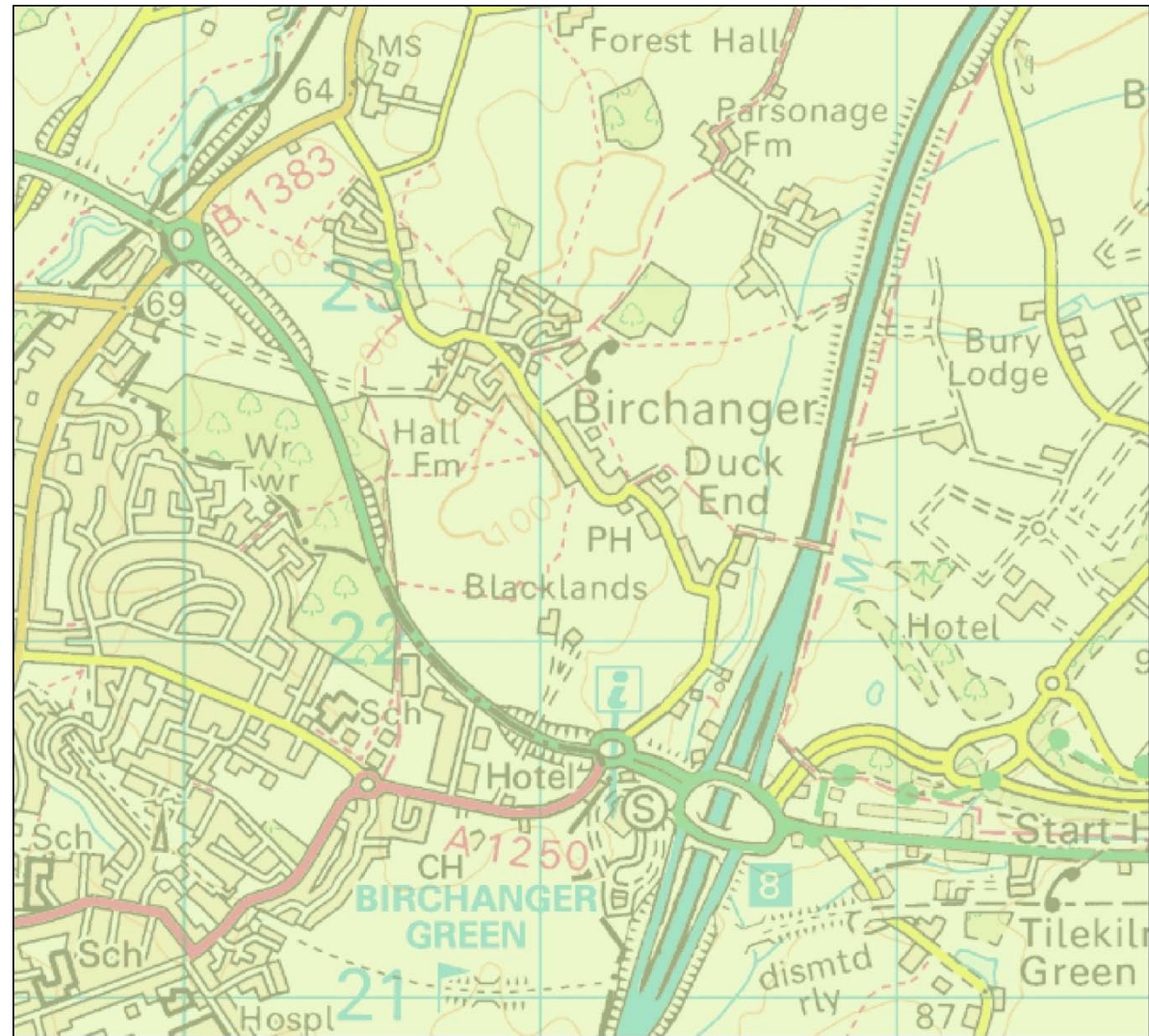
Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Ground instability summary

Soluble rocks

Landslides

Shallow mining (non-coal)

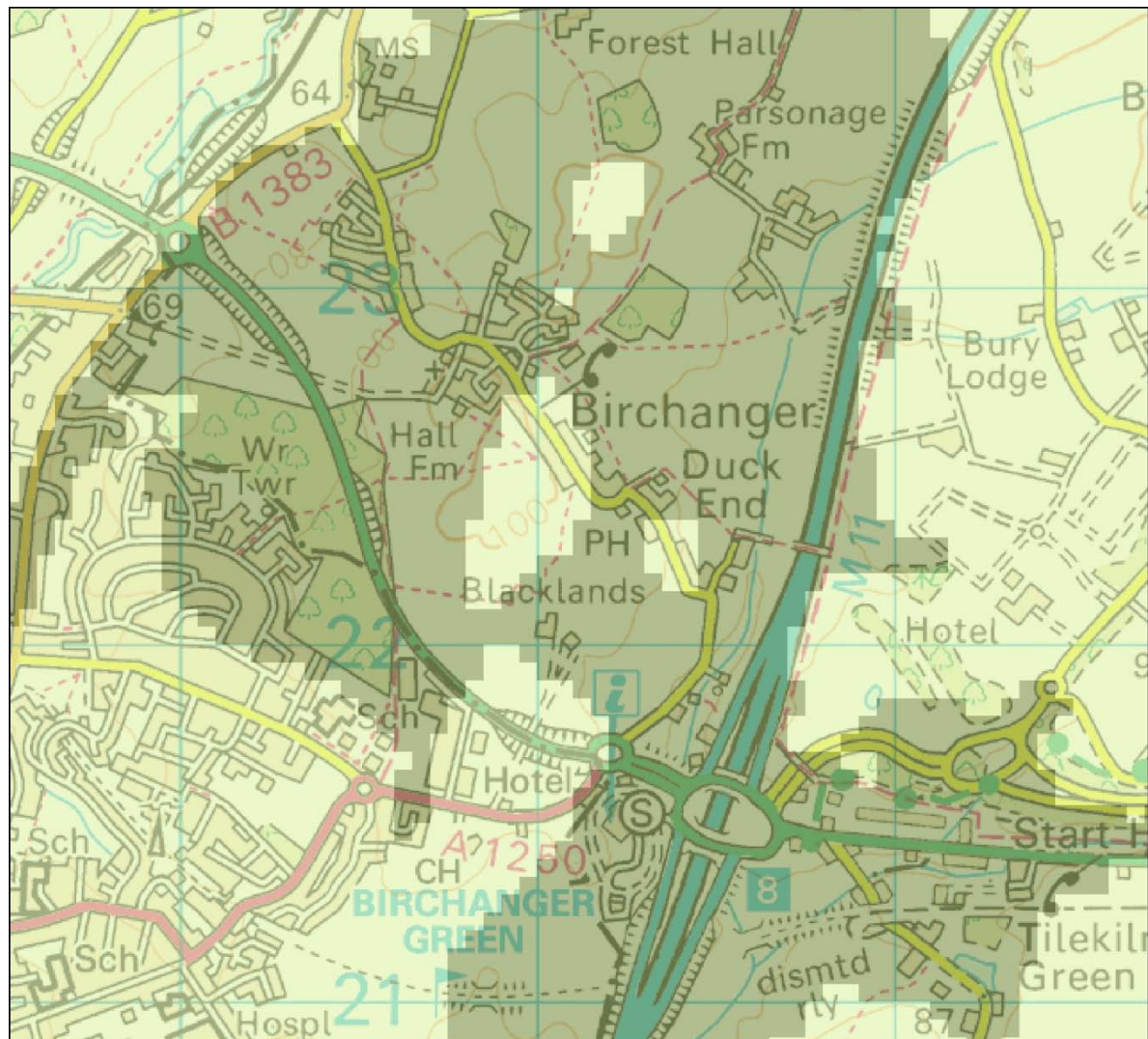
Running sand

Compressible ground

Collapsible ground

Swelling clays

Infiltration SuDS GW protection



Infiltration SuDS Map: Detailed

Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

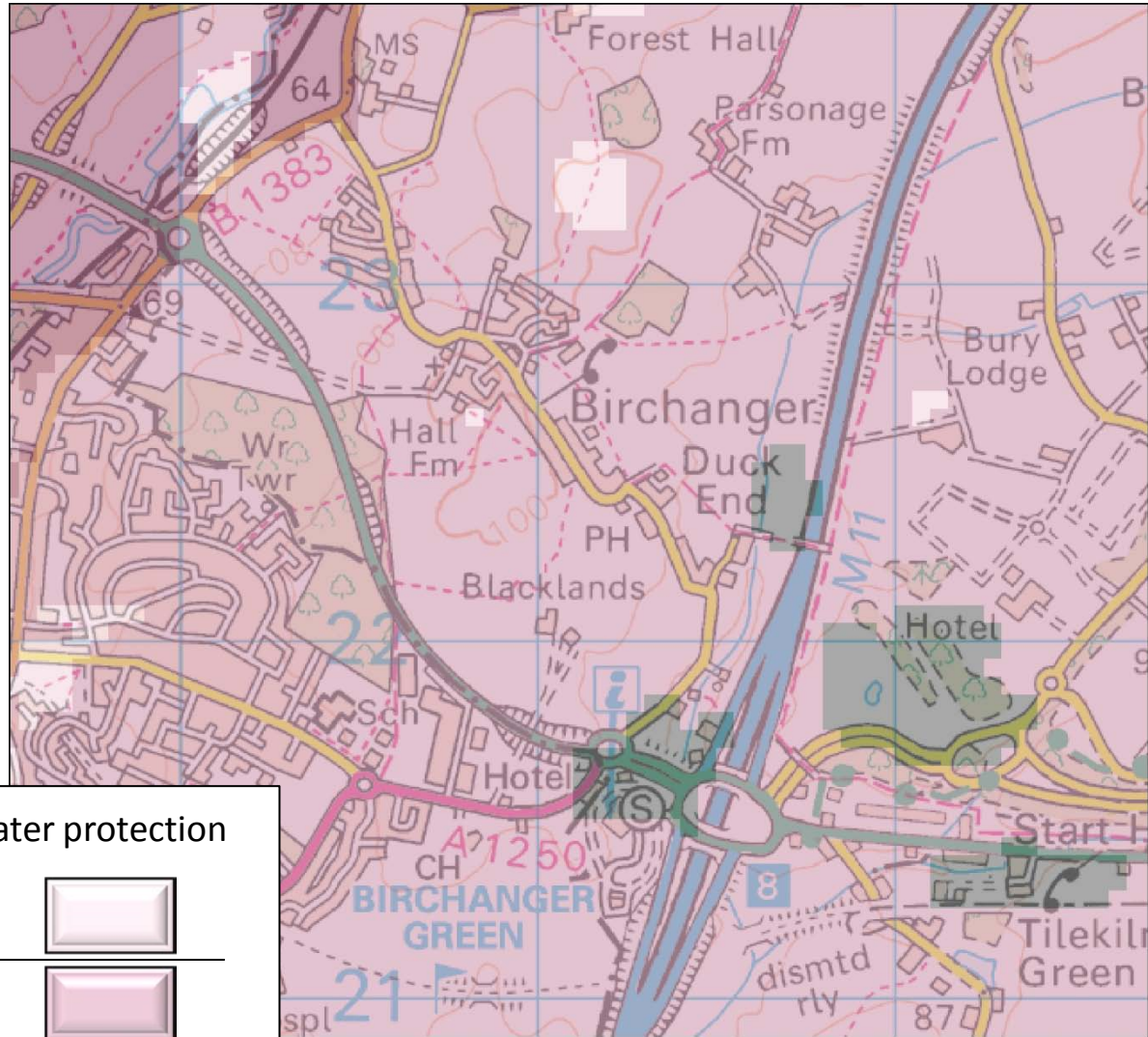
Infiltration SuDS GW protection

GW protection summary

GW source protection zones

Predominant flow mechanism

Made ground



Groundwater protection

Low susceptibility



Moderate susceptibility



Considerable susceptibility



Very significant constraints are indicated



Infiltration SuDS Map: Detailed

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

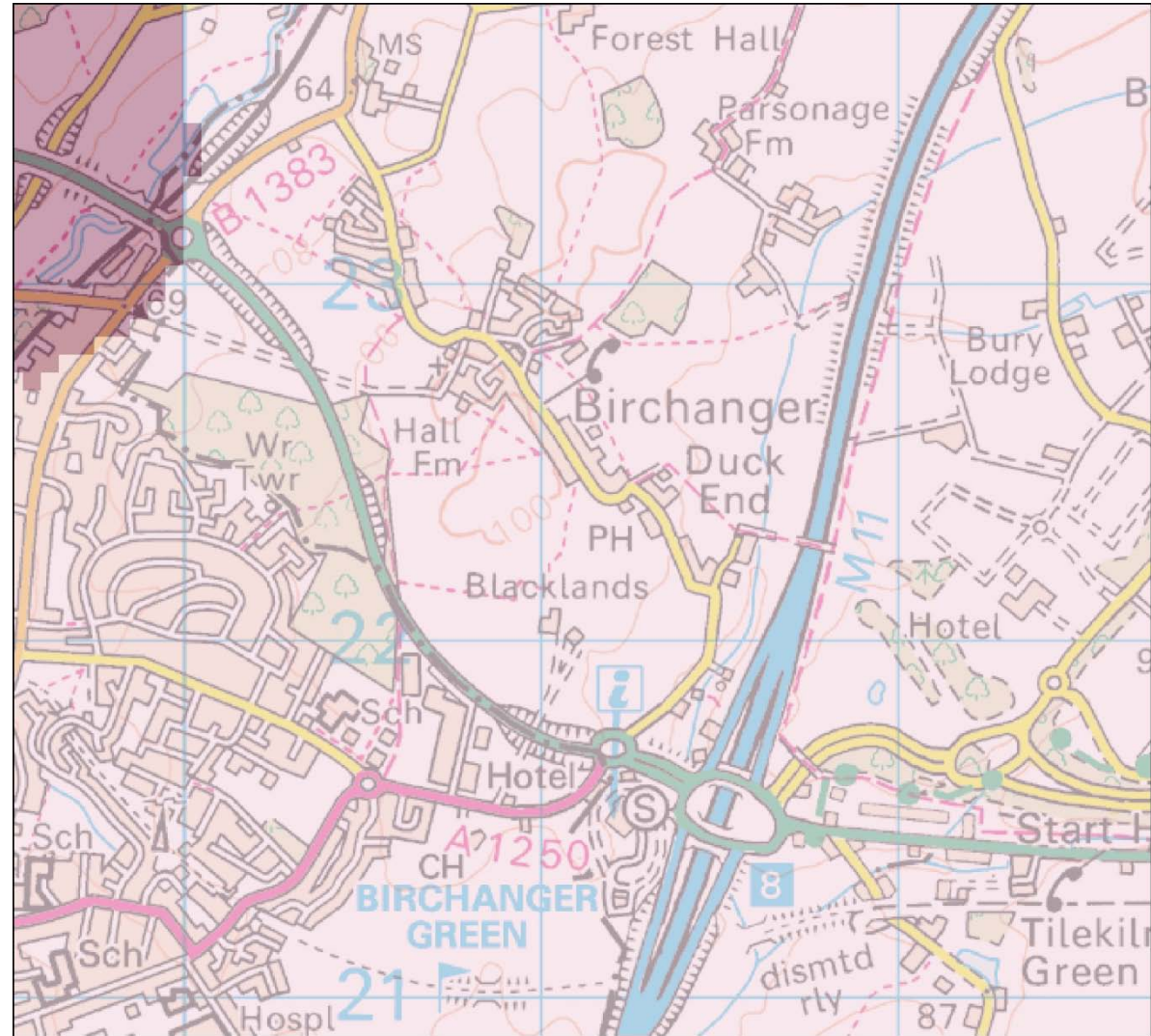
Infiltration SuDS GW protection

GW protection summary

GW source protection zones

Predominant flow mechanism

Made ground



Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

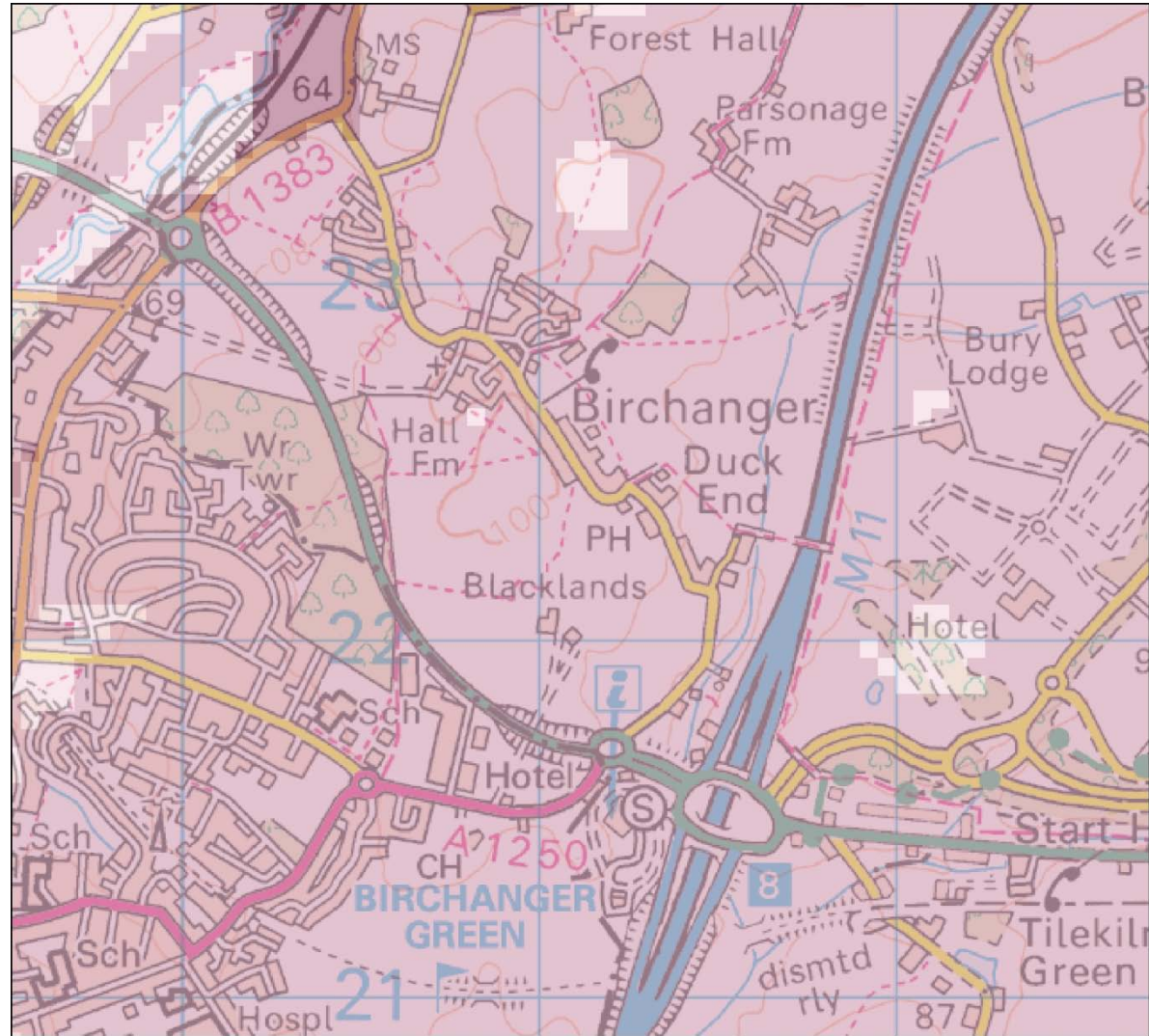
GW protection summary

GW source protection zones

Predominant flow mechanism

Made ground

Infiltration SuDS Map: Detailed



Infiltration SuDS constraints

Infiltration SuDS Drainage

Infiltration SuDS Ground stability

Infiltration SuDS GW protection

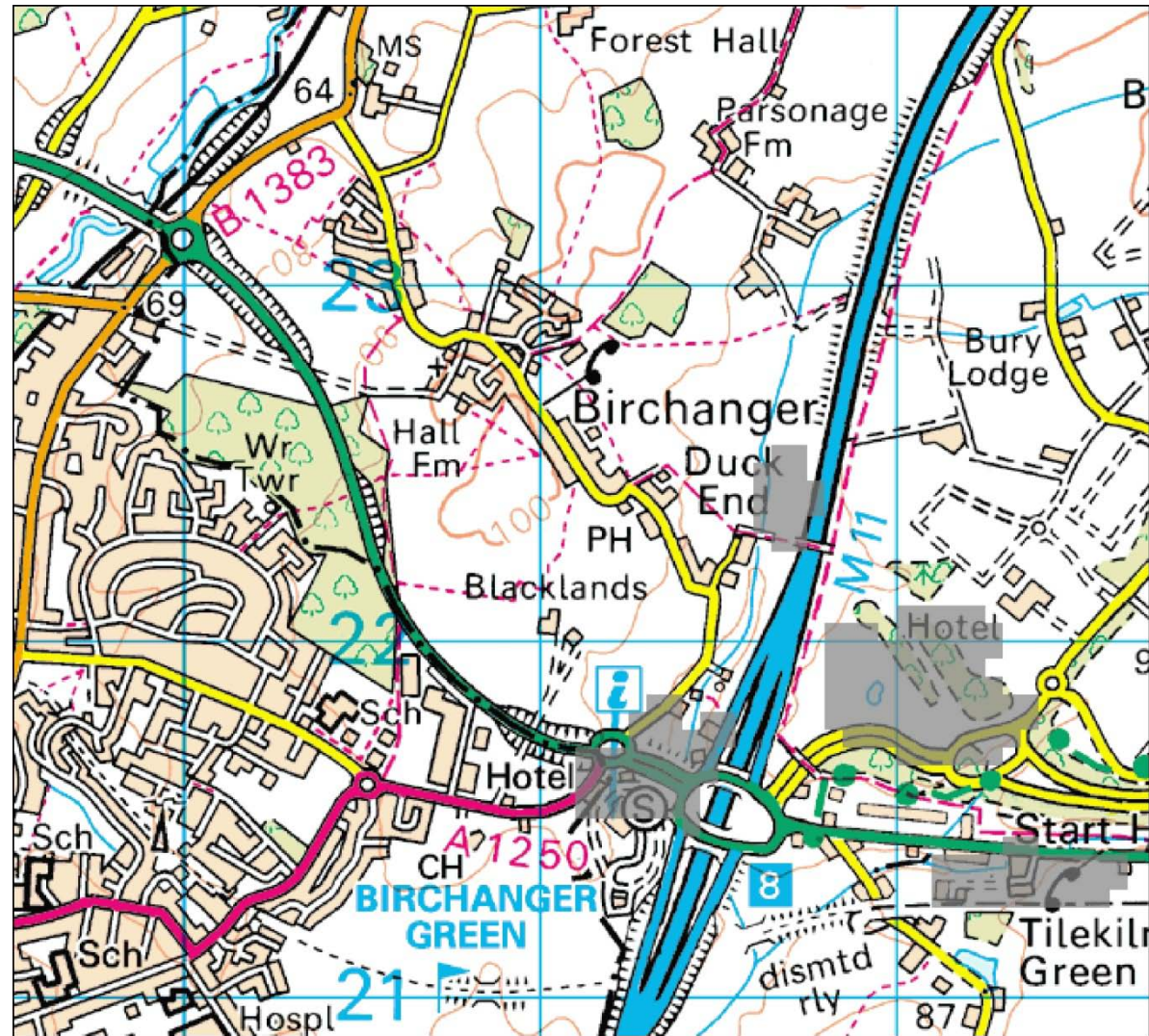
GW protection summary

GW source protection zones

Predominant flow mechanism

Made ground

Infiltration SuDS Map: Detailed



Birchanger – data summary

Step 1

Soluble rocks	Null
Landslides	Null
Groundwater flooding	Null
Artificial ground	Null
Mining hazards	Null

Step 2

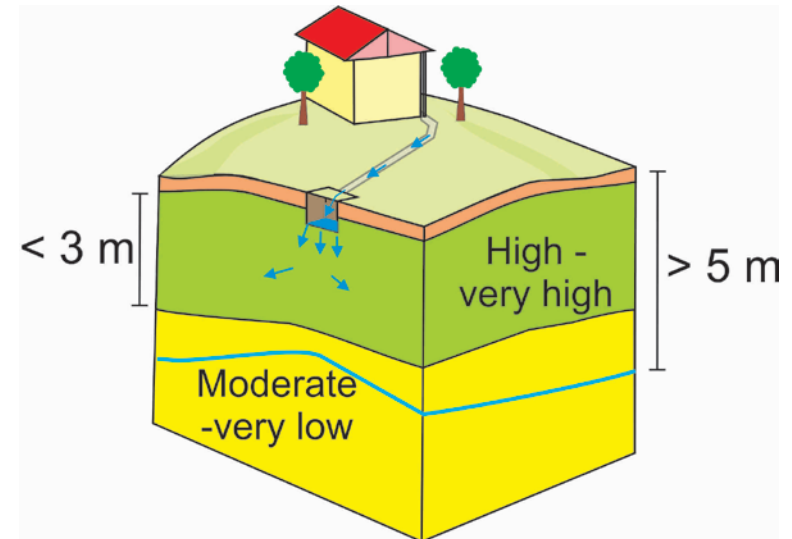
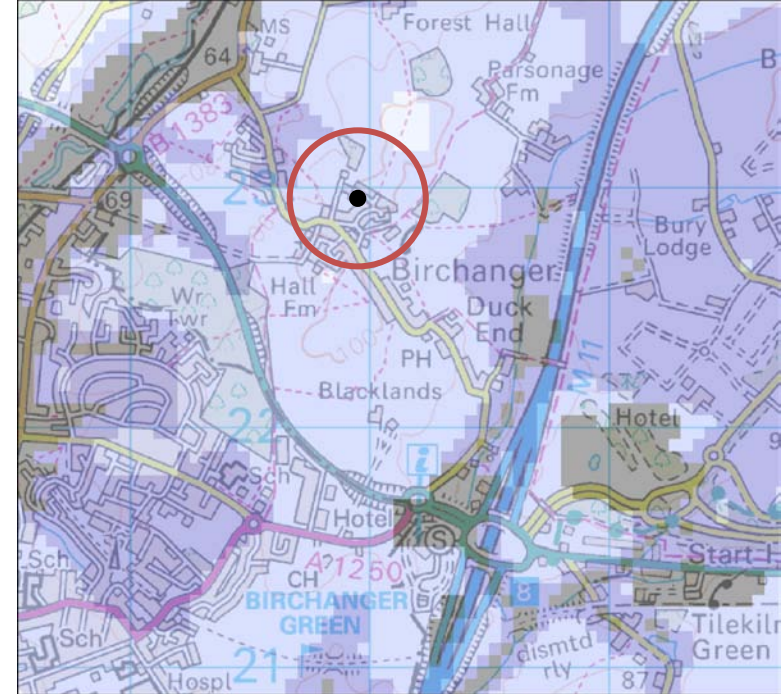
Superficial permeability	High to very high
Superficial thickness	< 3 m
Bedrock permeability	Moderate to very low
Depth to water table	> 5 m
Geological indicators of flooding	Null

Step 3

Soluble rocks	Geohazard unlikely
Landslides	Moderate constraint
Compressible deposits	Geohazard unlikely
Swelling clays	Considerable constraint
Running sands	Moderate constraint
Collapsible ground	Geohazard unlikely
Mining hazards	Geohazard unlikely

Step 4

Groundwater source protection zones	Null
Predominant flow mechanism	Fracture flow
Made ground	Null





Infiltration SuDS Map: Summary

Using the Infiltration SuDS Map for
strategic planning

Infiltration SuDS Map: Summary Description

The summary map comprises four summary layers, providing an indication of the suitability of the ground for infiltration SuDS.

The layers summarise: the presence of severe constraints; the drainage potential of the ground; the potential for ground instability as a result of infiltration and the susceptibility of the groundwater to contamination.

This map is anticipated to be of use in strategic planning and not for local assessment. It does not provide specific subsurface data or state the limitations of the subsurface with respect to infiltration.





Further details

Prices:

- Infiltration SuDS Map shapefile data
 - Summary (4 summary layers) = £0.50 per km²
 - Detailed (24 layers) = £1.50 per km²

Shapefile data is subject to costs for data prep (£150) and licensing (£150)

- Infiltration to the ground GeoReport = £70
- Email: digitaldata@bgs.ac.uk

Useful links

Email: rach1@bgs.ac.uk or suds@bgs.ac.uk

Website: www.bgs.ac.uk/suds

Product information:

<http://www.bgs.ac.uk/products/hydrogeology/infiltrationSuds.html>

Product demo:

http://www.bgs.ac.uk/science/landUseAndDevelopment/urban_geoscience/suds/research.html

User guide (detailed):

<http://nora.nerc.ac.uk/16618/>