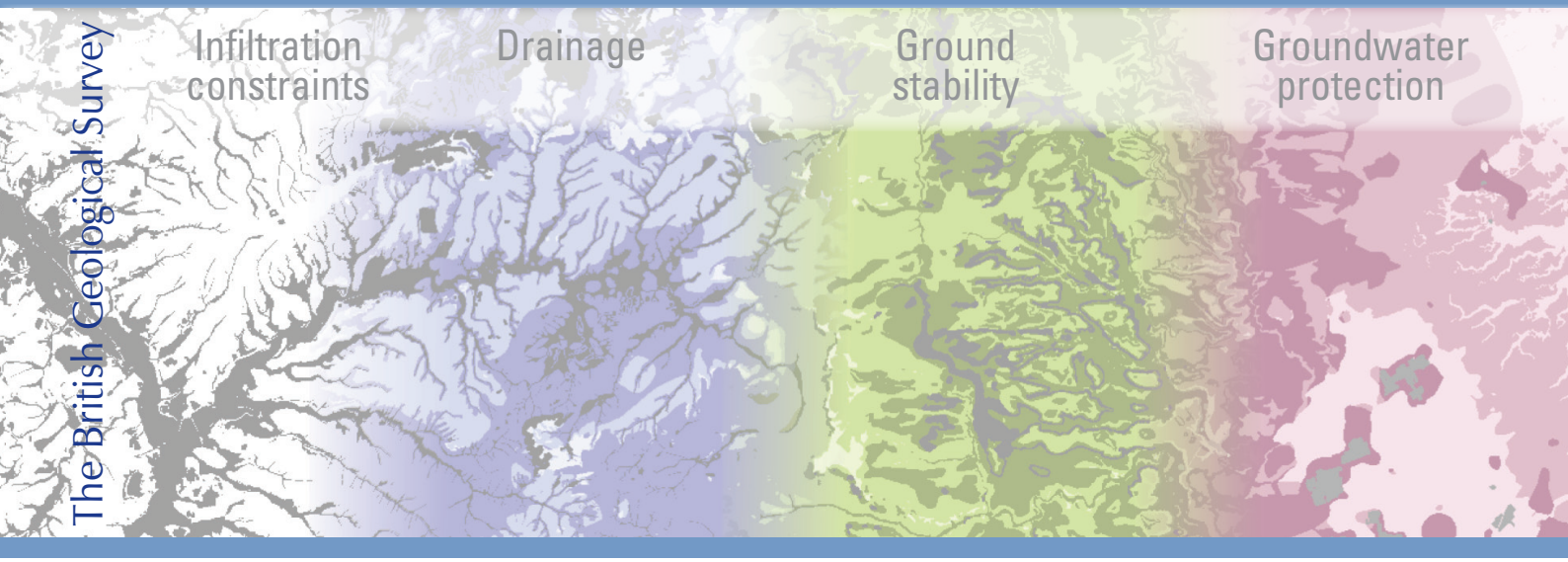
# Suitability of the subsurface for infiltration SuDS in Great Britain

The British Geological Survey




### What are infiltration SuDS?

Infiltration SuDS are sustainable drainage systems (SuDS) that allow surface water to infiltrate to the ground. Examples include soakaways, infiltration basins, infiltration trenches and permeable pavements.

### Can infiltration SuDS be installed anywhere?

Infiltration SuDS can be installed where the ground conditions are suitable. Consideration must be given to the drainage potential, the stability of the ground and the potential impact of infiltrating surface water to the quality of the receiving groundwater. Where ground conditions are optimal, infiltration may form the principal drainage solution, elsewhere, it may provide part of the solution.

### What does this document contain?

This document provides an indication of the suitability of the subsurface for infiltration SuDS in each unitary authority area within the United Kingdom. It gives percentage area estimates for where the subsurface is: highly compatible for infiltration SuDS; probably compatible for infiltration SuDS; where there are opportunities for bespoke infiltration SuDS, and where very significant constraints are indicated. These classifications are described in Table 1.

### How was the data derived?

The data was generated from the 'Drainage Summary' section of the Infiltration SuDS Map, which is derived from ten national British Geological Survey digital maps including: GeoSure soluble rocks, GeoSure landslide hazards, DiGMapGB50 artificial ground, mining hazards (non-coal) for SuDS, susceptibility to groundwater flooding, permeability indices, geological indicators of flooding, depth to groundwater and the superficial thickness model. The majority of these maps are derived from the 1:50 000 scale digital geological map (DiGMapGB50). The methodology used to derive this product is provided in the user guide (http://nora.nerc.ac.uk/16618/).

### How were the statistics calculated?

The maps allow estimation of the extent to which the geology and hydrogeology are suitable for infiltration SuDS. For each map, geologists predicted how suitable the ground would be for infiltration SuDS on that factor alone. All maps were then combined by

**Table 1** Description of suitability classifications.

| Classification | Description |
|---|---|
| Highly compatible for infiltration SuDS | Suitable for free-draining SuDS |
| Probably compatible for infiltration SuDS | The subsurface is probably suitable for infiltration SuDS, but the design of the system may be influenced by the ground conditions |
| Opportunities for bespoke infiltration SuDS | The subsurface is potentially suitable for infiltration SuDS, but the design will be highly influenced by the ground conditions |
| Very significant constraints | There is a very significant potential for one or more hazards associated with infiltration |

reporting the most limiting suitability, thereby producing a map with four categories, as per Table 1. For each Unitary Authority area (as derived from the Ordnance Survey's Boundary Line dataset, version October 2012) the percentage area covered by each of the above four categories was calculated.

### Are the statistics a fair representation of the suitability of the subsurface for infiltration?

The methodology used to create the Infiltration SuDS Map has been peer-reviewed and validated (Dearden et al., in press). Known limitations include the following omissions:

- presence of contaminated land;
- presence of coal mining hazards;
- areas of small-scale artisan mining may be under-represented in areas that have not typically been mined;
- previous and current land-use;
- presence of perched groundwater tables, and
- presence of made ground where not recorded.

### What can these statistics be used for?

These statistics have been released for general information and for high-level strategic planning purposes.

### The data suggest that the Unitary Authority area where I live is not very suitable for infiltration. What does this mean?

Where the subsurface is sub-optimal for infiltration SuDS, other types of sustainable drainage systems are likely to be more appropriate. For example, instead of infiltrating water to the ground, surface water can be temporarily stored in ponds, wetlands, or in constructed underground chambers, or alternatively if no other options are available, permission may be given for surface water to be discharged to the drainage network.

### Where can further information be found?

For further information, please visit the BGS SuDS webpages (www.bgs.ac.uk/suds) or contact enquiries@bgs.ac.uk.

### Is the data that these statistics are derived from available?

Information about obtaining the Infiltration SuDS Map is available from: http://www.bgs.ac.uk/products/hydrogeology/infiltrationSuds.html, http://shop.bgs.ac.uk/georeports/home.cfm or by emailing enquiries@bgs.ac.uk.

### References

Dearden, R A, Marchant, A P, and Royse, K R. (in press) Development of a suitability map for infiltration sustainable drainage systems (SuDS). *Environmental Earth Sciences.*

Dearden, R A. (2011) User Guide for the Infiltration SuDS Map Detailed. British Geological Survey, Open Report OR/11/061.

For more information please contact:

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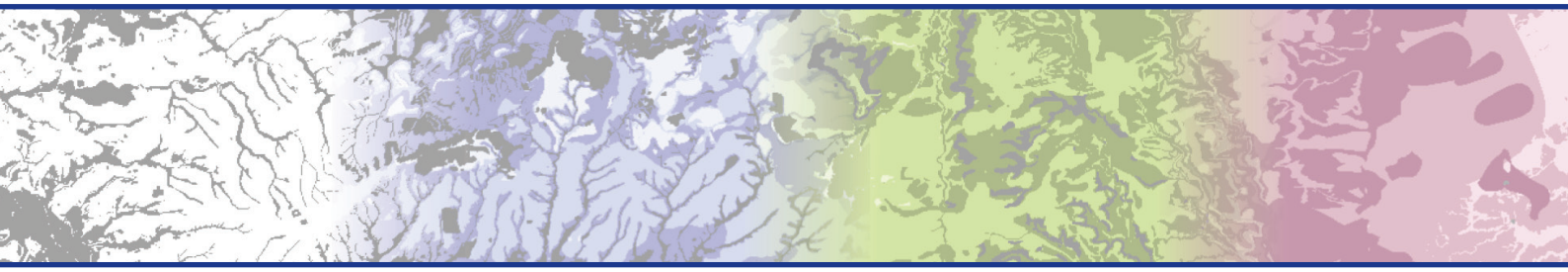

**Table 2** Suitability of the subsurface for infiltration SuDS within unitary authority areas (%) calculated from the 'Drainage Summary' layer of the Infiltration SuDS Map: Aberdeen City to City of Bristol.

| | Compatible for infiltration SuDS | Probably compatible for infiltration SuDS | Opportunities for bespoke infiltration SuDS | Very significant constraints indicated |
|---|---|---|---|---|
| **Aberdeen City** | 5 | 16 | 48 | 31 |
| **Aberdeenshire** | 2 | 7 | 67 | 24 |
| **Angus** | 5 | 25 | 40 | 31 |
| **Argyll and Bute** | 1 | 13 | 70 | 16 |
| **Barking and Dagenham** | 2 | 13 | 40 | 45 |
| **Barnet** | 1 | 56 | 38 | 4 |
| **Barnsley** | 28 | 26 | 23 | 23 |
| **Bath and North East Somerset** | 16 | 24 | 40 | 20 |
| **Bedford** | 2 | 22 | 55 | 22 |
| **Bexley** | 27 | 12 | 31 | 29 |
| **Birmingham District** | 22 | 12 | 47 | 19 |
| **Blackburn with Darwen** | 14 | 35 | 23 | 29 |
| **Blackpool** | 2 | 27 | 27 | 44 |
| **Blaenau/Gwent** | 29 | 20 | 8 | 42 |
| **Bolton District** | 6 | 49 | 18 | 28 |
| **Bournemouth** | 37 | 15 | 35 | 13 |
| **Bracknell Forest** | 21 | 32 | 37 | 10 |
| **Bradford** | 19 | 41 | 12 | 28 |
| **Brent** | 0 | 44 | 48 | 8 |
| **Bridgend** | 39 | 19 | 20 | 22 |
| **Bromley** | 31 | 11 | 28 | 30 |
| **Buckinghamshire** | 18 | 14 | 41 | 27 |
| **Bury** | 20 | 37 | 18 | 25 |
| **Caerphilly** | 46 | 25 | 15 | 14 |
| **Calderdale District** | 20 | 37 | 18 | 25 |
| **Cambridgeshire County** | 7 | 11 | 64 | 18 |
| **Camden** | 9 | 45 | 43 | 4 |
| **Cardiff** | 10 | 27 | 32 | 31 |
| **Carmarthenshire** | 6 | 29 | 45 | 21 |
| **Casnewydd/Newport** | 9 | 23 | 54 | 14 |
| **Central Bedfordshire** | 13 | 13 | 46 | 28 |
| **Ceredigion** | 1 | 43 | 37 | 19 |
| **Chester East** | 9 | 22 | 18 | 51 |
| **Chester West and Chester** | 10 | 21 | 34 | 35 |
| **City of Brighton and Hove** | 61 | 7 | 17 | 14 |
| **City of Bristol** | 16 | 13 | 44 | 27 |

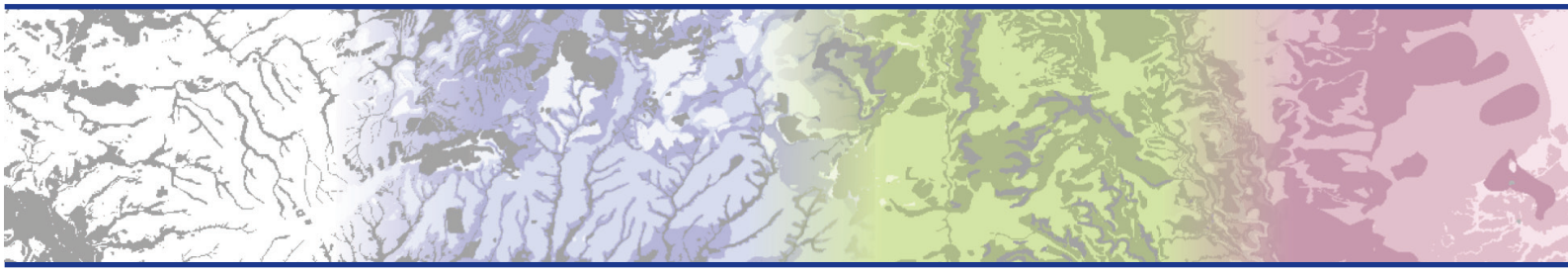

**Table 3** Suitability of the subsurface for infiltration SuDS within unitary authority areas (%) calculated from the 'Drainage Summary' layer of the Infiltration SuDS Map: City of Derby to Falkirk.

| | Compatible for infiltration SuDS | Probably compatible for infiltration SuDS | Opportunities for bespoke infiltration SuDS | Very significant constraints indicated |
|---|---|---|---|---|
| **City of Derby** | 2 | 3 | 64 | 31 |
| **City of Edinburgh** | 5 | 40 | 10 | 44 |
| **City of Leicester** | 1 | 18 | 47 | 34 |
| **City of London** | 10 | 17 | 50 | 23 |
| **City of Nottingham** | 22 | 9 | 37 | 32 |
| **City of Peterborough** | 8 | 5 | 60 | 28 |
| **City of Plymouth** | 4 | 3 | 75 | 18 |
| **City of Southampton** | 2 | 45 | 21 | 32 |
| **City of Stoke** | 7 | 36 | 6 | 52 |
| **City of Wolverhampton** | 12 | 22 | 26 | 40 |
| **Clackmannanshire** | 7 | 46 | 10 | 36 |
| **Conwy** | 3 | 26 | 47 | 24 |
| **Cornwall** | 3 | 40 | 48 | 9 |
| **County Durham** | 13 | 50 | 20 | 17 |
| **Coventry District** | 13 | 33 | 35 | 19 |
| **Croydon** | 26 | 5 | 23 | 46 |
| **Cumbria** | 8 | 30 | 42 | 20 |
| **Darlington** | 5 | 36 | 33 | 26 |
| **Denbighshire** | 5 | 35 | 33 | 27 |
| **Derbyshire** | 28 | 24 | 26 | 23 |
| **Devon** | 19 | 24 | 45 | 12 |
| **Doncaster** | 18 | 10 | 57 | 15 |
| **Dorset** | 31 | 12 | 32 | 25 |
| **Dudley District** | 18 | 23 | 19 | 40 |
| **Dumfries and Galloway** | 2 | 49 | 29 | 21 |
| **Dundee City** | 2 | 50 | 11 | 37 |
| **Ealing** | 1 | 26 | 54 | 19 |
| **East Ayrshire** | 3 | 45 | 32 | 21 |
| **East Dunbartonshire** | 3 | 50 | 14 | 33 |
| **East Lothian** | 8 | 51 | 9 | 32 |
| **East Renfrewshire** | 0 | 56 | 28 | 16 |
| **East Riding** | 20 | 14 | 49 | 17 |
| **East Sussex** | 26 | 17 | 47 | 10 |
| **Enfield** | 1 | 36 | 35 | 28 |
| **Essex CC** | 4 | 43 | 37 | 16 |
| **Falkirk** | 2 | 40 | 10 | 48 |

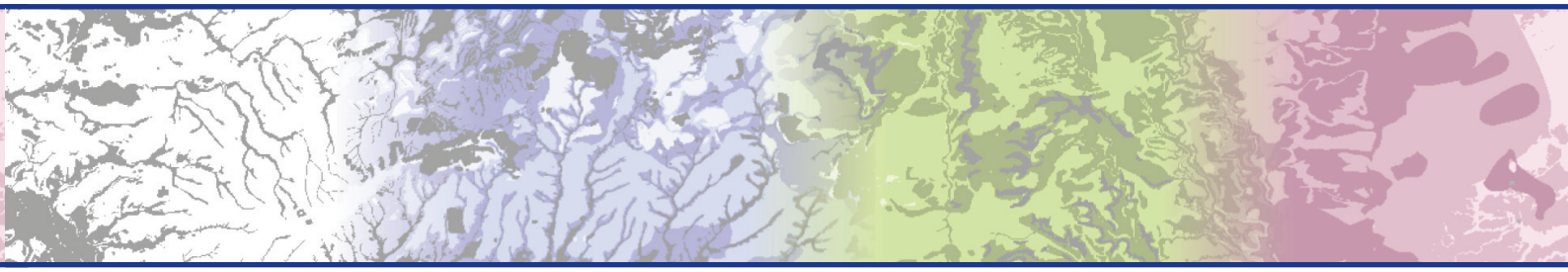

**Table 4** Suitability of the subsurface for infiltration SuDS within unitary authority areas (%) calculated from the 'Drainage Summary' layer of the Infiltration SuDS Map: Fife to Lewisham.

| | Compatible for infiltration SuDS | Probably compatible for infiltration SuDS | Opportunities for bespoke infiltration SuDS | Very significant constraints indicated |
|---|---|---|---|---|
| **Fife** | 4 | 45 | 15 | 36 |
| **Flintshire** | 7 | 29 | 20 | 44 |
| **Gateshead** | 14 | 36 | 20 | 30 |
| **Glasgow City** | 5 | 38 | 6 | 51 |
| **Gloucestershire** | 31 | 10 | 40 | 20 |
| **Greater London Authorities** | 8 | 20 | 39 | 33 |
| **Greenwich** | 16 | 9 | 45 | 30 |
| **Gwynedd** | 3 | 20 | 49 | 27 |
| **Hackney** | 4 | 22 | 40 | 34 |
| **Halton** | 12 | 21 | 54 | 13 |
| **Hammersmith and Fulham** | 0 | 2 | 64 | 35 |
| **Hampshire** | 34 | 21 | 24 | 22 |
| **Haringey** | 1 | 37 | 55 | 6 |
| **Harrow** | 0 | 41 | 55 | 3 |
| **Hartlepool** | 5 | 35 | 50 | 11 |
| **Havering** | 5 | 32 | 23 | 41 |
| **Herefordshire** | 13 | 45 | 22 | 20 |
| **Hertfordshire** | 19 | 34 | 23 | 24 |
| **Highland** | 1 | 11 | 66 | 22 |
| **Hillingdon** | 1 | 24 | 41 | 35 |
| **Hounslow** | 1 | 2 | 47 | 49 |
| **Hull** | 0 | 4 | 93 | 3 |
| **Inverclyde** | 7 | 49 | 23 | 20 |
| **Isle of Anglesey** | 2 | 14 | 51 | 33 |
| **Isle of Wight** | 21 | 28 | 34 | 17 |
| **Islington** | 6 | 32 | 49 | 12 |
| **Kensington and Chelsea** | 2 | 9 | 45 | 44 |
| **Kent** | 19 | 10 | 48 | 22 |
| **Kingston upon Thames** | 1 | 5 | 70 | 24 |
| **Kirklees** | 29 | 28 | 17 | 26 |
| **Knowsley** | 4 | 26 | 59 | 12 |
| **Lambeth** | 1 | 6 | 56 | 37 |
| **Lancashire** | 10 | 29 | 40 | 21 |
| **Leeds** | 26 | 33 | 17 | 23 |
| **Leicestershire** | 5 | 22 | 51 | 22 |
| **Lewisham** | 4 | 6 | 59 | 30 |

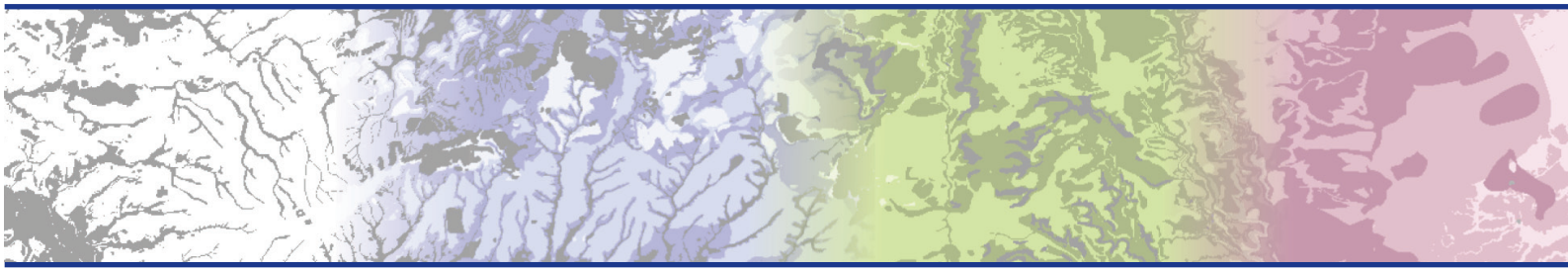

**Table 5** Suitability of the subsurface for infiltration SuDS within unitary authority areas (%) calculated from the 'Drainage Summary' layer of the Infiltration SuDS Map: Lincolnshire to Redbridge.

| | Compatible for infiltration SuDS | Probably compatible for infiltration SuDS | Opportunities for bespoke infiltration SuDS | Very significant constraints indicated |
|---|---|---|---|---|
| **Lincolnshire** | 11 | 10 | 57 | 22 |
| **Liverpool** | 15 | 17 | 50 | 18 |
| **Luton** | 24 | 19 | 32 | 26 |
| **Manchester District** | 6 | 25 | 50 | 19 |
| **Medway** | 11 | 9 | 51 | 29 |
| **Merthyr Tydfil** | 30 | 24 | 12 | 34 |
| **Merton** | 1 | 9 | 38 | 52 |
| **Middlesbrough** | 1 | 27 | 36 | 36 |
| **Midlothian** | 10 | 52 | 11 | 28 |
| **Milton Keynes** | 4 | 37 | 35 | 24 |
| **Monmouthshire** | 17 | 43 | 20 | 19 |
| **Moray** | 7 | 8 | 60 | 25 |
| **Na H-Eileanan an Iar** | 0 | 0 | 96 | 3 |
| **North East Lincolnshire** | 6 | 26 | 55 | 13 |
| **Neath and Port Talbot** | 33 | 20 | 19 | 28 |
| **Newcastle Upon Tyne** | 2 | 33 | 30 | 35 |
| **Newham** | 0 | 5 | 41 | 53 |
| **Norfolk** | 17 | 27 | 46 | 10 |
| **North Ayrshire** | 7 | 34 | 33 | 26 |
| **North Lincolnshire** | 10 | 12 | 34 | 44 |
| **North Somerset** | 28 | 5 | 55 | 12 |
| **North Tyneside** | 1 | 29 | 29 | 41 |
| **North Yorkshire** | 16 | 28 | 35 | 21 |
| **Northamptonshire** | 13 | 27 | 45 | 15 |
| **Northumberland** | 11 | 44 | 29 | 16 |
| **Nottinghamshire** | 16 | 10 | 48 | 25 |
| **Oldham** | 23 | 29 | 25 | 23 |
| **Orkney Islands** | 6 | 44 | 30 | 19 |
| **Oxfordshire** | 22 | 14 | 40 | 24 |
| **Pembrokeshire** | 9 | 22 | 55 | 13 |
| **Perth and Kinross** | 3 | 17 | 53 | 26 |
| **Poole** | 22 | 19 | 29 | 31 |
| **Portsmouth** | 8 | 5 | 39 | 48 |
| **Powys** | 4 | 34 | 42 | 20 |
| **Reading** | 9 | 24 | 25 | 42 |
| **Redbridge** | 2 | 29 | 29 | 39 |

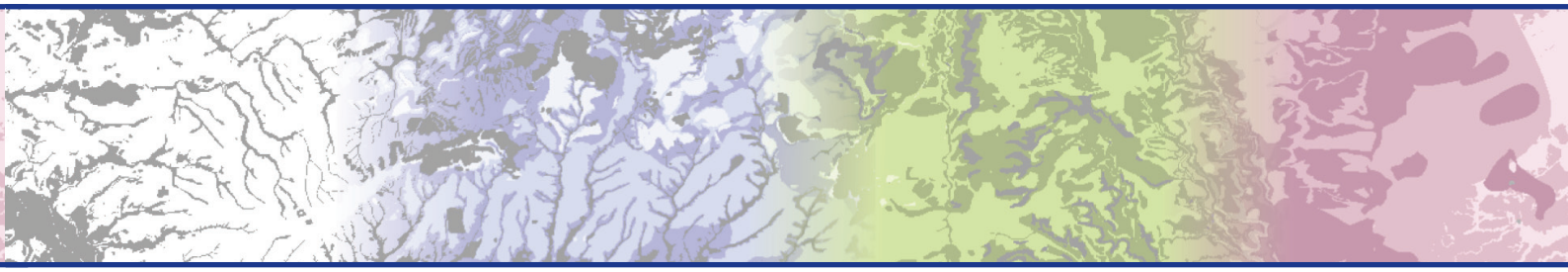

**Table 6** Suitability of the subsurface for infiltration SuDS within unitary authority areas (%) calculated from the 'Drainage Summary' layer of the Infiltration SuDS Map: Redcar and Cleveland to Thurrock.

| | Compatible for infiltration SuDS | Probably compatible for infiltration SuDS | Opportunities for bespoke infiltration SuDS | Very significant constraints indicated |
|---|---|---|---|---|
| **Redcar and Cleveland** | 6 | 40 | 18 | 36 |
| **Renfrewshire** | 2 | 47 | 17 | 34 |
| **Rhondda** | 30 | 25 | 17 | 28 |
| **Richmond upon Thames** | 6 | 14 | 40 | 40 |
| **Rochdale** | 28 | 27 | 14 | 31 |
| **Rotherham** | 34 | 27 | 20 | 19 |
| **Rutland** | 22 | 17 | 47 | 14 |
| **Salford** | 9 | 17 | 45 | 29 |
| **Sandwell** | 18 | 18 | 17 | 47 |
| **Scottish Borders** | 3 | 64 | 13 | 20 |
| **Sefton** | 5 | 8 | 57 | 31 |
| **Sheffield** | 26 | 30 | 26 | 18 |
| **Shetland Islands** | 3 | 6 | 73 | 19 |
| **Shropshire** | 10 | 36 | 29 | 25 |
| **Slough** | 1 | 3 | 41 | 56 |
| **Solihull** | 8 | 18 | 55 | 18 |
| **Somerset** | 19 | 13 | 51 | 17 |
| **South Ayrshire** | 2 | 33 | 48 | 17 |
| **South Gloucestershire** | 17 | 14 | 61 | 9 |
| **South Lanarkshire** | 6 | 51 | 20 | 23 |
| **South Tyneside** | 4 | 11 | 68 | 16 |
| **Southend-on-Sea** | 2 | 17 | 67 | 14 |
| **Southwark** | 0 | 1 | 66 | 33 |
| **St Helens** | 7 | 34 | 35 | 24 |
| **Staffordshire** | 18 | 19 | 37 | 26 |
| **Stockport** | 8 | 44 | 34 | 14 |
| **Stockton-on-Tees** | 3 | 35 | 44 | 18 |
| **Suffolk** | 13 | 40 | 41 | 7 |
| **Sunderland** | 8 | 28 | 51 | 12 |
| **Surrey** | 23 | 11 | 43 | 23 |
| **Sutton** | 25 | 3 | 29 | 43 |
| **Swansea** | 22 | 27 | 16 | 35 |
| **Swindon** | 28 | 8 | 51 | 14 |
| **Tameside** | 16 | 42 | 20 | 22 |
| **Telford and Wrekin** | 13 | 19 | 31 | 37 |
| **Thurrock** | 4 | 16 | 30 | 50 |

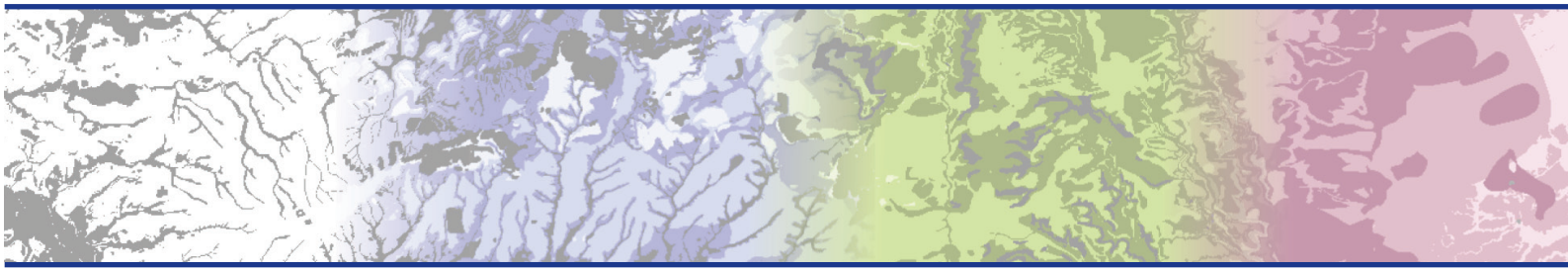

**Table 7** Suitability of the subsurface for infiltration SuDS within unitary authority areas (%) calculated from the 'Drainage Summary' layer of the Infiltration SuDS Map: Torbay to York.

| | Compatible for infiltration SuDS | Probably compatible for infiltration SuDS | Opportunities for bespoke infiltration SuDS | Very significant constraints indicated |
|---|---|---|---|---|
| **Torbay** | 35 | 39 | 16 | 10 |
| **Torfaen** | 25 | 26 | 17 | 32 |
| **Tower Hamlets** | 7 | 13 | 47 | 33 |
| **Trafford** | 8 | 11 | 43 | 38 |
| **Vale of Glamorgan** | 18 | 45 | 19 | 18 |
| **West Berkshire** | 28 | 22 | 16 | 34 |
| **West Midlands** | 16 | 20 | 37 | 27 |
| **Wakefield** | 24 | 25 | 27 | 23 |
| **Walsall** | 13 | 27 | 26 | 34 |
| **Waltham Forest** | 1 | 32 | 46 | 21 |
| **Wandsworth** | 6 | 5 | 49 | 39 |
| **Warrington** | 5 | 26 | 53 | 16 |
| **Warwickshire** | 6 | 14 | 61 | 18 |
| **West Dunbartonshire** | 11 | 37 | 15 | 38 |
| **West Lothian** | 2 | 42 | 18 | 37 |
| **West Sussex** | 26 | 8 | 45 | 21 |
| **Westminster** | 6 | 23 | 50 | 21 |
| **Wigan** | 4 | 38 | 32 | 26 |
| **Wiltshire** | 45 | 7 | 32 | 16 |
| **Windsor and Maidenhead** | 12 | 19 | 33 | 36 |
| **Wirral** | 10 | 19 | 48 | 23 |
| **Wokingham** | 13 | 24 | 32 | 31 |
| **Worcestershire** | 9 | 15 | 55 | 22 |
| **Wrexham** | 8 | 35 | 25 | 33 |
| **York** | 4 | 9 | 80 | 7 |