FLOOD RISK ASSESSMENT
Level 1 Screening Study

for

SILKSTONE COMMUNITY CENTRE
BARNSLEY ROAD, SILKSTONE, BARNSLEY

for

Silkstone Parish Council

Report Number 3413

October 2013

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants



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Charnock Court 6 South Parade Wakefield West Yorkshire WF1 1LR UK
T +44(0)1924 360458 **F** +44(0)1924 386535 **E** mdja@geoenvironmental.co.uk **W** www.geoenvironmental.co.uk

Flood Risk Assessment – Level 1 Screening Study Silkstone Community Centre, Barnsley Road, Silkstone, Barnsley

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1 INTRODUCTION

1.1 At the request of DMA Design Management Limited, acting on behalf of Silkstone Parish Council, a Level 1 Flood Risk Assessment has been carried out of land at Barnsley Road and The Cross in Silkstone near Barnsley. It is proposed to construct a new community centre on the site.

1.2 The FRA has been prepared in accordance with good practice guidance as outlined in "Development and Flood Risk: A practice guide companion to PPS25". It requires the FRA to be commensurate with the scope and size of the proposed development, namely;

For developments of less, that 1ha (10,000m^2) the level of detail required in an acceptable FRA will depend on the size and density of build. This will range from a brief report for small, low-density developments, to a more detailed assessment for a high-density development, 2000-10,000m^2 in size. For example: for very small developments (2000m^2 and less) an acceptable FRA could be a brief report done by the contractor's engineer, including information obtained from; the Environment Agency, water company/sewerage undertaker, other relevant authorities, site investigation and local knowledge.

1.3 Planning Policy Statement PPS25 Practice Guide identifies the need for reference to the following typical sources of information.

- Strategic Flood Risk Assessment
- Environment Agency Flood Map
- Environment Agency Standing Advice
- Surface Water Management Plan (SWMP) and Water Cycle Study

2 THE SITE

2.1 The proposed community centre is located on land at the junction of Barnsley Road and The Cross in Silkstone. It will replace an existing scout hut, albeit with a greater floor area. The Ordnance Survey grid reference is SE 289 052.



2.2 The present scout hut consists of pre-cast concrete panels with asbestos cement sheeting above and a pitched asbestos cement sheet roof.



View of Scout Hut looking to the northeast.



View of Scout Hut looking to the northwest.

2.3 There are existing buildings and a petrol filling station to the north of the proposed centre, with Barnsley Road beyond. Car parking lies to the west of these. The scout hut is surrounded by parking and there is a basketball court adjacent to it. To the south are playing fields, although on land at a higher elevation.

2.4 There is a watercourse which runs to the east of site, known as Silkstone Beck. This is estimated to be approximately 4m below the site level. It flows in a northerly direction adjacent to The Cross, before passing beneath The Cross near to the junction of Barnsley Road.



View towards Silkstone Beck looking north.



View of Silkstone Beck passing below The Cross.

3 GEOLOGY AND MINING

3.1 Geology

3.1.1 Maps of the British Geological Survey (BGS), in particular 6" to 1 mile sheet 274SW and 1:50,000 scale sheet 87, show the site to be underlain by undifferentiated siltstones, mudstones and shales of the Carboniferous Middle Coal Measures. No drift deposits are recorded on the site, which is also shown to be free of faulting.

3.2 Mining

3.2.1 A Coal Mining Risk Assessment has also been produced by Michael D Joyce Associates LLP and presented in Report No. 3409 dated October 2013. The geological maps show three shafts in close proximity to the proposed centre. One of the shafts records the Silkstone Coal seam at 82m depth. By reference to the stratigraphic column, this would place the Fourfoot Coal seam at approximately 51m depth below the site. By contrast this seam is shown outcropping to the west, with the Swilley Coal to the east. This would place the proposed site between the two coal horizons, and would mean that the Four Foot Coal was shallower than the 51m suggested by the stratigraphic column.

3.2.2 At the former Silkstone Colliery, the Thorncliffe Thin Coal is recorded as being 14m above the Fourfoot Coal, which would put this seam at 37m below the site. The Parkgate Coal is 21m above the Thorncliffe Thin Coal, which equates to 19m below the site. The following seam thicknesses are recorded;

Parkgate Coal - 2.34m
Thorncliffe Thin Coal - 1.73m

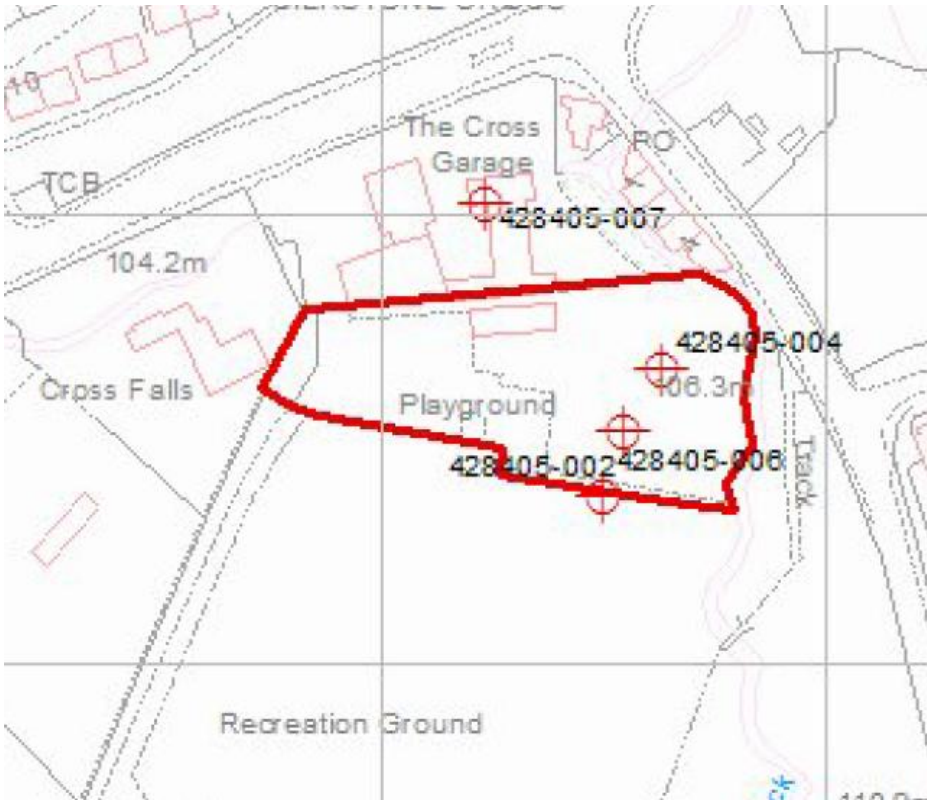
3.2.3 The Swilley Coal, Thorncliffe Thin Coal and Parkgate Coal were all good quality coals and extensively worked in the Barnsley area.

3.2.4 A mining report has been obtained from the Coal Authority, and is reproduced in full in the Coal Mining Risk Assessment. It states that there are known recorded coal workings in three seams below the site at shallow depth (less than 30m depth) and 110m depth, with the last date of working being 1965. The shallow seam is likely to be the Parkgate Coal.

3.2.5 The Coal Authority mining report also states that the site lies within a former opencast area.

3.2.6 The report also identified four former mine entries (shafts) on, or within 20m of the site as follows, although other unrecorded shafts may also be present;

Reference No.	Treatment
428405 – 002	Capped.
428405 – 004	Capped, but plugged and recapped at 2.3mbgl in 1995.
428405 – 006	Capped.
428405 – 007	Capped.



Shaft locations.

3.2.7 The Coal Authority holds no record of any notice or subsidence claim having been made since at least 1994 on the site itself.

4 CONSULTATION WITH THE ENVIRONMENT AGENCY

4.1 The following are the key issues raised by the Environment Agency in its response to a formal enquiry regarding potential flooding, and its complete response is presented in Appendix 1.

The Flood Map

The Flood Map provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map shows the following:

1. *Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences*

    - *For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;*

    - *For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.*

2. *Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:*

    - *indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.*

    - *and/or indicates the greatest recorded historic flood, whichever is greater.*

3. *Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.*

4. *Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.*

Flood History

2010 Upper Dearne Study

See enclosed extracts from the Upper Dearne Flood Mapping Study produced by Halcrow Group Limited in May 2010.

Extracts consist of;

- *A spreadsheet showing the results for max stage and 0.1% (1 in 1000yr), 0.5% (1 in 200yr), 1% (1 in 100yr), 1% CC (1 in 100yr +climate change), 1.3% (1 in 75yr), 2% (1 in 50yr), 4% (1 in 25yr), 10% (1 in 10yr) and 20% (1 in 5yr) annual chance events.*

- *An associated map showing the location of the model node points.*

The nearest modelling point to the site is where the watercourse passes below The Cross. It records the following;

Return Period (Years)	Level Value (mAOD)	Flow Value (m/s)
5	99.14	1.52
10	99.21	1.80
25	99.32	2.17
50	99.40	2.53
75	99.46	2.77
100	99.51	2.96
101	99.64	3.56
1000	100.00	5.40

Ground level of the site is not known at present although one of the historical Ordnance Survey maps suggests that groundlevel at the junction of Barnsley Road and The Cross is 102m AOD. This probably places the study site around this level. As can be seen the 1 in 1000 years flood level is considerably lower than this.

Climate Change

See attached extract from the National Planning Policy Framework Technical Guidance by Communities and Local Government.

River – Non Main River

The watercourse at this location is not designated as Main River. It is classed as an Ordinary Watercourse. The local authority holds responsibility for the maintenance of this river. The Environment Agency does not have any more information available in regard to past flooding issues or current flood risk. For any information on any past flooding and for any record of the impact of local drainage on that watercourse we suggest you speak to your City Council Drainage Section and to Yorkshire Water.

Flood Warning

The site is covered by a Flood Warning. To register to receive this service, you can call Floodline 24 hours a day on 0845 988 1188.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner. For more information on Rights and Responsibilities of a riverside owner, you can visit our website at: www.environment-agency.gov.uk and click on 'Flood', 'How can I be prepared?, 'Guidance for riverside property owners' and download the 'Living on the Edge' booklet.

Flood Zones

Under the National Planning Policy Framework (NPPF) land is divided into three zones with regard to flood risk.

Zone 1, little or no risk, this is land outside the 1 in 1000 year flood plain, land deemed to be safe from flooding in the event of a flood with a 0.1% probability of occurring in any one year.

Zone 2, medium risk; land between the 1 in 1000 & 1 in 100 year fluvial (1 in 200 year tidal) flood plain. Between 0.1% and 1.0% (0.5%) probability of occurring in any one year.

Zone 3, high risk, land within the 1 in 100 year fluvial (1 in 200 year tidal) flood plain, at risk in the event of a flood with a 1.0% (0.5%) probability of occurring in any in year.

These zones do not take account of any flood defences that may exist as these could be overtopped or breached by a more severe flood event than designed for or maintained against.

Site Assessment

The site area lies in Flood Zone 3 according to the Environment Agency Flood Map. There are two watercourses bordering the site, one approximately 25 metres away and one which borders the boundary of the site, known locally as Silkstone Beck. Both watercourses are classified as ordinary watercourses.

We have no information concerning the watercourses so I would suggest you contact the local authority main drainage department as they are the responsible drainage authority for the watercourse at this location. They may hold more detailed flood level information for the watercourses as well as local history of the area. Any works near to Silkstone Beck may require consent from the local authority; I would suggest you discuss your intentions to them as soon as possible.

Flood Risk Assessment

A flood risk assessment (FRA) must be submitted with a planning application on any proposed development in Flood Zone 3. The FRA assessment would need to demonstrate that the development would not increase the risk of flooding to others and would not be at risk of flooding itself. All potential sources of flooding will need consideration including; river flooding, groundwater flooding, surface water runoff and flooding from sewers etc. It should also assess the existing and proposed surface water drainage from the site.

Further information on producing a FRA and where a FRA is required can be found on the Environment Agency's website on the Flood Risk Standing Advice pages which can be found at:
http://www.environment-agency.gov.uk/research/planning/82587.aspx

A more comprehensive guide on FRAs can be found in CIRIA Report C624 'Development and flood risk - guidance for the construction industry' available through their website: http://www.ciria.org

Your Local Planning Authority should have undertaken a Strategic Flood Risk Assessment, where information on flood risk locally has been collated which may inform your FRA. Please contact your Local Planning Authority to determine what information may be available.

Flood Proofing

The Environment Agency would recommend that in areas at risk of flooding consideration be given to the incorporation into the design and construction of the development of flood proofing measures. These include barriers on ground floor doors, windows and access points, bringing in electrical services into the building at a high level so that plugs are located above possible flood levels and the use of solid or concrete beam floors.

Further information can be found at:
http://www.environment-agency.gov.uk/home&leisure/floods/default.aspx

Additional guidance can be found in the Environment Agency Flood line publication "Damage Limitation". A free copy is available by telephoning 0845 988 1188 or can be found on our website.

Reference could also be made to the Department for communities and local Government publication "Preparing for Floods". Please email: communities@twoten.com to request a copy.

Floor Levels

Setting the ground floor level above site ground level will provide a measure of protection against any flooding. Where available we would recommend that floor levels be set 600mm above the 1 in 100 year event with an allowance for climate change made.

For this site, this would require a floor level of at 100.11m AOD.

Surface Water Runoff

There should be no increase in surface water runoff from the new development. PPS25 recognises that the management of flood risk is not simply restricted to flood plains and that a catchments-wide approach should be employed. If the existing site is shown to drain to a watercourse, then surface water runoff should be attenuated to provide a 30% reduction in the final surface water discharge from the site when compared with the existing site outflow prior to redevelopment. However, if the site does not drain to a watercourse or public sewer at present, then flows must be attenuated to a maximum of 5 l/s/ha, equivalent to the Greenfield runoff rate.

Where surface water runoff drains to a public sewer, further advice on acceptable discharge rates should be sought form the Local water Authority.

Any balancing facility should be designed to accommodate a 1 in 30 year flow from the site below ground and a 1 in 100 year flow retained within the site (including an allowance for climate change), without causing ay flooding to buildings.

There are alternatives to conventional storage for the control of surface water run-off that are favoured by the Environment Agency where ground conditions are suitable.

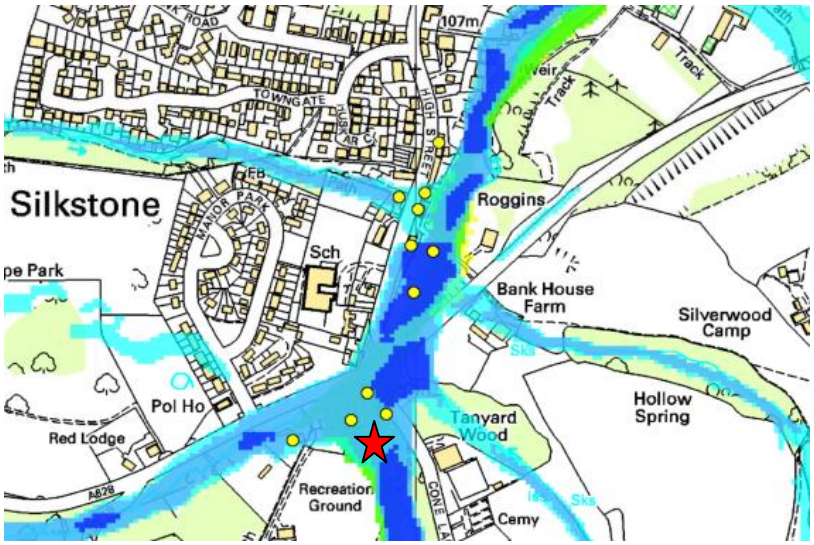
Sustainable Urban Drainage techniques (Suds) tackle surface water run-off problems at source using features such as soak ways, permeable pavements, grassed swales, infiltration trenches, ponds and wetlands to attenuate flood peak flows, produce water quality improvements and environmental enhancements. The Environment Agency seeks to promote the use of Suds techniques to this site and expects the developer of the site to submit detailed investigations such that the use of Suds' has been fully explored.

4.2 Barnsley Metropolitan Borough Council

4.2.1 Reference has been made to Barnsley Metropolitan Borough Council's "*Preliminary Flood Risk Assessment Report*" published in May 2011. The document reports the findings of research prepared following the floods of 2007.

4.2.2 In particular, the report includes a number of flood maps. Appendix 2 – Annex 2 contains a plan showing the properties flooded in 2007 (yellow dots). The following is the relevant extract from that report.

4.2.3 According to Silkstone Parish Council, this study site did not flood in 2007.



Extract from Barnsley MBC's "Preliminary Flood Risk Assessment Report"

Site location ★

5 PLANNING POLICY

5.1 Planning Policy Statement 25: Development and Flood Risk (PPS25) sets out the Government's policy for managing development and flood risk. It provides guidance to Local Authorities for determining planning applications in areas prone to flooding to ensure that new development is safe and not unnecessarily exposed to flooding.

5.2 The policies are based on the Environment Agency's maps of flood risk zones. These cover all of England and Wales and map areas prone to flooding in terms of the following:

Zone 1 - Low Probability (Little or No Risk)

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year. There are no development constraints.

Zone 2 - Medium Probability (Low to Medium Risk)

This zone comprises land assessed as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding or between a 1 in 200 and 1 in 1000 annual probability of sea flooding in any year.

Zone 3a - High Probability (High Risk)

This zone and the site itself comprises land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from sea in any year.

Zone 3b - Functional Floodplain

This zone comprises land where water has to flow or be stored in times of flood. The annual probability that such land will flood will be 1 in 20 or greater.

5.3 PPS25 defines proposed land use by its vulnerability to flooding and relates it to these flood risk categories. Appropriate developments for each flood zone are given. The proposed development at the site falls under the 'less vulnerable' PPS25 and as such, development should be permitted.

Flood Vulnerability Zone	**Essential Infrastructure**	**Water Compatible Development**	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**
1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
2	Appropriate	Appropriate	Exception test required	Appropriate	Appropriate
3a	Exception test required	Appropriate	Inappropriate	Exception test required	Appropriate
3b	Exception test required	Appropriate	Inappropriate	Inappropriate	Inappropriate

6 SURFACE WATER DISCHARGE ASSESSMENT

6.1 A requirement of PPS25 is that a site once developed should not lead to an increased risk of flooding downstream. This means that the peak surface water discharge rate from the site should be no greater then occurs in its existing condition.

Existing Run-Off Levels

6.2 It is understood that the proposed development will have the same footprint as the existing scout hut and it is not proposed to make any changes to the existing car parking and hardstanding. As such, the future site will essentially be as at present.

6.3 It is believed that the current surface water drainage is to the main drainage system in Barnsley Road. It is envisaged that this will continue and as such, future site run-off levels will mirror the current run-off levels.

Sustainable Urban Drainage Systems (SUDS)

6.4 The most effective and practical measure to reduce peak surface water discharges from the site will be the incorporation of soakaways in the development. The surface water drainage system at the site should be designed to collect water running from impermeable areas of hardstanding and roof areas and to drain this into the soakaways. These would be located in the grassed areas, and will be in the form of buried chambers. These will act as a temporary reservoir for water during peak rainfall events and providing storage capacity for storm water. This will then slowly percolate into the underlying strata, therefore reducing peak hour discharges. An overflow can be provided to the existing piped system.

6.5 It is recommended that soil infiltration tests be carried out prior to the construction of the soakaways, as these tests will identify whether soakaways are feasible and to facilitate their design.

6.6 Further benefits can be achieved through the use of permeable paving and rainwater harvesting, in the form of water butts to the building.

7 CONCLUSIONS

7.1 The site lies in Flood Zone 3 and is classed as a "*less vulnerable*" development. As such, development is deemed appropriate. It is however recommended that the Environment Agency's recommendations in respect of flood mitigation measures are followed in order to prevent any future flood events causing damage to the property or putting the occupants at risk. A minimum flood level of 100.11m AOD should be adopted, although groundlevel is considered to be higher than this already. As such this risk if flooding affecting this development is considered to be very low.

7.2 In addition, the proposed development will not increase the risk of flooding elsewhere, and practical measures are proposed which will reduce the potential for such flooding by reducing surface water run-off.

A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC



M D Joyce

HonDSc (Consultant)

October 2013

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Appendix 1

Response from the Environment Agency

Michael D Joyce Associates LLP

From:	Beech, Cheryl <Cheryl.Beech@environment-agency.gov.uk>
Sent:	15 October 2013 10:12
To:	Michael D Joyce Associates LLP
Subject:	Your Enquiry: RFI/2013/27235
Attachments:	Standard_Notice sept 2012.pdf; VAT Receipt.pdf; Cross Section Location Map.pdf; Flood History Map.pdf; Flood Map.pdf; Model Results.pdf; NPPF TG Climate Change extract.pdf

Our Ref: RFI/2013/27235

Your Ref:

Dear Anthony

RE: Silkstone Community Centre, Silkstone, Barnsley

Thank you for your request of 30 September 2013 regarding the above site.

The Flood Map

Please see the enclosed extract from the Flood Map.

The Flood Map provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
   - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
   - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.

2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
   - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
   - and/or indicates the greatest recorded historic flood, whichever is greater.

3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.

4. Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.

Flood History

2010 Upper Dearne Study

See enclosed extracts from the Upper Dearne Flood Mapping Study produced by Halcrow Group Limited in May 2010.

Extracts consist of

- A spreadsheet showing the results for max stage and 0.1% (1 in 1000yr), 0.5% (1 in 200yr), 1% (1 in 100yr), 1% CC (1 in 100yr +climate change), 1.3% (1 in 75yr), 2% (1 in 50yr), 4% (1 in 25yr), 10% (1 in 10yr) and 20% (1 in 5yr) annual chance events.
- An associated map showing the location of the model node points.

Climate Change

See attached extract from the National Planning Policy Framework Technical Guidance by Communities and Local Government.

River – Non Main River

The watercourse at this location is not designated as Main River. It is classed as an Ordinary Watercourse. The local authority holds responsibility for the maintenance of this river. The Environment Agency does not have any more information available in regard to past flooding issues or current flood risk. For any information on any past flooding and for any record of the impact of local drainage on that watercourse we suggest you speak to your City Council Drainage Section and to Yorkshire Water.

Flood Warning

The site is covered by a Flood Warning. To register to receive this service, you can call Floodline 24 hours a day on 0845 988 1188.

Lidar Data

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

To get a license for the data you will need to contact our Science Group, stating the area you are interested in (preferably an OS Grid Reference, or a map with the area outlined). There may be a charge for this data.

Low resolution Data is returned as an ASCII grid, which can easily be converted to a surface model for use in most GIS applications, and is provided in 2km x 2km tiles, at a resolution of 2m.

High resolution Data is also returned as an ASCII grid, in 0.5km x 0.5km tiles, at a resolution between 0.125 and 0.5m.

For current catalogue of coverage see: http://www.geomatics-group.co.uk/GeoCMS/order.aspx

To obtain the data and license agreement, please contact:

Environment Agency Geomatics
Phoenix House
Lower Bristol Road
Bath BA2 9ES
Tel: 01225 487658
Fax: 01225 487643
E-mail: archived-lidardata@environment-agency.gov.uk
Or visit the website at www.geomatics-group.co.uk

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner. For more information on Rights and Responsibilities of a riverside owner, you can visit our website at: www.environment-agency.gov.uk and click on 'Flood', 'How can I be prepared?, 'Guidance for riverside property owners' and download the 'Living on the Edge' booklet.

Alternatively type the following address into your web browser:
http://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx

Flood Zones
Under the National Planning Policy Framework (NPPF) land is divided into three zones with regard to flood risk.

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Zone 2, medium risk; land between the 1 in 1000 & 1 in 100 year fluvial (1 in 200 year tidal) flood plain. Between 0.1% & 1.0% (0.5%) probability of occurring in any one year.

Zone 3, high risk, land within the 1 in 100 year fluvial (1 in 200 year tidal) flood plain, at risk in the event of a flood with a 1.0% (0.5%) probability of occurring in any in year.

These zones do not take account of any flood defences that may exist as these could be overtopped or breached by a more severe flood event than designed for or maintained against.

Site Assessment;
The site area lies in Flood Zone 3 according to the Environment Agency Flood Map. There are two watercourses bordering the site, one approximately 25 metres away and one which borders the boundary of the site, known locally as Silkstone Beck. Both watercourses are classified as ordinary watercourses.

We have no information concerning the watercourses so I would suggest you contact the local authority main drainage department as they are the responsible drainage authority for the watercourse at this location. They may hold more detailed flood level information for the watercourses as well as local history of the area. Any works near to Silkstone Beck may require consent from the local authority; I would suggest you discuss your intentions to them as soon as possible.

Flood Risk Assessment
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Further information on producing a FRA & where a FRA is required can be found on the Environment Agency's website on the Flood Risk Standing Advice pages which can be found at: http://www.environment-agency.gov.uk/research/planning/82587.aspx

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Your Local Planning Authority should have undertaken a Strategic Flood Risk Assessment, where information on flood risk locally has been collated which may inform your FRA. Please contact your Local Planning Authority to determine what information may be available.

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The Environment Agency would recommend that in areas at risk of flooding consideration be given to the incorporation into the design & construction of the development of flood proofing measures. These include barriers on ground floor doors, windows & access points, bringing in electrical services into the building at a high level so that plugs are located above possible flood levels & the use of solid or concrete beam floors.

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Reference could also be made to the Department for communities & local Government publication "Preparing for Floods". Please email: communities@twoten.com to request a copy.

Floor Levels
Setting the ground floor level above site ground level will provide a measure of protection against any flooding. Where available we would recommend that floor levels be set 600mm above the 1 in 100 year event with an allowance for climate change made.

Surface Water Management Plans & Water Cycle Study

This information is obtainable from the Local Authority

Surface Water Runoff

There should be no increase in surface water runoff from the new development. PPS25 recognises that the management of flood risk is not simply restricted to flood plains & that a catchments-wide approach should be employed.
If the existing site is shown to drain to a watercourse, then surface water runoff should be attenuated to provide a 30% reduction in the final surface water discharge from the site when compared with the existing site outflow prior to redevelopment.
However, if the site does not drain to a watercourse or public sewer at present, then flows must be attenuated to a maximum of 5 l/s/ha, equivalent to the Greenfield runoff rate.

Where surface water runoff drains to a public sewer, further advice on acceptable discharge rates should be sought form the Local water Authority.

Any balancing facility should be designed to accommodate a 1 in 30 year flow from the site below ground & a 1 in 100 year flow retained within the site (including an allowance for climate change), without causing ay flooding to buildings.

There are alternatives to conventional storage for the control of surface water run-off that are favoured by the Environment Agency where ground conditions are suitable.

Sustainable Urban Drainage techniques (Suds) tackle surface water run-off problems at source using features such as soak ways, permeable pavements, grassed swales, infiltration trenches, ponds & wetlands to attenuate flood peak flows, produce water quality improvements & environmental enhancements. The Environment Agency seeks to promote the use of Suds techniques to this site & expects the developer of the site to submit detailed investigations such that the use of Suds' has been fully explored.

More information on SUDs can be found at: http://www.ciria.org.uk/suds/

For information on Green Roofs in particular, please visit: www.thegreenroofcentre.co.uk

If you wish to discuss the site with the officer dealing with the area, Lesley Slaney can be contacted on (0113) 8196044.

The local authority will hold Regional Flood Risk Appraisals (RFRA), and can confirm that Strategic Flood Risk Assessment (SFRA) for Barnsley has been published..

Please note that the view expressed in this letter by the Environment Agency is a response to a pre-application enquiry only & does not represent our final view in relation to any future planning application made in relation to this site. We reserve the right to change our position in relation to any such application.

You should seek your own expert advice in relation to technical matters relevant to any planning application before submission.

This information is provided subject to the attached notice which we advise that you should read.

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Yours sincerely

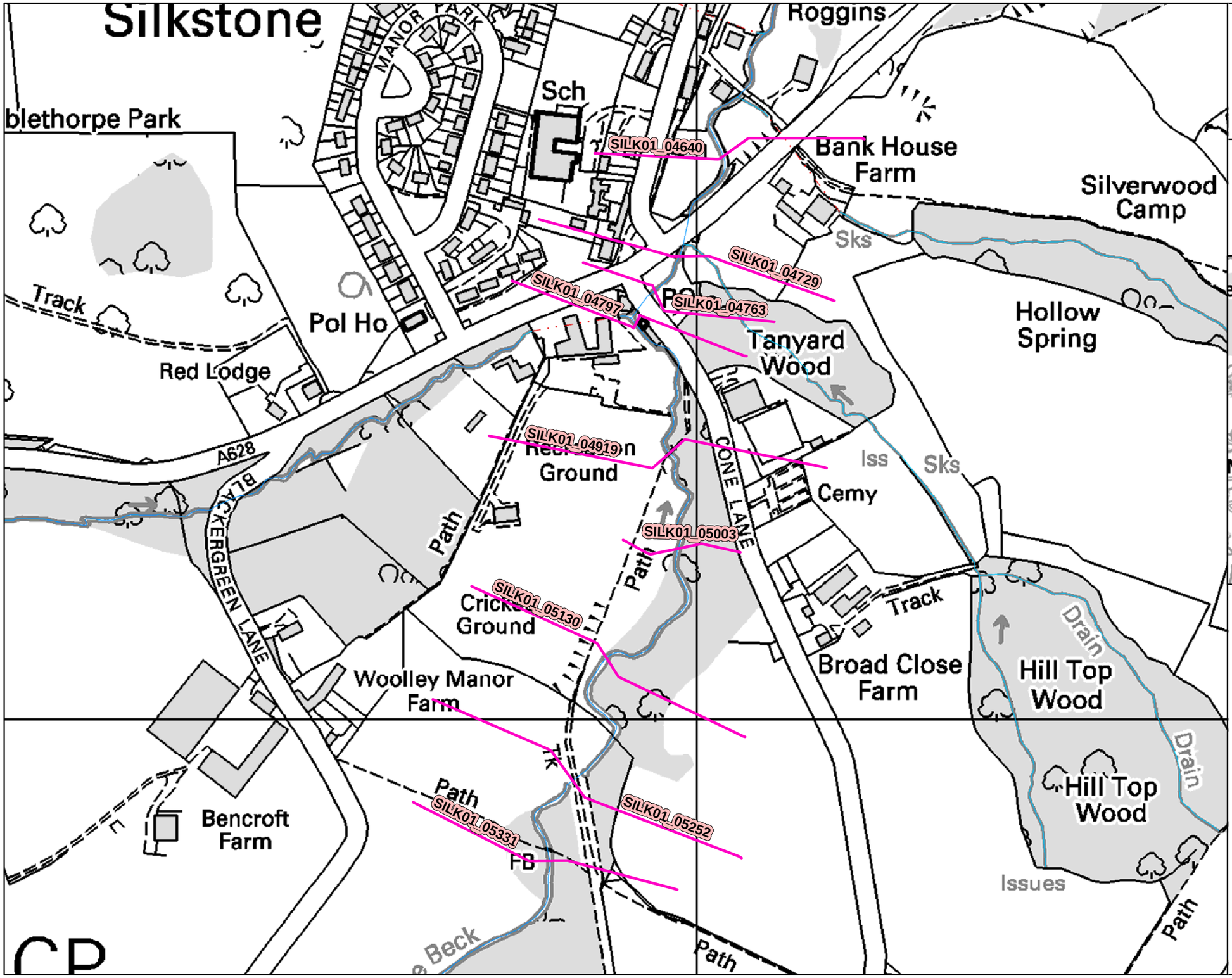
Cheryl Beech
Customers and Engagement Team
Direct Dial 0113 8196360
Email neyorkshire@environment-agency.gov.uk

Please note: I only work part time - my usual working days are Tuesday, Wednesday & Thursday

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Cross Section Location Map for Silkstone Community Centre, Barnsley - Date Created: 11/10/2013 Ref: 27235



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Detailed River Network

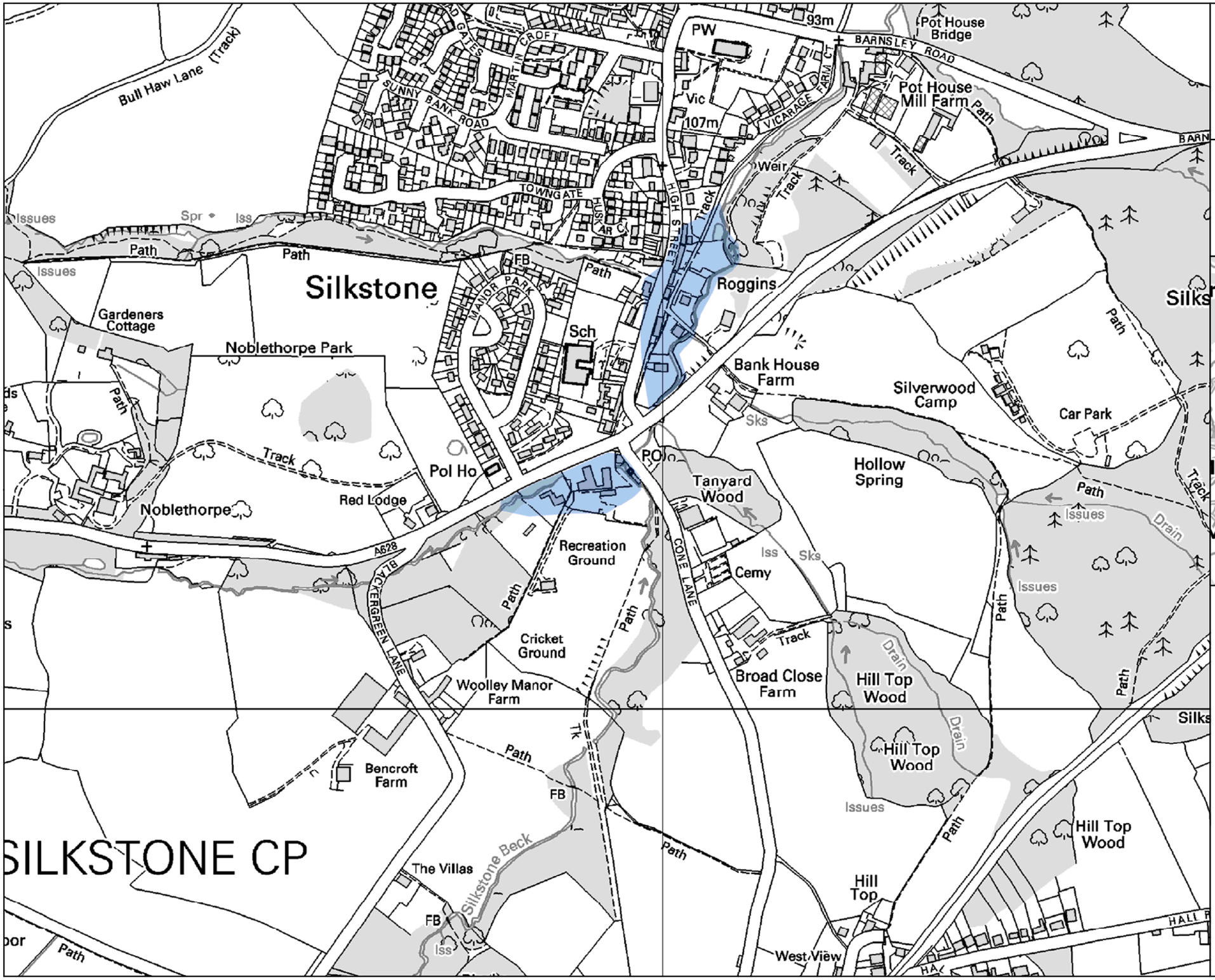
CDS_CONTEXT.DRN.RIVERTYPE

- Primary River
- Secondary River
- Tertiary River
- D/S of High Water Mark
- D/S of Seaward Extension
- Lake / Reservior
- Canal
- Extended Culvert (greater than 50m)
- Canal Tunnel
- Underground River (inferred)
- Underground River (local knowledge)
- Cross Sections

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Flood History Map for Silkstone Community Centre, Barnsley - dated: 11/10/2013 [Ref: 27235]



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Flood Extents

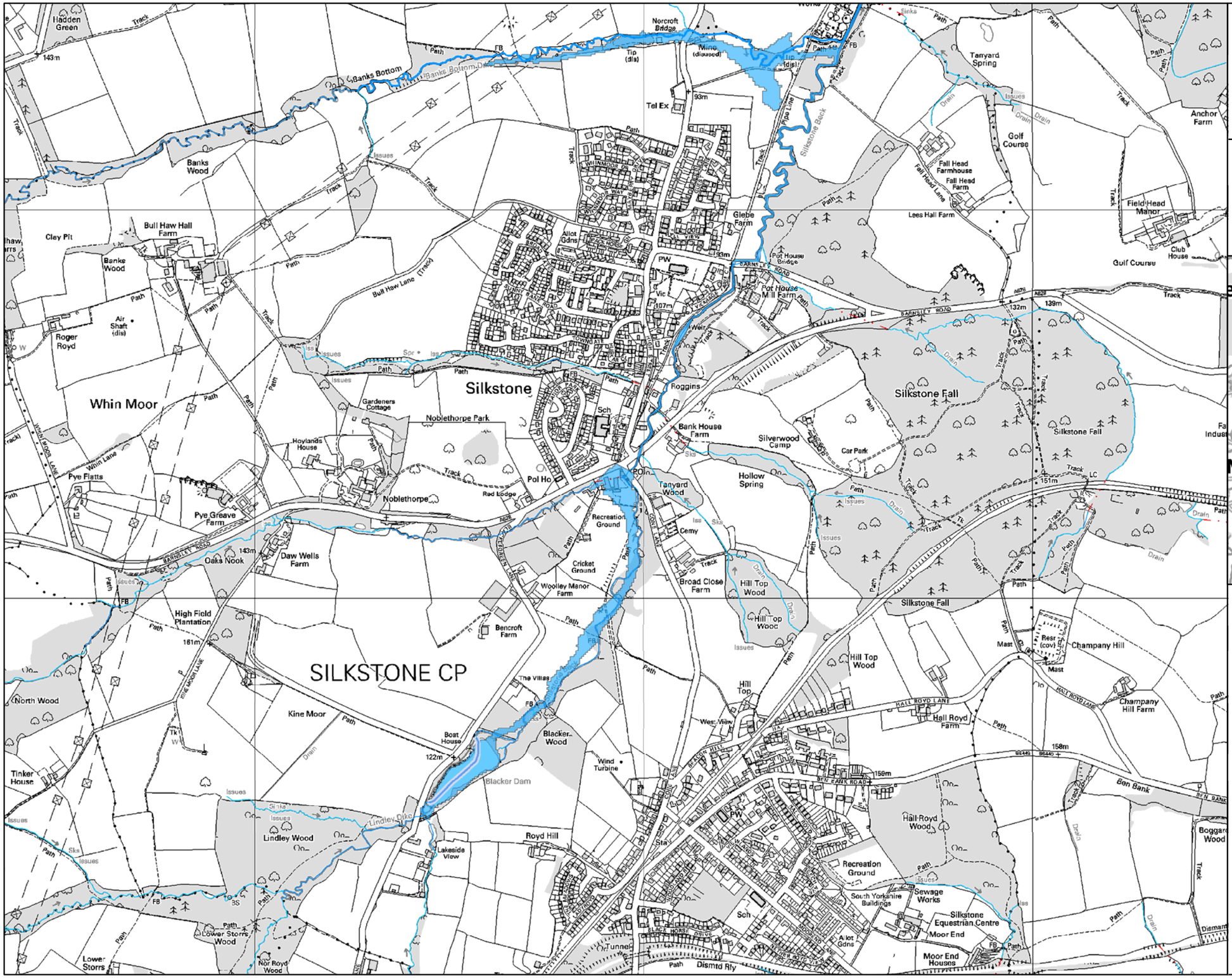
Legend

2007 Flood Events Flood Extent

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Flood Map for Silkstone Community Centre, Barnsley - Date Created: 11/10/2013 Ref: 27235





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LEGEND

Detailed River Network

CDS_CONTEXT.DRN.RIVERTYPE

- Primary River
- Secondary River
- Tertiary River
- D/S of High Water Mark
- D/S of Seaward Extension
- Lake / Reservior
- Canal
- Extended Culvert (greater than 50m)
- Canal Tunnel
- Underground River (inferred)
- Underground River (local knowledge)
- Flood Zone 3 (FZ3)
- Flood Zone 2 (FZ2)

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RFI no: 27235 River Don Model Results (Level -mAOD, Flow -m^3s)

NodePointName	ReturnPeriod	LevelValue	FlowValue
EA1231396_SILK01_05331	5	105.48	0.9
EA1231396_SILK01_05331	10	105.53	1.07
EA1231396_SILK01_05331	25	105.58	1.31
EA1231396_SILK01_05331	50	105.62	1.53
EA1231396_SILK01_05331	75	105.65	1.68
EA1231396_SILK01_05331	100	105.67	1.8
EA1231396_SILK01_05331	101	105.73	2.16
EA1231396_SILK01_05331	1000	105.91	3.37
EA1231396_SILK01_05252	5	104.58	0.99
EA1231396_SILK01_05252	10	104.61	1.18
EA1231396_SILK01_05252	25	104.65	1.43
EA1231396_SILK01_05252	50	104.68	1.67
EA1231396_SILK01_05252	75	104.7	1.84
EA1231396_SILK01_05252	100	104.71	1.97
EA1231396_SILK01_05252	101	104.76	2.37
EA1231396_SILK01_05252	1000	104.83	3.67
EA1231396_SILK01_05130	5	102.46	1.13
EA1231396_SILK01_05130	10	102.5	1.34
EA1231396_SILK01_05130	25	102.53	1.63
EA1231396_SILK01_05130	50	102.56	1.9
EA1231396_SILK01_05130	75	102.58	2.09
EA1231396_SILK01_05130	100	102.59	2.23
EA1231396_SILK01_05130	101	102.64	2.68
EA1231396_SILK01_05130	1000	102.8	4.12
EA1231396_SILK01_05003	5	100.93	1.28
EA1231396_SILK01_05003	10	100.98	1.51
EA1231396_SILK01_05003	25	101.03	1.83
EA1231396_SILK01_05003	50	101.08	2.14
EA1231396_SILK01_05003	75	101.11	2.35
EA1231396_SILK01_05003	100	101.13	2.51
EA1231396_SILK01_05003	101	101.2	3.01
EA1231396_SILK01_05003	1000	101.4	4.61
EA1231396_SILK01_04919	5	100.36	1.37
EA1231396_SILK01_04919	10	100.39	1.63
EA1231396_SILK01_04919	25	100.44	1.97
EA1231396_SILK01_04919	50	100.48	2.3
EA1231396_SILK01_04919	75	100.51	2.52
EA1231396_SILK01_04919	100	100.53	2.69
EA1231396_SILK01_04919	101	100.59	3.23
EA1231396_SILK01_04919	1000	100.75	4.93
EA1231396_SILK01_04797	5	99.14	1.52
EA1231396_SILK01_04797	10	99.21	1.8
EA1231396_SILK01_04797	25	99.32	2.17
EA1231396_SILK01_04797	50	99.4	2.53
EA1231396_SILK01_04797	75	99.46	2.77
EA1231396_SILK01_04797	100	99.51	2.96
EA1231396_SILK01_04797	101	99.64	3.56
EA1231396_SILK01_04797	1000	100	5.4
EA1231396_SILK01_04763	5	98.6	1.56
EA1231396_SILK01_04763	10	98.67	1.84
EA1231396_SILK01_04763	25	98.76	2.23
EA1231396_SILK01_04763	50	98.85	2.59
EA1231396_SILK01_04763	75	98.9	2.84
EA1231396_SILK01_04763	100	98.94	3.04
EA1231396_SILK01_04763	101	99.07	3.65
EA1231396_SILK01_04763	1000	99.42	5.53
EA1231396_SILK01_04729	5	98.53	1.6
EA1231396_SILK01_04729	10	98.61	1.89
EA1231396_SILK01_04729	25	98.72	2.29
EA1231396_SILK01_04729	50	98.82	2.66
EA1231396_SILK01_04729	75	98.88	2.91
EA1231396_SILK01_04729	100	98.93	3.11
EA1231396_SILK01_04729	101	99.06	3.74
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EA1231396_SILK01_04640	5	97.48	1.7
EA1231396_SILK01_04640	10	97.52	2.01
EA1231396_SILK01_04640	25	97.58	2.43
EA1231396_SILK01_04640	50	97.63	2.83
EA1231396_SILK01_04640	75	97.66	3.1
EA1231396_SILK01_04640	100	97.69	3.31
EA1231396_SILK01_04640	101	97.77	3.97
EA1231396_SILK01_04640	1000	98	6.01

Taking climate change into account

11. Global sea level will continue to rise, depending on greenhouse gas emissions and the sensitivity of the climate system. The relative sea level rise in England also depends on the local vertical movement of the land, which is generally falling in the south-east and rising in the north and west. In preparing a Strategic Flood Risk Assessment or a site-specific flood risk assessment, the allowances for the rates of relative sea level rise shown in table 4 should be used as a starting point for considering flooding from the sea, along with the sensitivity ranges for wave height and wind speed in table 5.

Table 4: Recommended contingency allowances for net sea level rises

	Net sea level rise (mm per year) relative to 1990			
	1990 to 2025	**2025 to 2055**	**2055 to 2085**	**2085 to 2115**
East of England, east midlands, London, south-east England (south of Flamborough Head)	4.0	8.5	12.0	15.0
South-west England	3.5	8.0	11.5	14.5
North-west England, north-east England (north of Flamborough Head)	2.5	7.0	10.0	13.0

Notes to table 4:

a. For deriving sea levels up to 2025, the 4mm per year, 3mm per year and 2.5mm per year rates (covering the three geographical groups respectively), should be applied back to the 1990 base sea level year. From 2026 to 2055, the increase in sea level in this period is derived by adding the number of years on from 2025 (to 2055), multiplied by the respective rate shown in the table. Subsequent time periods 2056 to 2085 and 2086 to 2115 are treated similarly.

b. Refer to Department for Environment, Food and Rural Affairs *FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts,* October 2006, for details of the derivation of this table. In particular, Annex A1 of this Note shows examples of how to calculate sea level rise.

c. Vertical movement of the land is incorporated in the table and does not need to be calculated separately.

12. The rise in sea level will change the frequency of occurrence of high water levels relative to today's sea levels, assuming no change in storminess. There may also be secondary impacts such as changes in wave heights due to increased water depths, as well as possible changes in the frequency, duration and severity of storm events. A 10 per cent sensitivity allowance should be added to offshore wind speeds and wave heights by the 2080s.

13. In making an assessment of the impacts of climate change on flooding from the land, rivers and sea as part of a flood risk assessment, the sensitivity ranges in table 5 may provide an appropriate precautionary response to the uncertainty about climate change impacts on rainfall intensities, river flow, wave height and wind speed.

Table 5: Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	*+5%*	*+10%*	*+20%*	*+30%*
Peak river flow	*+10%*	*+20%*		
Offshore wind speed	*+5%*		*+10%*	
Extreme wave height	*+5%*		*+10%*	

Notes to table 5:

a. Refer to Department for Environment, Food and Rural Affairs *FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts,* October 2006, for details of the derivation of this table.

b. For deriving peak rainfall, for example, between 2025 and 2055 multiply the rainfall measurement (in mm per hour) by 10 per cent and between 2055 and 2085 multiply the rainfall measurement by 20 per cent. So, if there is a 10mm per hour event, for the 2025 to 2055 period this would equate to 11mm per hour; and for the 2055 to 2085 period, this would equate to 12mm per hour. Other parameters in table 5 are treated similarly.

14. Sensitivity testing of the flood map produced by the Environment Agency, using the 20 per cent from 2025 to 2115 allowance for peak flows, suggests that changes in the extent of inundation are negligible in well-defined floodplains, but can be dramatic in very flat areas. However, changes in the depth of flooding under the same allowance will reduce the return period of a given flood. This

means that a site currently located within a lower risk zone (e.g. Zone 2 in table 1) could in future be re-classified as lying within a higher risk zone (e.g. Zone 3a in table 1). This in turn could have implications for the type of development that is appropriate according to its vulnerability to flooding (see table 2). It will therefore be important that developers, their advisors and local authorities refer to the current flood map and the Strategic Flood Risk Assessment when preparing and considering proposals.

15. Flooding in estuaries may result from the combined effects of high river flows and high sea surges. When taking account of impacts of climate change in flood risk assessments covering tidal estuaries, it will be necessary for the allowances for sea level rise in table 4 and the allowances for peak flow, wave height and wind speed in table 5 to be combined.[11]

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[11] Refer to Defra *FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts*, October 2006. Annex A2 gives details of joint probability analysis. www.defra.gov.uk/environ/fcd/pubs/pagn/climatechangeupdate.pdf

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Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Charnock Court 6 South Parade Wakefield West Yorkshire WF1 1LR

Tel: 01924 360458

Web: www.geoenvironmental.co.uk Email: mdja@geoenvironmental.co.uk