DIALSTONE CENTRE

STOCKPORT

FLOOD RISK ASSESSMENT

For

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August 2011

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STOCKPORT

Flood Risk Assessment

August 2011

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Abbreviations / Acronyms

BGL	Below Ground Level
CC	Climate Change
EA	Environment Agency
FEH	Flood Estimation Handbook
FRA	Flood Risk Assessment
Ha	Hectare
FZ	Flood Zone
LPA	Local Planning Authority
mAOD	Metres Above Ordnance Datum
PPS25	Planning Policy Statement: 25
QSE	Quick Storage Estimate (WinDES)
ReFEH	Revitalised FSR/FEH Rainfall Run-off Method
SMBC	Stockport Metropolitan Borough Council
SuDS	Sustainable Urban Drainage Systems
TWL	Top Water Level
UKCIP	UK Climate Impacts Programme
UU	United Utilities

Specialist Drainage/Flood Risk Management Software

- WinDES by MicroDrainage v12.6 – Quick Storage Estimates (QSE)

1.0 INTRODUCTION

1.1 Government policy with respect to development in flood risk areas is contained within the Department of Communities and Local Government Planning Policy Statement 25 (PPS25) 'Development and Flood Risk' which was issued on 07 December 2006.

1.2 PPS 25 builds on the previous guidance contained in the Planning Policy Guidance Note 25 (PPG 25) 'Development and Flood Risk' which was issued on 17 July 2001.

1.3 This report was commissioned by the client to support a planning application for the construction of a residential development of approximately 94 units complete with estate roads, external works, footpaths, car parking, external lighting, landscaping, boundary walls, fencing, external services and drainage.

1.4 The Local Planning Authority (LPA), Stockport Metropolitan Borough Council (SMBC), will make the final decision with regard to any planning permission. PPS 25 advises that a local planning authority should consult with the Environment Agency (EA) who are a statutory consultee and provide advice on flood issues at a strategic level and in relation to planning applications.

1.5 Discussion and agreement has been reached with United Utilities regarding the proposed surface water discharge rates and points of connection.

2.0 PROPOSED DEVELOPMENT SITE

2.1 Site Location

2.1.1 The is located just off Lisburne Lane, Stockport. The National Grid Reference for the site is 391666 E, 388603 N. The site location plan is shown in Appendix A.

2.2 Site Levels

2.2.1 The site is reasonably level with no significant levels features and no major boundary level issues.

2.3 Development Proposals

2.3.1 The site covers approximately 3.540 hectares (Ha) and historical records show that the site consisted of agricultural land until 1934 when a school was constructed. The site at the time of this investigation consisted of the Dialstone Centre and associated car parking, which housed a mixture of Local Authority offices, various community and social services, youth centre, library, children's learning centre and a computer repair centre. A recent photograph is shown in Figure 1.

2.3.2 The proposed redevelopment of the Dialstone Centre site, to include demolition of the existing building, to provide 16 no. two bedroom houses, 27 no. three bedroom houses and 51 no. four bedroom houses with associated open space and two local areas for play.

Figure 1: Photograph of site
View north from Lisburne Lane into the main parking area for the Dialstone Centre

3.0 FLOOD RISK ASSESSMENT

3.1 Environment Agency Information on Flood Risk

3.1.1 Information relating to the flood risk at the site has been obtained from the Environment Agency's (EA) website and online Flood Map, an extract of which is shown in figure 2 (below).

3.1.2 Examination of the Flood Map shows that the site is located wholly within Flood Zone 1. This is based on the EA Flood Map and is classified Flood Zone 1 with regards to the risk of flooding from Rivers or the Sea; Appendix B shows the online flood map and statement in full.

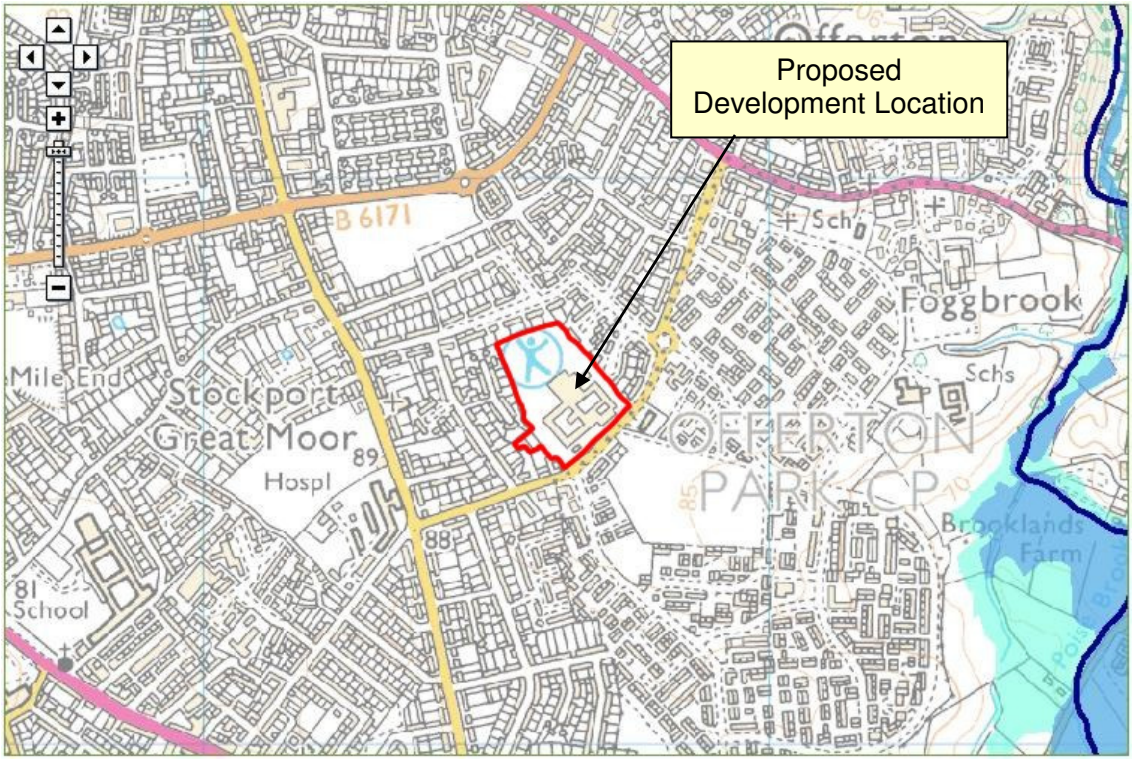

Figure 2: EA Flood Zone Map Extract (2011)

3.2 Strategic Flood Risk Assessment (SFRA) Information

3.2.1 The SFRA also indicates that the overall site is not located within functional flood plain and there are no specific risks to the site area indicated within the SFRA.

3.3 Anecdotal Flooding Information

3.3.1 An Internet based search for flooding events did not recall any historical flooding in the immediate site area.

3.4 Watercourses

3.4.1 There is no watercourse on or in close proximity to the proposed development area and as such a practical solution connecting to a watercourse cannot be achieved.

3.5 Sewer Flooding

3.5.1 There are no known sewer capacity issues with the surface water system in the immediate vicinity that have given rise to flooding issues.

3.5.2 No specific flood risk issues from the public sewer network have been identified. It was intimated by UU that the most likely source of flood risk from the sewer network was surcharging of the sewer system in periods of intense rainfall.

3.5.3 In urban areas, rainwater is frequently drained into surface water sewers or sewers containing both surface and waste water known as “combined sewers”. Foul water flooding often occurs in areas prone to overland flow and can result when the sewer is overwhelmed by heavy rainfall and will continue until the water drains away. It can also occur when the sewer becomes blocked or is of inadequate capacity, this could lead to there being a high risk of internal property flooding with contaminated water.

3.6 Overland Flooding

3.6.1 Intense rainfall, that is unable to soak into the ground or enter drainage systems can run-off land and result in flooding. Local topography and the land use can have a strong influence on the direction and depth of flow. Large catchment areas are particularly prone to this type of flooding. The volume and rate of overland flow from land can be exacerbated if development increases the percentage of impermeable area.

3.6.2 The topography of the development and surrounding area means there is little likelihood of significant flows impacting on the proposed development or on land and property adjacent to the development. The only flows that are likely to be present on site are from direct rainfall on areas of hardstanding.

3.6.3 Any flows generated by the proposed development must be directed away from the adjacent existing residential properties on the western boundary; safe avenues of overland flow away from the proposed dwellings are advised.

3.7 Groundwater Flooding

3.7.1 In general terms groundwater flooding can occur from three main sources: - raised water tables, seepage and percolation and groundwater recovery or rebound.

3.7.2 Raised water tables – at the current time there are no reported problems associated with rainfall raising the local water table and flooding occurring.

3.7.3 Seepage and percolation – Seepage and percolation occur where embankments above ground level hold water. In these cases water travels through the embankment material and emerges on the opposite side of the embankment. Due to the distance of the proposed development area relative to any watercourse the likelihood of flooding from this source is low.

3.7.4 Groundwater recovery / rebound – occurs where the water table has been artificially depressed by abstraction. When the abstraction stops the water table makes a recovery to its original level. There is the potential for groundwater flooding in low lying areas where groundwater levels have been depressed below their pre-pumping conditions, where these were at or close to ground level. As with the seepage scenario the likelihood of flooding from this source is low.

3.8 Flood Risk Vulnerability and Flood Zone Compatibility

3.8.1 The development is classified as a residential development and as such ‘more vulnerable’ in Table D.2 of PPS 25. Table D.3 in PPS 25 confirms that this type of land use is appropriate for Flood Zone 1 (see Appendix H for tables).

4.0 SURFACE WATER MANAGEMENT

4.1 Impermeable Area and Surface Water Run-off

4.1.1 The total site area of 3.540 hectares currently consists of 1.640 hectares (46%) impermeable area.

4.1.2 The existing impermeable area generates a run-off rate of 227.8 l/s based on a rainfall of 50mm/hr.

4.1.3 The proposed development will reduce the impermeable area of the development to approximately 42% of the total site area (1.480 Ha).

4.1.4 The proposed impermeable area generates a run-off rate of 205.6 l/s based on a rainfall of 50mm/hr.

4.1.5 It is proposed that the development provide a reduction in discharge rate of 50% by comparison to the existing. This rate has been agreed with United Utilities as 115 l/s.

4.1.6 The resultant storage volume generated by the restricted outfall is stored on site in the proposed below ground piped system for the 30 year return period storm event however, for the 100 year return period storm event (plus 30% allowance for Climate Change) the capacity of the proposed sewer design will be exceeded with some surface water storage being contained within the public highway for a brief period of time for this extreme rainfall event. This is an accepted method of dealing with the extreme rainfall event provided depths of resulting storage are shown to be minimal.

4.2 Sustainable Drainage Systems (SuDS)

4.2.1 In accordance with PPS25, Sustainable Drainage Systems (SuDS) should be specified wherever possible to manage surface water. This in turn reduces the burden downstream on both watercourses and sewerage systems.

4.2.2 SuDS have the ability to address three core objectives; water quantity, water quality and amenity value. With the appropriate system specified, all three core objectives can be satisfied. Where possible, peak surface water discharge rates to watercourses and sewers should be reduced.

4.2.3 Preference should always be given to SuDS over the traditional methods of buried sewers wherever possible and practical. Runoff from car parking areas and roads could be conveyed through swales, permeable pavements, bio-retention areas and petrol interceptors to provide a degree of treatment before flows are carried to public sewers.

4.2.4 Opportunities should be taken to provide soft landscaping where at all possible on site to assist in minimising surface water run-off. Added benefits include biodiversity and visual enhancements.

4.2.5 The exact type of SuDS will be determined at the detailed design stage.

4.3 Methods of Surface Water Management

4.3.1 At present the site is developed and is being treated as Brownfield. There is approximately 1.640 hectares of existing pervious area, 46% of the total site area.

4.3.2 The proposed impermeable area of the development is 1.480 hectares, 42% of the total site area.

4.3.3 There are three methods that have been reviewed for the management and discharge of surface water detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority listed below.

- Infiltration/soakaway
- Discharge to watercourse
- Discharge to public sewerage system

4.4 Infiltration

4.4.1 Ground conditions are of a cohesive nature and deemed unfavourable with little to no infiltration and as a result surface water discharge via soakaways is not feasible.

4.5 Discharge to a Watercourse

4.5.2 There is no watercourse on or in close proximity to the proposed development area and as such a practical solution connecting to a watercourse cannot be achieved.

4.6 Discharge to a Public Sewer

4.6.1 The primary option for surface water disposal is for discharge to the surface water public sewer in Oakland Avenue.

4.1.2 The existing impermeable area (1.640 Ha) generates a run-off rate of 227.8 l/s based on a rainfall of 50mm/hr.

4.1.3 The proposed development will reduce the impermeable area of the development to approximately 42% of the total site area (1.480 Ha). This proposed impermeable area generates a run-off rate of 205.6 l/s based on a rainfall of 50mm/hr that is unrestricted.

4.1.5 It is proposed that the development provide a reduction in discharge of 50% by comparison to the existing pre-development discharge. This rate has been agreed with United Utilities as 115 l/s.

4.1.6 The estimated storage requirements for the 30 year storm event and 100 year storm event are 97-222 m^3 and 256-485 m^3 respectively (full WinDES calculation summary in Appendix H).

4.7 Climate Change

4.7.1 There are indications that the climate in the UK is changing significantly and it is widely believed that the nature of climate change will vary greatly by region. Current expert opinion indicates the likelihood that future climate change would produce more frequent short duration and high intensity rainfall events with the addition of more frequent periods of long duration rainfall.

4.7.2 PPS25 table B.2 states that the recommended national precautionary sensitivity ranges for increase of peak rainfall intensity is 30% until 2115. It is widely believed that the impact of climate change means there is likely to be a long term increase in the average sea levels, with an expectation that sea levels will rise gradually.

4.7.3 An increase in flood water levels means that future flooding events will occur more frequently and will have a greater impact.

4.7.4 Any increase in the level of flood risk to the proposed development from climate change is likely to be related to the increase in rainfall intensity and duration and its impact upon the surface water drainage system.

4.8 Residual Risks

4.8.1 The development is accessible for emergency access and egress during times of extreme flooding as the flood plain does not extend into the area proposed for residential development.

5.0 SUMMARY AND CONCLUSIONS

5.0.1 The Environment Agency Online Flood Maps indicated that the site is located in an area classified as Flood Zone 1 and at low risk of flooding from Fluvial or Tidal sources.

5.0.2 The site falls within Flood Zone 1. PPS 25 confirms that the land use falls into 'more vulnerable' and this is appropriate for Flood Zone 1.

5.0.3 The primary option for surface water disposal is for discharge to the surface water public sewer in Oakland Avenue. Discussions have been undertaken with United Utilities regarding proposed rates of discharge and the point of connection and the principle of discharging surface water flows at a restricted rate of 115 l/s has been agreed.

5.0.4 In summary, the development can be considered appropriate for Flood Zone 1 in accordance with PPS 25.

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Stockport Metropolian Borough Council - http://www.stockport.gov.uk/

Appendix A: Location Plan

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Appendix B: Planning Layout Drawing

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Appendix C: Topographical Survey

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Appendix D: Environment Agency Flooding Information

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Appendix E: United Utilities Sewer Records Extract

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Appendix F: PPS 25 Extracts (Tables D.2. and D.3.)

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Appendix G: Surface Water Run-off Calculations

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Appendix H: WinDES Quick Storage Estimate

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Appendix I: Proposed Drainage Layout

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Appendix J: Photographs

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Appendix K: Notes of Limitation

The data essentially comprised a study of available documented information from various sources together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our l conclusions, we request the opportunity to review the information, reassess the potential concerns and modify our opinion if warranted.

It should be noted that any risks identified in this report are perceived risks based on the available information.

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