

DOCUMENT C

DRAINAGE AND FLOOD RISK STRATEGY

SEPTEMBER 2010 (RPS)

AND

**HYDRAULIC FOUL WATER SEWER CAPACITY ASSESSMENT
FOR PROPOSED DEVELOPMENT ON LAND AT BROCKHILL
WEST, REDDITCH**

DECEMBER 2010 (STW)



PROJECT:

**BROCKHILL WEST,
REDDITCH**

DRAINAGE & FLOOD RISK STATEMENT

For

**MILLER HOMES / PERSIMMON HOMES /
SOUTHERN & REGIONAL DEVELOPMENT
LTD**

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Our Ref: AAC 4835

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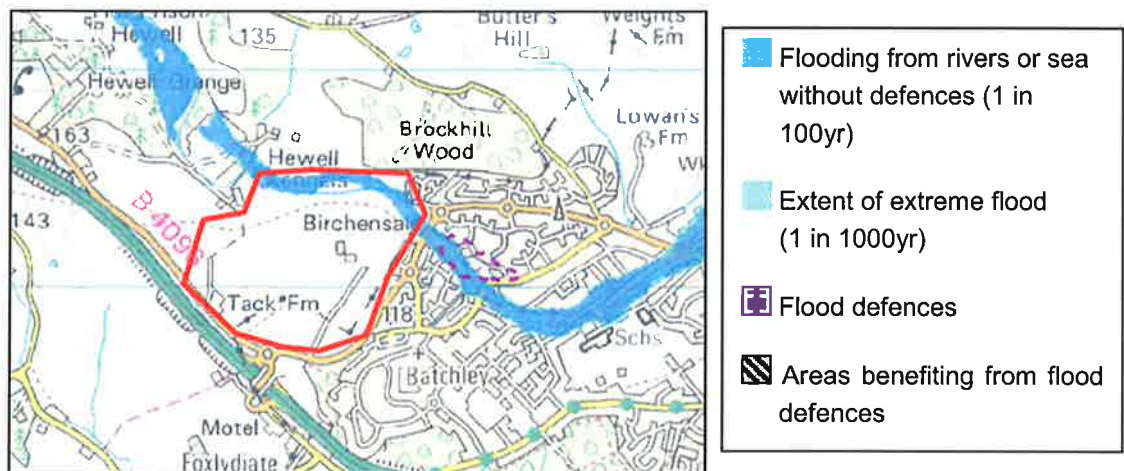
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1 FLOOD RISK

1.1 NATURE OF FLOOD RISK

- Due to the sloping nature of the NW site, there is only a limited corridor width adjacent to two brooks which fall into Flood Zones 2 and 3, as a consequence of this there is very limited potential for flooding of the development areas. The flood risk to this area is lower than that of the potential development site at Bordesley Park. Due to the far flatter topography of the Bordesley Park area a much larger portion of the development site is located within Flood Zones 2 and 3.
- The Environment Agency is responsible for the provision of information pertaining to flood risk from tidal and main watercourses throughout England and Wales. The EA provides an online information service through its Flood Map data an extract of which is provided in Figure 1.1 below.
- Clive Wilson, Redditch Borough Councils Operations Manager – Asset Maintenance has indicated that there may be a requirement to hydraulically model the brook in order to determine the extent of the flood zone associated with the watercourse which would need to be included within a Flood Risk Assessment for the site at the planning application stage.

Figure 1.1: Extract from EA Flood Map (downloaded on 21/09/10)



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2 SURFACE WATER DRAINAGE

2.1 SURFACE WATER DRAINAGE PRINCIPLES

- Surface water drainage is not an issue for development of land to the NW of Redditch, flows should be limited to existing greenfield run off rates and discharge to the Batchley Brook which runs through the site. As a consequence of the development flows downstream would also be better regulated reducing the risk of flooding to properties to the south and east.

3 FOUL WATER DRAINAGE

3.1 FOUL WATER DRAINAGE PRINCIPLES

- Clive Wilson has confirmed that flooding by foul effluent occurs to both Batchley Brook and River Arrow during inclement weather. The cause of which is that there has been over the preceding years a proliferation of additional foul flows and/or pumping stations which all discharge via a public sewer in Windsor Road. Both and then in combination, the original FWS Outfall Sewer and the comparatively recent Forge Mill Duplication Sewer which are known to fail regularly. This lack of capacity extends between Windsor Road and Ipsley Church Lane.
- Foul water from the NW development site would gravitate to a single new foul water pumping station, flows would then be pumped over the River Arrow and gravitate via a new trunk sewer through the Arrow Valley or around the outskirts of Redditch before outfalling to the existing public sewer system downstream of Ipsley Church Lane before finally discharging to the Spennall Sewage Treatment Works.
- This would provide a sustainable outfall.
- This would divert by means of the proposed single pumping station a substantial proportion of Priest Bridge catchment to Spennall and this would comprise of a high proportion of its combined catchment. This would be strategically nearer to Spennall (operational benefits) and eliminate all the existing western area pumping stations which would be abandoned and allowing their flows to drain by gravity to Priest Bridge. The point of discharge to Spennall would be well downstream of the known throttle points. At a stroke, this would eliminate a substantial proportion of flows.
- It would also reduce or eliminates the existing flooding problems.
- Allow the abandonment of existing smaller pumping stations.
- And could potentially reduce flows to Priest Bridge STW allowing new smaller sites to be connected with little or no impact.
- A Hydraulic Assessment of the existing foul sewers in the vicinity of the site was completed by Severn Trent Water of Persimmon Homes and Miller Homes (09/01/2009) (Extract provided in Appendix A). The report confirms that if foul flows from the development site are connected to the foul sewer in Salters Lane and/or Windsor Road there would be an adverse effect on the overall hydraulic performance of existing system to the extent that the risk of flooding is substantially

increased as such the foul proposals as detailed above would overall improve the existing situation in Redditch:

- Re-directing existing foul water flows through a new trunk sewer will eliminate flooding of untreated sewage into the River Arrow and the Red Ditch.
- This would have a positive effect on local biodiversity, health and ecology of the River.
- Levels of Ammonia, Dissolved O₂ , BOD (biochemical oxygen demand) and phosphates should be improved by eliminating the foul water flooding problems.
- Developing the NW site will reduce current pressure on the River Arrow and may help to reach the objectives of the River Basin Management Plan set out for the catchment.

APPENDICES



A. APPENDIX A

**Extract - Hydraulic Foul Water Sewer Assessment completed by Severn Trent Water
09/01/2009**

Severn Trent Water

**HYDRAULIC FOUL WATER SEWER
ASSESSMENT FOR PROPOSED
DEVELOPMENT AT
BROCKHILL EAST & WEST, REDDITCH.**

Joint Client : PERSIMMON HOMES (WEST MIDLANDS)
&
MILLER HOMES (WEST MDLANDS)

**Sewerage Asset Assessment
Strongford STW's
Barlaston Old Road
Barlaston
Stoke-on-Trent
ST12 9EX**

3. CONCLUSIONS & RECOMMENDATIONS

Conclusions: **Hydraulic Performance of Foul/combined Sewers to Sernal STW.**

Existing FWS: The model indicates that the hydraulic performance of the existing foul sewer downstream of the proposed connection point in Windsor Road is generally overloaded, with surcharging predicted in a 1 year event.

Flooding is also predicted in a 5 year event from manhole No. 5201 in Windsor Road, plus a number of manholes located in Dolphin Way, Proctors Barn Lane and Holloway Drive. However, there are no sewer flooding incidents recorded in these areas and therefore the predicted flooding cannot be verified.

**Existing FWS +
239 l/s Dev. Flow
Salters Lane &
Windsor Road:**

The model was re-run with a development site design flow of 121 l/s added to the existing foul sewer in Salters Lane at manhole No. 5908 and 118 l/s added to the sewer in Windsor Road at manhole No. 5201.

The model now shows an increase in the level of surcharge and the predicted flood volume at manhole No. 5201 is substantially increased. The manholes predicted to flood in Dolphin Way, Proctors Barn Lane and Holloway Drive also show increased flood volumes, albeit to a lesser extent. Flooding is also now predicted from manhole No. 9502 located at the lower end of Windsor Road and manhole No. 2506 in Middlehouse Lane.

We would therefore conclude that adding a development site flow of 239 l/s upstream of Windsor Road would have an adverse effect on the overall hydraulic performance of existing sewerage system to the extent that the risk of flooding is substantially increased.

**Existing FWS +
239 l/s Dev. Flow
Old Forge Drive:**

The model was again re-run with a development site design foul flow of 239 l/s added to the existing foul sewer located in land off Old Forge Drive at manhole No. 4603.

The model now shows an increase in the level and frequency of surcharge in the sewer downstream of the connection point on Old Forge Drive, but flooding is still not predicted in a 30 year event.

We would therefore conclude that although the level of surcharge is increased, a total development site flow of 239 l/s added to the existing sewer in Old Forge Drive would not adversely effect the overall hydraulic performance of the downstream sewerage system.

Conclusions: **Hydraulic Performance of Foul/combined Sewers to Priest Bridge STW.**

Existing FWS: The upper reaches of the Priest Bridge catchment is at Blackstitch Lane, which is to the south of the Brockhill East development site. These sewers are generally 225/300mm dia pipes with a very limited amount of available spare capacity. The outfall sewer to the STW's is a 525mm pipe which is predicted to flood in a 1 year event

Further detailed analysis of this system of this particular catchment was not undertaken on the basis that this system is not capable of taking the flows generated by a development site of this magnitude.

Recommendations:

Foul Sewer: The model suggests that the existing foul/combined sewer downstream of Winsor Road is already overloaded and that an additional development site flow of 239 l/s would have a substantial effect on the overall hydraulic performance of the sewerage system.

However, the outfall sewer downstream of Old Forge Drive will accommodate a limited amount of additional flow and therefore on this basis we would make the following recommendations;

- That the foul water flows from the proposed development site are not connected to the existing sewer in Windsor Road, or any of the upstream sewers, without implementing improvement works to reduce the risk of flooding. Further feasibility works will be needed to establish the viability and extent of any necessary improvement works.
- That further consideration is given to the option of connecting the foul water flows from the proposed development site **to the existing public foul/combined sewer located in land off Old Forge Drive, at/or in the vicinity of manhole No. SP 0665 4603 and subject to maximum allowable discharge rate of 239 l/s.**
- It is also recommended that the company's Sewage Treatment Group are consulted with regard to the ability of Spenal Sewage Treatment to accommodate the additional load generated by the development site.

Notwithstanding the above, it should be noted that the final decision on this matter lies with the Company's Asset Protection Section and therefore it is also recommended that the client discuss this with your Asset Protection contact at the earliest opportunity.
