

## Land at Barton, Oxford

### Waste Water and Surface Water Strategy

#### Non-Technical Summary

10 September 2013

#### Introduction.

This note has been prepared to summarise the strategy for the waste water and surface water management of the proposed development at Barton.

The note deals in the first instance with the waste water strategy for the site and considers the existing sewers, the diversions of these sewers and how the proposed foul water is dealt with. Secondly, the note identifies how the surface water is managed, including measures to control storm water to prevent flooding, integrating the rainwater control features within the proposed landscaping by retaining existing ditches and hedgerows, together with incorporating measures to improve water quality.

#### Waste Water Strategy.

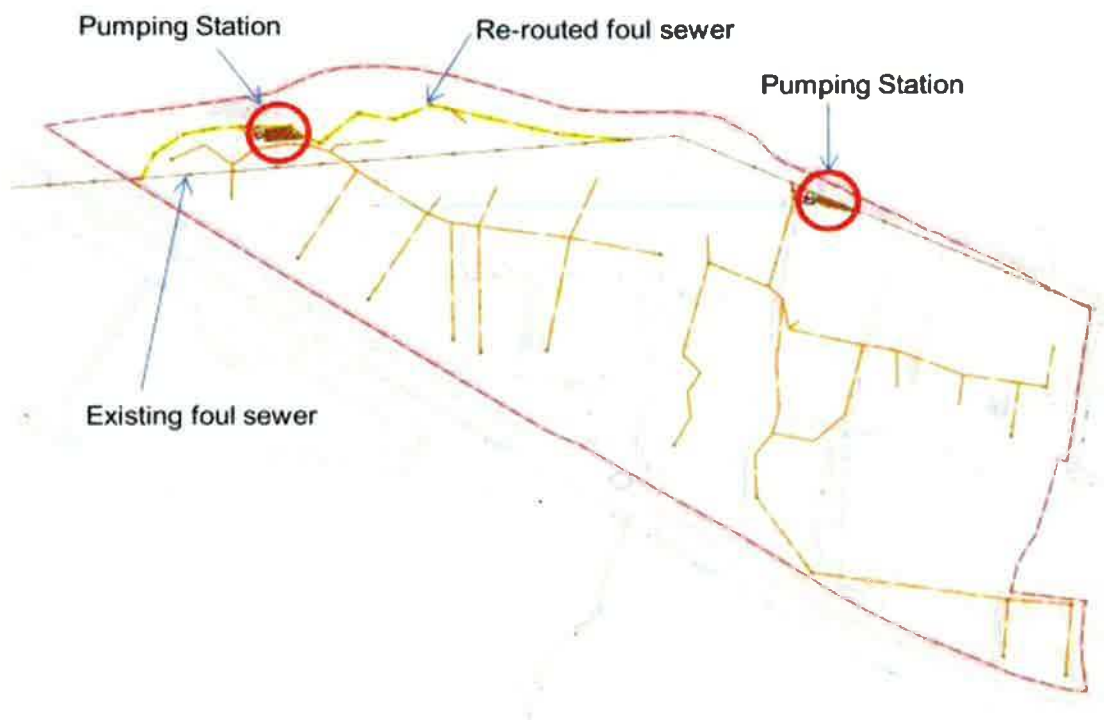


Figure 1. – Waste Water Strategy.

# Land at Barton, Oxford

## Water Resources and Drainage Note

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- Existing sewer located through the site.

An existing wastewater sewer passes through the site carrying foul water flows from the Barton residential area to the east, through the northern area of the development site along the line of the Bayswater Brook, before continuing in a westwards direction under the A40 towards Northway.

- Thames Water impact study.

Thames Water is the overseeing authority and they undertook a foul water impact study of the existing sewer network. This included surrounding areas in the vicinity of the proposed development to understand the capacity of the existing sewers, including any sewers flooding in the Northway area. As part of the study, Thames Water undertook extended monitoring of the existing sewer flows to verify and update the data in their model of the existing network and assess the added impact of the foul water from the proposed development.

The Thames Water study reported that there was spare capacity within the existing foul sewer network to accommodate the development foul water flows during normal conditions. However, during peak rainfall events, storm water enters the existing network and therefore floods the existing pipe system, temporarily removing the spare capacity in the existing sewer network.

Thames Water assessed the possible options to accommodate the proposed development foul water flows and concluded that the most suitable solution is to store the foul water within the development when the existing pipe network is at its full capacity. The stored development foul water will therefore be held back until conditions return to normal when the foul water can then be released at a controlled rate during dry periods into the existing downstream system.

- Proposed development measures.

To provide the proposed development and associated infrastructure it is proposed to divert the existing waste water sewer in part by replacing the western section on a new line within and around the northern fringe of the development, but avoiding the Bayswater Brook and its associated floodplain.

Two foul water pumping stations with underground storage will be provided within the development for Thames Water to maintain, store and control the foul water discharge from the proposed development.

During intense flow conditions, when the existing waste water pipe network is at capacity as a result of storm water from periods of heavy rainfall entering the system, foul water flows from the development will be stored underground at each pumping station and discharged at a controlled rate when there is spare capacity within the existing pipe network.

The proposed development measures provide a solution that will ensure that the local area does not experience an increase in foul water discharge at times of peak storm flow. The measures ensure that the occurrence of localised flooding does not increase and therefore does not affect the downstream foul system in Northway and Marston.

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The waste water strategy has been approved by Thames Water in principle.

### Surface Water Strategy.

Existing conditions.

The development is located within the existing rainwater catchment area for the Bayswater Brook that forms the northern boundary of the site. The associated Bayswater Brook flood plain within the development site closely follows the route of the Bayswater Brook and is relatively narrow which is typical of a steeply sloping landscape. The development site slopes over some 30m from a high point in the southeast corner to a low point in northwest corner adjacent the Bayswater Brook. The extent of the Bayswater Brook flood plain has been reviewed and agreed with the Environment Agency to form the basis of the Flood Risk Assessment report for the development. The flood risk assessment is based on a 1 in 100 year storm plus an additional 30% to allow for climate change and therefore provides a robust basis.

Ground conditions within the site have been monitored and show groundwater levels are relatively high. This means that soakaway drainage which would allow water to seep into the ground is not be possible and does not form part of the proposals for the development. The consequence of such high water levels and the fact that the underlying ground is generally clay means that when there is a heavy rain fall, the water runs directly into the Brook. The existing rain water movement is shown as a schematic below.

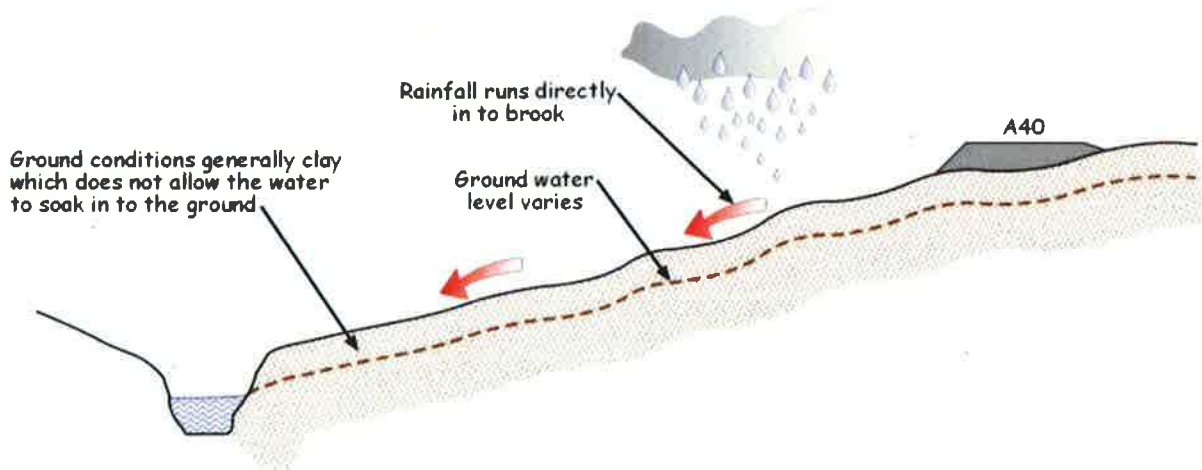


Figure 2. - Existing situation.

# Land at Barton, Oxford

## Water Resources and Drainage Note

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### Proposed Measures.

Having established the extent of the flood plain the development proposals ensure that there is no development within the Bayswater Brook floodplain, or within the associated tree protection zones along the Brook corridor, or within 8m of the banks of the Bayswater Brook.

The development mitigation scheme proposes a number of sustainable rainwater management measures as part of an overall Sustainable Drainage System (SUDS) strategy to collect and manage the rainwater within the development. Rainwater is to be collected through a number of different features such as water butts, permeable surfacing, green roofs, planted areas adjacent to the roads, and drainage trenches before being passed through a cascading system of underground storage tanks or open storage ponds where the water is held. The retained water is then released in to the Bayswater Brook at a controlled rate to avoid flooding.

The mitigation measures proposed are those typically used in other similar developments to control the rate of water passing through the system and hence through the site. The surface water is managed across the site and provides an improvement over the current situation where the water runs directly into the Brook and adds to the flood conditions downstream. A schematic of the proposed management of water across the site is shown below.

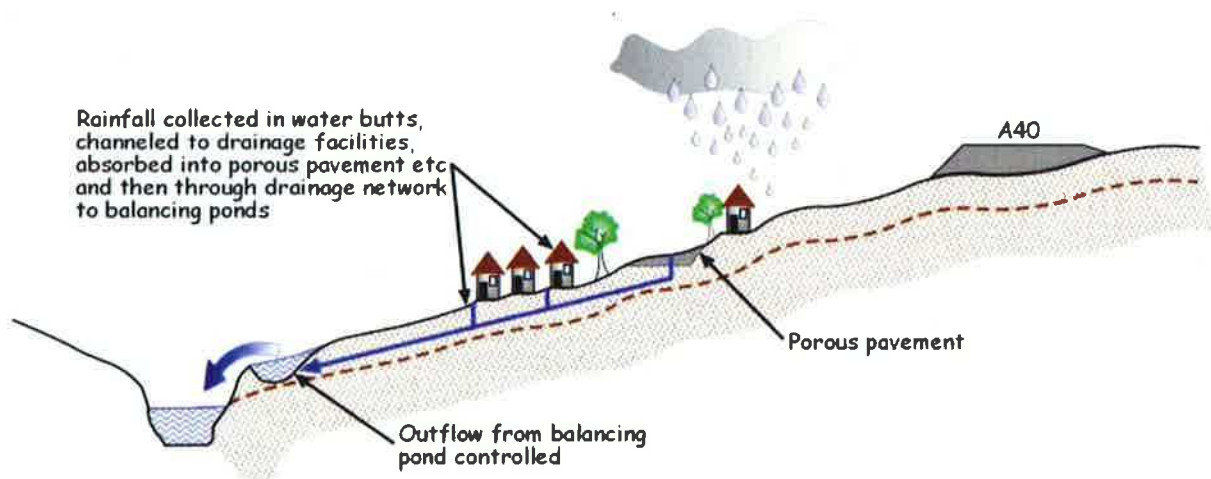


Figure 3. - Proposed Surface Water Management.

The Environment Agency response to the planning application dated 24<sup>th</sup> July 2013 accepts the strategy proposed to address surface water drainage and raises no objection to the planning application subject to the development being carried out in accordance with the Flood Risk Assessment accompanying the planning application.

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Extract from the Environment Agency response:

***“The report confirms that the drainage system will provide an overall reduction in the rate and volume of surface water runoff from the site following development. This will be achieved by limiting the rate of runoff for all events beyond the 1 in 2 year storm. Although there will be a minor increase in the rate and volume of runoff up to this event the proposals represent an overall improvement during higher order storms”***

The flood water attenuation ponds are to be located in the linear park adjacent to the brook and are designed to deal with the 1 in 100 year flood. The ponds incorporate permanent water bodies to add interest and habitat value. Further attenuation is provided by additional underwater tank storage beneath the sports pitches.

Green corridors will be retained within the development. The existing ditches will be retained to maintain surface water flows. Swales (grassed areas) and filter drains will be provided alongside the existing ditches to collect overland surface water flows in extreme storm events prior to routing the waters into the strategic storage ponds.

The SUDS strategy proposed for the development provides a control of the surface rainwater. All features will be designed in accordance with the emerging National SUDS Standards and SUDS Approving Body (SAB) guidance for hydraulic and safety requirements including the outline Health and Safety Risk Assessment and management strategy. The overall strategy is agreed with the Environment Agency.

### **Summary.**

In summary it is considered that the strategy for the waste water and surface water as outlined above provide the appropriate mitigation for the proposed Barton development. The measures proposed for waste water will provide a solution that will ensure that the local area does not experience an increase in foul water discharge at times of peak storm flow. The measures ensure that the occurrence of localised flooding does not increase and therefore does not affect the downstream foul system in Northway and Marston.

In the context of the surface water, the existing ditches will be retained to maintain existing surface water flows. Swales (grassed areas) and filter drains will be provided alongside the existing ditches to collect overland surface water flows in extreme storm events prior to routing the waters into the strategic storage ponds. The flood water attenuation ponds are to be located in the linear park, to deal with the 1 in 100 year flood including an allowance for climate change. Matters relating to waste water and surface water are agreed with the relevant Authorities.

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