

# The Waterhouse, Fitzroy Park

Initial comments and observations on the hydrological impact of the development on  
local surface and groundwater - updated June 2011.

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## Background

Haycock Associates were asked by RSK to undertake a summary review of the geotechnical report on The Waterhouse (February 2011). This review was to be shared with the City of London, Hampstead Heath (agreed March 2011). The review was to inform both parties of the issues associated with this development, both on the development site and downstream on Hampstead Heath Ponds, notably Bird Sanctuary Pond.

The document initially reviewed was "The Waterhouse, Geotechnical, Hydrogeological and Geoenvironmental Site Investigation Report, February 2011, RSK" plus drawing 901/SK020 P1 and drawing 901/SK/021 P2.

In addition, documents related to proposed planning application for 53 Fitzroy Park were reviewed (as issued October 2010) which have a bearing on the combined impact of the development of this sub-catchment to Bird sanctuary Pond.

In May and June 2011 additional documents were forwarded to Haycock Associates Limited, listed below. These have been reviewed and an addendum of comments listed below.

- 633(SK)717 (B) Revised Plan \_ Layout.pdf
- 901\_sk\_020-P5.pdf
- 901\_SK\_020-P6.pdf
- 901\_sk\_021-P4.pdf
- 901\_SK\_021-P5.pdf
- 901\_sk\_022-P2.pdf
- 2391-SKPH01(O).pdf
- 2391-SKPH02(A).pdf
- 2391-SKPH03(O).pdf
- 2391-SKPH04(A).pdf
- Haycocks 24.05.11.doc
- SWP Surface Water Strategy 24.05.11.doc

*In June 2011, additional discussions with Simon Robinson (design engineer) have clarified a number of points. The text has therefore been amended in relation to the comments on the June 2011 documentation.*

## Summary of Observations (April 2011)

The RSK document contains a comprehensive assessment of the sites shallow geology and made ground materials which enables an accurate conceptual model of the site to be determined. Key issues are how proposed development of 53 Fitzroy Park will impact the site have been overlooked. Likewise, the current hydrology of 55 Fitzroy Park pond and its impact on the basement hydrology of The Waterhouse have also been overlooked.

The proposed development of The Waterhouse involves the development of a large house frontage that spans the building plot from the northwest boundary to the southeast boundary. The span of the development is wider than the current development plot. The span of development will have an impact on the seepage movement of groundwater flowing northeast to southwest, although the proposed development does include King Post retaining walls to enable the seepage to pass around the foundation, although the exact performance of this seepage management solution not defined.

The proposed single story basement for The Waterhouse will have a finished flood level of 78.00m AOD, the excavation depth is unknown (estimated 77.5m AOD). The water level of the pond at 55 Fitzroy Park is estimated to be 79.65m AOD with a pond depth of 79.00 m AOD (based on work undertaken for 53 Fitzroy Park). The peizometric pressure from the pond to the base of the foundation is estimated to be 2.15m. The near surface saturation of the ground at WS2 maybe as a result of seepage loss from 55 Fitzroy Park pond towards the pond in the southern corner of The Waterhouse.

The movement of current groundwater seepage from the northeast of the development site is likely to be compromised by the proposed raising of garden land levels for 53 Fitzroy Park. The current proposal for 53 Fitzroy Park (October 2010)

involves the creation of a level garden at 81.2m AOD. This level is proposed by the installation of gabion walls between 53 Fitzroy Park and The Waterhouse and filling the void space with basement sub-soil. The permeability of the garden area is likely to be compromised. This raised ground level is likely to deflect the seepage from the northeast further into The Waterhouse plot and along the southeastern boundary of The Waterhouse. This will have implications for the drainage for this side of the plot and the hydrology of 55 Fitzroy Park pond and the pond within the development plot. This deflected flow is also likely to stress the performance of the King Post retaining walls.

Within the RSK document, no mention is made on the management of surface water from the buildings roof and hard standing areas. The resulting low permeability of the southern garden area may mean that soakaway systems are not possible without some degree of attenuation. The discharge of this water to the storm drains will result in lower volumes of runoff for the Hampstead Heath ponds, so some discussion on the management of this water resource would be welcome.

The management of runoff during construction is not mentioned, apart from a comment that soakaway disposal of water is not an option (section 10.7). The management of construction water needs to be discussed.

Finally, the site is impacted by surface runoff from adjoining upslope land (see comment section 11 point 2). The management of surface water flood risk through the site, especially with the proposed raising of land levels at 53 Fitzroy Park, needs to be considered. The development now spans the width of the plot, and potentially impacts the movement of surface waters in wetter periods. Provision in the construction plan and the final drainage of the site need to take account of this risk.

## Summary of Observations (May 2011)

**Haycock 24.05.11.doc contains responses to the issues raised in April 2011. The only substantial issue that seems to exist is ensuring that a better understanding exists on the potential drainage issues between Waterhouse and the pond at 55 Fitzroy. It has been proposed that an agreed site investigation protocol is established and required mitigation measures are developed to ensure the protection of this important pond.**

**In addition, it has been commented in the responses that the Construction Design Management Plan needs to be implemented correctly. Issues at Fitzroy Farm demonstrate the need for close control on the implementation of the plan. We concur with the response comments in this regard.**

**The addition of a surface water strategy and associated drawings adds to the clarity of the proposed scheme. Drawing "2391-SKPH04(A)" outlines the final surface water drainage plan for the site. It is noted that all surplus rainwater plus associated garden drainage will be directed to the surface sewers in Mill Lane (via soakaway and attenuation chambers). The garden drainage system will also collect any near surface groundwater and direct this to the surface sewers as well. The responses to our April 2011 comments suggest that soakaways will not work on London Clay geology, yet a 1800 by 3000mm soakaway is proposed in the location of the current small pond. We would suspect that this soakaway will not work and surplus water will continually overflow to the sewers via the 12 m-cu attenuation tank. It would be prudent to modify this design to ensure that any required water that is needed to sustain the pond at 55 Fitzroy could be made available and secondly to explore if excess rainwater and surplus groundwater / garden drainage could be effectively pass south of Millfield Lane and actively flow into the Hampstead Heath ponds. This would ensure that excess rain water from the development plot is not exported from the Ponds catchments and contributes to the sustained flows on the Heath.**

**Update, June 2011:** *It is our understanding that the surface water will not be disposed to sewers, but provision will be made to ensure that this normal runoff continues to seep/drain towards the City of London Ponds. Additional drainage under Millfield Lane will be required. This is subject to agreement with the City of London. It is also noted that the 1800 by 3000mm soakaway in drawing 2391-SKPH04(A) will act as an attenuation tank to ensure green field runoff rates from the development prior to natural discharge to Hampstead Heath.*

## Report Comments (April 2011)

1. RSK summary states that the site was dry on the day of the site inspection, but no date given for the site inspection. Own observations are that seepage is leaving the site and issuing over Millfield Lane towards Bird Sanctuary Pond in the southern corner of the site.
2. RSK summary states that pumps to be used to dewater site (p8) but management and discharge of water not clear. Ideally this needs to be stated and impact on water yield for area assessed.
3. RSK summary states southern pond to be infilled. Impact on made ground hydrology unclear, the resultant drainage of this land unclear. Is it to be drainage directly to the City of London ponds ?
4. RSK summary report does not consider issues inherent in proposed development of 53 Fitzroy Park (see my comment above).
5. Section 2.2, no date when observations made. This section gives the impression that the site is dry with no assessment of the likely behaviour of the site in wet periods (see section 11.0 point 2).
6. Section 4.2.1 groundwater at 1m below ground level in land north of southern pond. This level contiguous with level of water in 55 Fitzroy Park pond.
7. Section 4.3 seems dismissive of any water through the site.
8. Section 4.3.1 seems to ignore surface flood risk issues for the site (see section 11. point 2).
9. Section 7.1.2, reference to WP5, but this not shown on 901/SK/020 P1 drawing ?
10. Section 10.4, basement at -3.2m and FFL at 78.0 mAOD, relate these levels to water levels in 55 Fitzroy Park pond (c 79.65m AOD ?)
11. Section 10.7 mentions soakaway not applicable, but no comment made of where construction water will be discharged.
12. Section 11, point 2, mention of surface flooding of the site during the construction of the current house basement. The nature of this flooding and the risk to construction needs to be assessment and also the long term surface water flood risk to the site assessed in the light of proposed development of 53 Fitzroy Park. The flow line shown in dwg 901/SK/020 has a 13 hectare catchment (0.13 km-sq) and can generate considerable volumes of water when surface water drains are surcharged.
13. Section 11, point 5, the drainage of water from waterhouse to the pond at 55 fitzroy is interesting. The sealing of this pipe and the resultant discharge point of this water is even more interesting. Would like to discuss this further and whether this water is seeping onto Millfield Lane (as observed in February 2011).
14. Drawing 901/SK021 P2 x-sec C states pond to be infilled. With what and where will resultant water be discharged ?
15. Drawing 901/SK021 P2 x-sec A seeks to transfer seepage from 2m of made ground on the upslope side of the development and pass this water into less than 1m of made ground on the downslope side of the development. The performance of the King Post retaining walls and how this transfer of seepage will be effective without saturating the southern garden needs to be defined. Seepage from the southern garden will discharge onto Millfield Lane is not managed correctly. Current drains through the lane cannot cope with current seepage and small runoff volumes.

## Comments (April 2011)

The current RSK document considers the geotechnical information for The Waterhouse site comprehensively and enables both parties to have a conceptual model of the hydrology of the site. The RSK document does not consider the implications

of the proposed development at 53 Fitzroy Park nor the implications of the pond hydrology at 55 Fitzroy Park on the hydrology within the Waterhouse development plot. We would suggest that additional consideration is given to these issues, but the resultant impacts may need to be factored into the design of the King Post retaining walls, especially on the southeastern boundary of the proposed development plot.

Surface water flood risk to the site is not considered in any detail, but is cited as an issue in the construction of the basement of the current house. The upslope catchment is 13 hectares and with the proposed development of 53 Fitzroy Park, surface water is likely to be steered towards The Waterhouse. Provision for this movement of this water through the plot needs to be considered.

There is no provision or discussion for the management of runoff from the site, either through construction phase or for the developed site. This needs to be reviewed and the off-site impact on City of London lands reviewed, especially the impact on Bird Sanctuary pond.

Please be aware that the City of London are proposing to raise the dam at Bird Sanctuary Pond as part of improvements to the reservoir safety of all the ponds on the Heath. The crest height of the dam is currently proposed to be 76.25m (+3.65m) with peak water levels at 76.00m (>1:10 000 year water levels). The Waterhouse and Millfield Lane will not be impacted and normal water levels in Bird Sanctuary will remain at their current levels.

## Comments (May - June 2011)

**Additional documents in May and June 2011 clarify the proposed drainage strategy for the scheme and add clarification to the management of surface and groundwater. The proposal seeks to attenuate flow and then allow natural discharge into Hampstead Heath, along the existing seepage channels, via a refurbished pipe under Millfield Lane. This arrangement is subject to agreement with the City of London. The principle of ensuring that normal flow that would be directed to the Ponds is maintained is welcome. The attenuation of this runoff is also welcome, since this will also assist with the naturalisation of runoff in the area.**

**The developers have proposed further site investigation on the potential links between the drainage of Waterhouse and 55 Fitzroy, this is advisable and details should be developed to ensure that the pond at 55 Fitzroy is not adversely impacted.**

**The developers comments on the potential impact of development at 53 Fitzroy on the Waterhouse are noted.**



