

LLFA COMMENT / QUERY TRACKER - 11.02.2020

INTRODUCTION

This tracker has been compiled to provide a detailed response to comments received by Camden Planning from the Lead Local Flood Authority in relation to the proposed development.

EXECUTIVE SUMMARY

Earlier (2nd and 3rd) LLFA comments were discussed and informally resolved at a meeting between Coyle Kennedy, LBH and the Camden LLFA Officer on 26th November 2019.

This version of the tracker now introduces further (4th) comments received following that meeting that have been provided by Camden's outsourced LLFA consultant Aecom, who had previously provided the 1st comments but have possibly not been involved subsequently in any discussion or resolution of the issues.

The tracker may be a little hard to follow as a result of different issues, comments and interpretations attributed to different LLFA reviewers.

It seems apparent that Aecom have not studied all of the information that has been submitted. Importantly this includes the very first Hydrological and Hydrogeological Assessment for the site that introduced and explained the site circumstances to a greater extent than seems to be the current understanding.

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ISSUE REF:	ORIGINAL LLFA COMMENTS (AECOM)	APPLICANT RESPONSE
	22/08/2019	23/09/2019
Issue 1	Provide the maximum volume each of the SuDS features can accommodate, as well as freeboard requirements in order to verify if the 141.5m³ of attenuation required can be accommodated and indicate the discharge rate from the impermeable driveway to the combined sewer.	The SuDS volumes are included in the plan on Page 7 (of13) of the CK report which also shows a flow control limiting the discharge rate from the impermeable driveway to the combined sewer at 5 l/sec.
Issue 2	Provide calculations in demonstration of the discharge rate from the swale and the discharge rate to the combined sewer for the 1 in 1-year event, the 1 in 30 event, the 1 in 100 year event and the 1 in 100 year + 40% CC event.	Calculations are included on Pages 10 to 13 of the CK report, including discharge rates to the combined sewer for the 1 in 1-year event, the 1 in 30 event, the 1 in 100 year event and the 1 in 100 year + 40% CC event.
Issue 3	Provide evidence of acceptance of discharge proposal to Hampstead Heath from the Corporation of London	The Corporation of London's requests regarding maintaining the current discharge to Hampstead Heath is addressed on page 1 (Page 3 of 13) of the CK report.
Issue 4	Outline flood mitigation measures for Plots 4 & 5 to demonstrate how these plots will be mitigated against the ingress of surface water.	This was actually addressed in our Hydrological & Hydrogeological assessment LBH4480 Ver 2.0 section 7.8 (page 31), where it was indicated that local landscaping would be used to direct any surface water flooding away from Plots 4& 5 and direct this to the designated overland flood route immediately to the north of Plot 5

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LLFA 2ND COMMENTS 04/10/2019	APPLICANT RESPONSE 24/10/2019	LLFA 3RD COMMENTS 08/11/2019	APPLICANT RESPONSE 11/12/2019
<p>Plan shows:</p> <ul style="list-style-type: none"> 50 m³ surface water attenuation 15 m³ swale 3 m³ underground attenuation tank Flow controlled rate from driveway 5 l/s <p>Issue i: the indicated storage adds to 68 m³, a shortfall of 73.5 m³.</p> <p>Issue ii: No technical details indicated for the blue-green roofs (storage volume, area/depth, void %, flow controls, discharge rates etc.)</p> <p>Issue iii: no information on freeboard requirements</p>	<p>Issue i: There is a total storage volume of approximately of 141.5m³, which is made up as follows:</p> <ul style="list-style-type: none"> 15m³ in the swale 50m³ in the attenuation tank 76m³ in green and blue roof storage <p>Issue ii: The green/blue roofs will be designed by a specialist supplier/designer and it is unreasonable to request such details at this time as any specialist supplier/designer is unlikely to carry out a design without first receiving an order and deposit.</p> <p>Issue iii: The proposed house levels for the houses on the east side of the site are in excess of 1m above the level of Millfield Lane. From this it is clear there is more than ample freeboard provided.</p>	<p>Issue i: Noted. The blue-green roof storage information the Drainage Report. At least the Site Drainage Layout should be updated with the figures that make up the 76 m³. Further action requested</p> <p>Issue ii: Adequate information should be submitted at planning stage, based on outline designs generated by the drainage consultant. This is to show the LPA/LLFA how the proposed drainage measures, rates and volumes could be achieved in the scheme. Final detailed design information is not expected at this stage; it is accepted details may change, but the potential to achieve the stated aims should be demonstrated. Further action requested</p> <p>Issue iii: This request related to the SuDS freeboards as per original comment: "Provide the maximum volume each of the SuDS features can accommodate, as well as freeboard requirements in order to verify if the 141.5 m³ of attenuation required can be accommodated and indicate the discharge rate from the impermeable driveway to the combined sewer. Further action requested</p>	<p>Issue i: The roof designs will be undertaken by a specialist designer in due course.</p> <p>At this stage a conservative assumption might be made as follows:</p> <p>Assumed Approx. green/blue roof area</p> <p>Plots 1 to 3 - 80 m² each Plots 4 & 5 - 135 m² each Assumed equivalent depth water retained 150mm (3 x 80) + (2 x 135) = 510 m² 510 m² x .15m = 76.5 m³</p> <p>NB. Coyle Kennedy have provided a further assessment (attached) based upon revised areas that suggests 125m³ of blue/green roof storage to be potentially available.</p> <p>Issue ii: Coyle Kennedy have provided additional information (attached) to demonstrate how the drainage measures will be achieved.</p> <p>Issue iii: Coyle Kennedy have indicated a surplus storage capacity of some 50m³. Given that there is no potential for freeboard within the filled swale and the attenuation tank this can be accommodated within the roof designs as a freeboard of some 60mm. (see attached CK detail)</p>

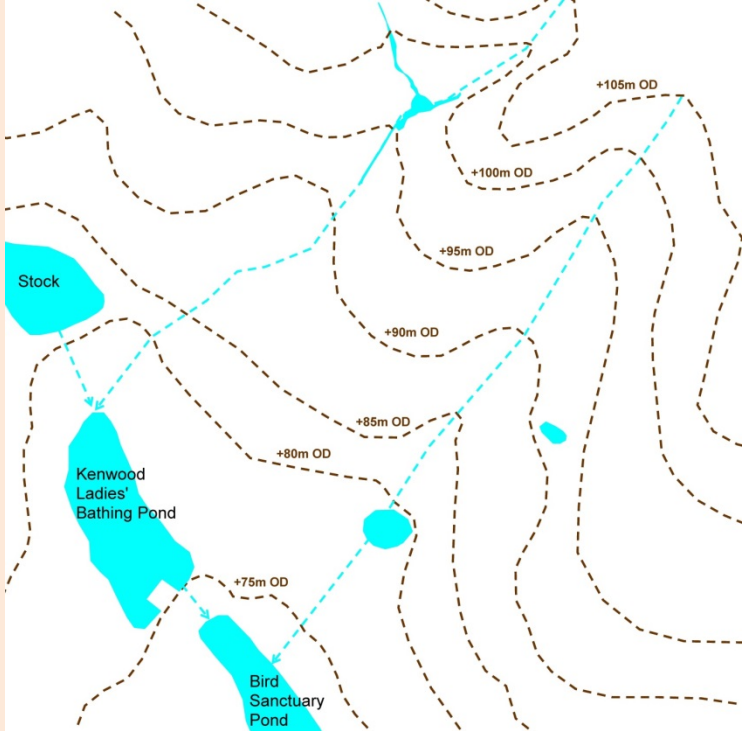
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<p>The Micro Drainage tables show storm sewer design results and foul sewerage design.</p> <p>Issue iv: we should expect, for each return period:</p> <ul style="list-style-type: none"> - summary of results - rainfall details / time area diagram - model details / storage structure / depth-flow relationship outflow control 	<p>The storage provided on site caters for the 100 year return period + 40% CC event which has been demonstrated by LBH Wembley in detail. The system is currently designed for a 100 year return period + 40% CC event – this will clearly cover return period less than the 100 year and clearly each of these return periods will have a lesser requirement than the 100 year period.</p> <p>The proposed drainage system is designed to mimic the existing drainage on the site, except that it is now much improved as additional storage is provided where the water now permeates naturally to the ground via the storage systems.</p> <p>An overflow is provided from the storage systems to the Heath via a pipe as agreed with Mr. Bob Warnock (Camden Council) which will eliminate the current discharge across Millfield Lane and the Health and Safety issue he was concerned about.</p> <p>The details of the storage structures are outlined in Coyle Kennedy's drawings to a level of detail which is reasonable for this stage of the planning/design.</p>	<p>We are seeking copies of the MicroDrainage calculations which will have been carried out by the consultant in order to generate the storage proposals. This is your evidence to support the proposed attenuation volumes and discharge rates. I can provide example copies on request from other schemes but the consultant would be aware of the items requested.</p> <p>Further action requested</p>	<p>Issue iv:</p> <p>See attached updated LSD Proforma and calcs to demonstrate storage required to achieve</p> <ul style="list-style-type: none"> A. Greenfield Rates - 161m³ B. 50% Betterment - 143m³ <p>(it is noted that the previous estimate for 50% betterment was 141.5m³, and also that the 190m³ storage proposed by Coyle Kennedy will accommodate the Camden Policy to limit post development discharge to greenfield rates)</p>

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<p>The reference states “...as agreed with Mr. Bob Warnock on site on the 10 May 2018.” .</p> <p>Issue v: We should seek written confirmation from the landowner</p>	<p><i>[Not addressed in ‘Response to Further information request – 55 Fitzroy Park’]</i></p>	<p>Further action requested</p>	<p>Issue v: We met on Bob Warnock of the City of London (and his then Hydrology advisor) on 1st May 2018 (not 10th May) and discussed how best to deal with the water that runs across Millfield Lane.</p> <p>I think we mistakenly understood at the time that the CoL were indicating a preference that they wished to see it removed and dealt with by means of a pipe installed under the carriageway of the lane.</p> <p>On 4th October 2018 we re-iterated to the CoL that we had no strong feelings on the matter but wished to accommodate whichever of the following options the CoL felt to be the most appropriate. 1) Leave as is 2) Replace with a pipe or 3) Replace with a more formal surface stone/concrete “ford/channel”.</p> <p>Unfortunately, the CoL were unable to provide any clarification but have since indicated that they have commissioned an independent hydrological consultant.</p> <p>On 26th October 2018 the CoL wrote that they would not support a request to discharge water onto the Heath, but again were unable to clarify what they wished to happen with the existing discharge. However, it would seem somewhat unlikely that the historic discharge of an ancient watercourse would require CoL permission to flow. (Not the least because the flow must be seen as an important contribution to the wetland area of the nature reserve, and, ultimately, to the Highgate Pond chain.)</p>

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<p>The reference states landscaping without providing further details.</p> <p>Issue vi: Final details may be conditioned, but we should ask for additional information to clarify the measures in outline.</p>	<p><i>[Not addressed in 'Response to Further information request – 55 Fitzroy Park']</i></p>	<p>Further action requested</p>	<p>Issue vi:</p> <p>The landscaping details will be finalised in due course to provide the flood defence required. The required measures were outlined in the Hydrological & Hydrogeological assessment LBH4480 Ver 2.0 section 7.8 (page 31), where it was indicated that local landscaping would be used to direct any surface water flooding away from Plots 4& 5 and direct this to the designated overland flood route immediately to the north of Plot 5. (see attached additional information in the form of a plan and sketch sections by Coyle Kennedy)</p>

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ISSUE REF:	LLFA 4TH COMMENTS	APPLICANT RESPONSE
	15/01/2020	11/02/2020

<p>Issue 1:</p>	<p>Comment:</p> <ul style="list-style-type: none"> - The information within the <i>Response to Further Information request</i> indicates the total storage volume of the swales, the attenuation tank and the green and blue roof to be 141m³. - The <i>Drainage Report</i> indicates the drainage strategy for the development will comprise of discharging runoff from the “paved carparking & roads areas & discharging to the combined sewer running beneath Fitzroy Park via attenuation”. The drainage plan (<i>Drawing No. P300 Rev B</i>) shows a 3m³ attenuation tank connecting to MH S5. The Asset MH S5 is a Hydro-brake flow control manhole restricting flows to 5l/s. It is assumed the attenuation tank is designed as offline storage for this section of the drainage network as the drainage plan shows no online connections draining to the tank. The storage provided by this attenuation tank is not mentioned in the proposed attenuation storage stated in the <i>Response to Further Information request</i>. - The <i>Drainage Report</i> also indicates the drainage strategy for the “blue/green roofs, paved areas & footpaths” will discharge “through the attenuation / swale via percolation”. An overflow pipe is proposed to discharge excess flows from the attenuation to the Heath. - Furthermore, the Figure (no label) in the <i>Addendum to BIA Submission</i> report shows the location proposed for infiltration to be underlain by London clay which lies at approximately 80.5 mAOD. The ground level shown in the Figure indicates the ground level to be 81.2 mAOD. The report presents groundwater monitoring results from September 2017 and November 2018 investigations. The highest groundwater level, with respect to ground level, were record 80.14 mAOD 	<p>The LLFA comments of 15th January do not reflect what was presented and discussed at the meeting of 26th November.</p> <p>It is necessary to right back to the initial hydrological & hydrogeological impact assessment report and to understand that this site substantially comprises a parcel of land with a watercourse running through it. Over the ages, that watercourse has become largely hidden but it is still there, feeding the pond and in turn the Heath Nature Reserve and the Bird Sanctuary.</p> <div style="text-align: center;">  </div> <p>It has been recognised from the very outset of the project that the potential</p>
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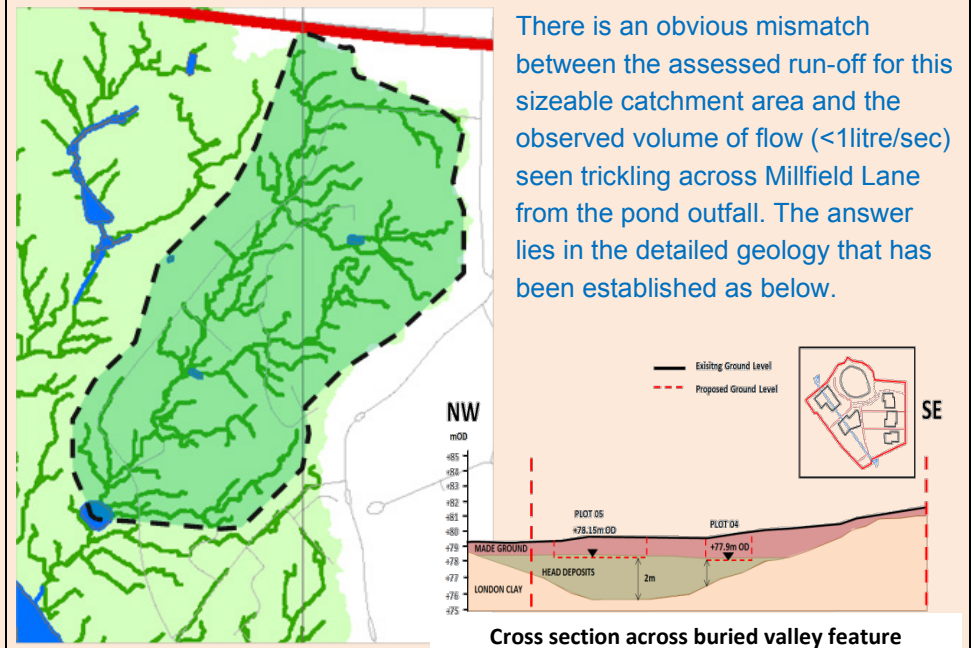
in September 2017 and 80.05 mAOD in November 2018. These values are equivalent to 0.66m below ground level (bgl) and 0.75m bgl respectively. If infiltration is feasible, it would not be compliant with guidance within the SuDS Manual.

- The borehole records for BH2, found in the *Site Investigation Report*, show Clay was encountered up to a depth of 30m.
- No infiltration rates and calculations for the infiltrations SuDS are provided in the information submitted, therefore it is not possible to assess the SuDS against the design standard (i.e. the 1 in 100 year plus Climate Change event).
- The drainage layouts (*Drawing No. P-300 Rev B and Drawing No. P-301 Rev A*) indicate that the swales lie outside the site boundary.
- The drainage network sections plan (*Drawing No. P-302*) indicates the invert level (IL) of the foul network at the outfall to the combined sewer to be 82.101 m AOD and the IL of the surface water network at the outfall to combined sewer network to be 81.145 m AOD. However, the IL of the existing Thames Water sewer has not been provided. Thames Water asset plans are provided in the *Addendum to BIA Submission* report, however the asset information for the proposed connection point is not within the asset search boundary.
- The drainage strategy indicates that the foul will discharge from the site by pumping.

Action for applicant:

Provide evidence to demonstrate infiltration is the most

impacts of development could affect not only the development itself, but also neighbouring properties and the wider neighbourhood, including the important wildlife habitats of the Hampstead Heath nature reserve and more specifically the Highgate Ponds, which lie a short distance below the site. It is not a matter of requesting permission from the CoL for the watercourse to be allowed to continue to discharge into the nature reserve. Conversely, it is absolutely essential that it should continue to do so.



Pond Catchment Area (based upon Lidar)

There is an obvious mismatch between the assessed run-off for this sizeable catchment area and the observed volume of flow (<1litre/sec) seen trickling across Millfield Lane from the pond outfall. The answer lies in the detailed geology that has been established as below.

The SuDS statement acknowledged the presence of perched groundwater

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	<p><i>appropriate method of discharge from the site as the evidence found in the ground investigation report indicates that infiltration is not viable due to geology and the high water table.</i></p> <p><i>Provide evidence that the swale location is permitted by the landowner. Furthermore, provide evidence that the swale attenuation volume is correct considering groundwater levels in this area.</i></p> <p><i>Provide the invert level of the existing Thames Water combined sewer which the outfalls from the proposed site drainage will connect to.</i></p>	<p>running through the made ground along the upper surface of the London Clay as evidence of some permeability within the overlying soils.</p> <p>The purpose of SuDs is to restore the natural balance and to prevent negative impacts. The pattern of natural drainage at this site has to be understood and preserved in order to ensure that the nature reserve still receives all the water that it previously did, subject to attenuation to remove any increased flood risk resulting from a faster and increased discharge from the developed areas of the site.</p> <p>The proposed Mill Lane swale is located entirely within the site ownership but has been located outside the plot boundaries at the request of the CoL for ease of maintenance. The attenuation volume has been previously demonstrated and the nature of the overflow will be a matter following advice from the CoL on whether they wish to continue to see water running over Mill Lane, or require it to be culverted beneath the carriageway.</p> <p>The existing foul water drainage discharge invert level is recorded at +81.62m OD</p>
Issue 2:	<p>Comment: The preferred method of discharge from the swale / attenuation tank is via infiltration. However, no (infiltration) calculations are provided to demonstrate the hydraulic performance of the infiltration SuDS against the required design standard (i.e. 1 in 100 year plus 40% CC). Further, an overflow pipe is proposed from the attenuation tank but no calculations have been provided to show the likely discharge rate from the attenuation SuDS when the capacity has been exceeded.</p>	<p>Calculations have been provided to demonstrate that the capacity of the attenuation that will be provided for the development has been calculated on the basis of what is required to deliver the site run-off at a greenfield rate for the 1 in 100 year plus 40% CC design standard. However, the reader must understand that this is not any new discharge. This is water that is currently entering the downstream nature reserve by a combination of percolation beneath the carriageway of mill lane and by running across it.</p> <p>Calculations have been provided. The SuDS scheme has been carefully designed to accommodate and preserve existing infiltration and percolation</p>

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	<p>Action for applicant:</p> <p>Applicant to provide infiltration rates and supporting calculations for the infiltration SuDS to verify the hydraulic performance of the infiltration SuDS.</p> <p>Additionally, calculations in demonstration of the discharge rates from the swale / attenuation tank for the 1 in 100 year plus Climate Change event should be provided.</p>	<p>beneath the Mill Lane carriageway into the nature reserve while not relying upon this for effectiveness. The CoL have suggested that some testing and monitoring of the swale itself during initial construction might be considered to inform the final overflow design.</p>
Issue 3:	<p>Comment:</p> <p>The correspondence from Nexus Planning, dated 21 October 2019, confirms that the City of London Corporation has <u>not</u> given permission for overflows from the proposed development to be discharged to the Hampstead Heath. In addition, the letter from Kenwood Ladies Pond Association also expresses concerns about the proposed development in terms of the long-term impact of the drainage strategy on the surrounding environment.</p> <p>Action for applicant:</p> <p>Consent has not been granted by the City of London Corporation to discharge overflows from the infiltration SuDS to the Hampstead Heath. An alternative solution following the drainage hierarchy should be sought.</p>	<p>We confirm that permission is <u>not</u> required to preserve the existing watercourse. The suggestion that “an alternative solution should be sought” implies a worrying lack of understanding.</p> <p>We have repeatedly stressed that that the most important issue here is to preserve the natural drainage situation. Is the LLFA is seriously advising stopping up of the watercourse and its diversion to some receptor other than the nature reserve? This would be frankly unthinkable and could lead to fairly disastrous environmental consequences for the existing wetland area and would doubtless also affect the Highgate Ponds beyond.</p>
Issue 4:	<p>Comment:</p>	<p>This issue was addressed and closed out on 11/12/2019. It is apparent that</p>

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	<p>The Extract from Hydrological and Hydrogeological Impact Assessment indicates it is planned to provide raised landscaping around Plot 4 and 5 to direct surface water floodwater away from the buildings and direct it towards the pond.</p> <p><u>Recommendation – Further information required</u></p>	<p>the LLFA has possibly not seen all of the relevant information, including the full Hydrological and Hydrogeological assessment that we have referred to above.</p>