HAMPSTEAD NEIGHBOURHOOD FORUM

To: Sustainability, Air Quality and Energy Team, Camden
From: Hampstead Neighbourhood Forum
16 October 2022

Comments on draft Camden Flood Risk Management Strategy 2022-2027

We very much appreciate Camden's wish to engage others on its draft strategy. Since its 2003 Flood Report, Camden has worked to raise awareness of flood sources, impacts, mitigation and prevention, and to build relationships between organisations. As a result, progress has been made.

Camden is also to be commended for delaying publication until the LLFA had completed its investigation into the July 2021 flooding, so that the findings could be taken into account.

Camden's Flood Investigation Report of 2021 (CFIR 2021) and the Camden Flood Risk Management Strategy of 2022 (henceforth referred to as CFRMS 2022) are noteworthy for their focus on surface run-off and sewer surcharge, indicating appropriate on-site evaluation and understanding, with good strategies for reducing future risks and improving outcomes.

However, some factors, which particularly concern the 'northern uplands' of Camden, have been only partly understood or accounted for. CFRMS 2022 will not sufficiently mitigate their effects on flood risk. Below we offer some comments on these factors, which include basement construction, groundwater flows, and run-off into sewers, including that caused by extreme weather.

BASEMENT APPLICATIONS AND FLOODING

Camden's Flood Report of 2003 noted that the six streets in the borough with the highest numbers of basement planning applications (43 in total) were all flooded in August 2002: two in NW3 and four in NW6. While an important finding, this did not fully explain the causes. The 2003 report recommended the UDP review broaden two policies related to flooding in vulnerable areas and restricting basements for residential purposes '*in areas of known flood risk*'. But this did not fully explore the important mechanisms at play downstream from these areas. Planning guidelines therefore continued to focus on *immediate* neighbours, and did not take into account the wider hydrological and geological mechanisms that were operating, particularly those of groundwater upstream impacting on downstream areas vulnerable to flooding.

This is not addressed in CFRMS 2022. Basements produce many responses in the ground and the geology as well as the hydrology of north Camden are complex. Each basement needs to be assessed on its merits and potential problems for its surroundings *based on specialised knowledge of the local geology as well as appropriate testing*. This should include its effect on groundwater: immediately above and to the sides of flow but also on 'downstream' properties due to its contribution towards sewers reaching capacity by speeding up groundwater flow directly into them.

Cumulative basements

Camden's Strategic Flood Risk Assessment (2014) stated at 6.4.6: 'A basement search radius of 500m around a development is advisable to inform a basement impact assessment'. But Camden's Development Policy 27 on Basements is not strong enough to limit the impact of cumulated basements on flooding. In BIAs, it is very rare to find an adequate professional assessment of the effect of cumulated basements in an area. Normally, there is only an out-of-date map of the basements in the vicinity with no indication of depth or the

accumulated effect on the groundwater. Where an assessment is done, it is not used to inform the basement construction plan and is rarely required to by Camden's independent expert. Few applicants appear to consider other properties that might be affected, whether neighbouring or 'downstream'. As far as we are aware, Camden no longer keeps an up-to-date list of basement applications by year online.

We would urge that the CFRMS 2022 encourages Camden's Planning department and its independent BIA auditor to be firmer about this with respect to flooding.

GROUNDWATER

The northern parts of Camden have three potential superficial aquifers: beneath the Head superficial deposits and/or 'Made Ground', beneath the Bagshot sands and beneath the Claygate Beds. In addition, these layers and that of Unit D of the London Clay Formation have groundwater in various amounts and constancy, with many tributaries lying within sand partings and feeding the four major rivers that begin in this region: the rivers Fleet, Brent, Tyburn and Westbourne.

In both CFIR 2021 and CFRMS 2022 no mention is made of the Tyburn, Westbourne or Brent rivers – only the Fleet. Few people understand the movement of groundwater before it flows into the sewers that now take the place of these main river courses. The Groundwater Vulnerability Map and Flooded Street Locations (fig 3-4) is presented in the CFIR 2021 without comment, and the role and importance of groundwater is not well covered in CFRMS 2022. Where groundwater flows to is just as important as where it is immediately found: if it has been interrupted by deeper more modern building foundations or basements, then pumped directly into the sewer system, this will impact downstream sewer capacity.

The CFIR 2021 map confirms that groundwater runs into sewers affecting all of Camden's six Hot Spots related to three of the four rivers involved with Hampstead & Highgate (the river Brent flows to Brent). While surface run-off is the most important factor, some emphasis on the role of groundwater in flooding is needed.

Groundwater Storm Surges

Groundwater surges occur during and for a time following rainstorms. This is just the time when the sewer system does not need excess groundwater channelled into its pipes and conduits. It was already struggling to cope prior to recent escalations in weather extremes. In addition, there have been long-standing reductions in maintenance and repairs of sewers and mains pipes.

Groundwater storm surges can be erosive and destructive under certain conditions, as happened beneath Air Studios, Lyndhurst Road, where a groundwater storm surge removed ~60m^3 of silt from the Unit D clay n 1991. Testing for groundwater surging during heavy rainfall is normally not insisted upon for Basement Planning Applications. Thames Water usually allows groundwater to be pumped directly (and rapidly) into the sewer system from basement dig-outs (the opposite effect of SuDS).

We suggest that what evidence there is of groundwater within the borehole logs of individual Basement Impact Assessments (BIAs) could be made more use of collectively. There is no requirement for such data to be sent to and considered by the British Geological Survey (BGS), so most BGS-available borehole data is ancient and very, very sparse.

Groundwater flooding

CFRMS 2022 acknowledges a small number of groundwater flooding incidents in basements and cellars every year, with a tendency for these to be located in Kilburn, West Hampstead and north Kentish Town, but that 'many incidents may not be reported'. This is certainly the case for Hampstead. To our knowledge there are very many Hampstead properties with pumps as a result of past groundwater flooding. Despite these pumps and measures flooding can still occur during storm surges, there is no central collection of such data or attempt by the authorities to collect it, and householders would not know to whom to report it. CFRMS 2022 could perhaps confirm that this is a bigger problem for the most northern parts of Camden and warrants further assessment. We know more about the wells and pumps that peppered Hampstead in 1866 than we do about the situation today.

Speeding the direction of groundwater straight into the sewer system

Many buildings in Hampstead have pumps in their cellars and basements to deal with groundwater, quite a number requiring multiple pumps, for example University College School and 99 Frognal. But this is probably the tip of the iceberg.

Planning applications are still being approved where the BIAs have not assessed the presence of groundwater through periods of any – let alone heavy – rainfall, so as to estimate groundwater surging during dig-out and construction and the need for post-construction pumps. BIAs frequently turn to the Environment Agency's map of productive and unproductive ground, which considers all ground *immediately* beyond the Claygate Beds spring line as 'unproductive'. But this oversimplifies a very imprecise and complex boundary and is far from the reality. Camden's independent auditor of BIAs condones this practice. The Unit D of the London Clay Formation below, while relatively less permeable, still contains significant silt, and not infrequent sand partings containing continuous or intermittent groundwater forming the underground streams and tributaries that flow into four of London's rivers.

Basements in the Hampstead area can be knowingly dug through groundwater flows and aquifers, especially those below the superficial deposits. We notice that Thames Water usually gives the go-ahead for such groundwater to be pumped to the sewer system during the construction process and sometimes even permanently, and if there is any mitigation it is paltry. CFRMS 2022 should press Camden's Planning department and Thames Water to improve their strategies for stopping or reducing the incidence of groundwater being directed straight into the sewer system.

SEWER CAPACITY

While this is beyond Camden's remit, we would still encourage Camden to press for Thames Water to receive funding and be required to develop sewers able to accommodate more severe storms. Thames Water should also update its calculations for sewer capacity in a one-in-30-year storm as well as base attenuation levels on a more appropriate level of event, including the additional effects of climate change.

Also, groundwater tests have already shown the presence of sewer water in parts of Hampstead. We consider leaking sewers should not be relied upon to mitigate the effects of surface run-off and groundwater on sewer capacity, particularly as these sewers are combined.

Hard standing and surface run-off

While run-off is considerable from public roads and pavements, and Camden is to be commended for its work to produce Pocket Parks and Rain Gardens in mitigation, the largest area of Camden that could be adapted to help mitigate run-off is that of private dwellings and their gardens. Mitigation for hard surfaces and run-off cannot be performed entirely by public bodies or those acting on their behalf such as Thames Water. They do not have as large a surface area and ground volume to receive and slow/store such rainfall as private owners.

There is no mention in CFIR 2021or CFRMS 2022 of responsibility for residents to fully mitigate for surface run-off from their property and for new development to do better than standard SuDS if the development feeds into a Flooding Hot Spot. This would seem to be a lost opportunity. Increased hard standing or increased building footprint need to be *positively* mitigated for.

Despite Camden's attempts with its Local Plan to limit garden loss, developers can frequently still grab 50% of gardens one way or another via Permitted Development, whether through basements, garden buildings or swimming pools, without mitigation for the loss of permeable surface area and also loss of significant permeable volumes (see below). A Camden-wide Article 4 directive could be made to limit this further and encourage Planning Inspectors to hold firm at appeal.

There is no inducement for – and it is not possible to enforce – reduction of pre-existing hard standing, even when a front garden is an impermeable car park over 100% of its area. When mitigating for hard standing within new developments by installing artificial 'permeable' surfaces, it is not always ensured such surfaces are sufficiently permeable in any meaningful way and remain so in the distant future through appropriate maintenance. Camden could press for change and enforcement here.

However, such mitigation must not be seen as a green light to build over most gardens. Trees, shrubs, hedges and other plants are important for many other reasons, and are part of the flooding solution as well as keeping Hampstead's soggy gardens drier. Attenuation tanks can still allow gardens and even trees to be planted above them, their permeable soil itself absorbing rain.

SuDS and ground volume

We consider there has been insufficient focus in SuDS on the removal of huge volumes of relatively permeable ground with basement dig-outs in certain geological conditions in the northern part of Camden: the superficial deposits and 'Made Ground', Bagshot Sands or more permeable parts of the Claygate Beds.

This is probably due to the belief by developers' experts, but also Camden's independent experts and the Environment Agency, that all 'London clay' is essentially impermeable. They often ignore the permeable 'Made Ground' and the superficial deposits despite their presence to a depth of between 0.7 and 3+ metres in extensive areas of northern Camden. It seems Camden is unaware of its extent too. We suggest Camden, possibly via ARUP who produced the 'Camden geological, hydrogeological and hydrological study: Guidance for subterranean development' of 2010 (ARUP 2010), to ask the BGS to up-date its map of superficial deposits http://www.largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001750 to indicate where mitigation for loss of permeable ground volume is particularly required.

Central gathering of commercially obtained borehole data would also be valuable, though this must take into account the boring and sampling methods used to obtain the groundwater level data. We notice that boreholes can be dug without using instruments such as shell and auger that take precautions to shield one layer within water-bearing material from another. This is too frequently done for BIAs, contributing to the belief that groundwater is found more rarely than is actually the case.

CFRMS 2022 should highlight this removal of such a significant part of the ground's ability to absorb and slow the passage of rainwater, leaks and groundwater. We urge Camden to press the SuDS Approval Body to strongly encourage

i) positive mitigation of hard standing area and increases in building footprint
ii) positive mitigation of volume loss of ground demonstrated to have a degree of permeability
iii) requirement for greater volumes of on-site attenuation tank installation.

Attenuation tanks

There is a need for a borough-wide scheme to enforce meaningful provision of attenuation systems/tanks by developers to prevent storm water going into the sewer system and to drastically reduce run-off to areas below Hampstead and Highgate. No guidelines or provision have been made for Camden's higher, more northern properties dug into the more permeable soils: that is, those that block or constrain groundwater and channel it into the sewer system and increase run-off. We propose that mitigation should be required to protect not only the site itself but also contribute to the protection of properties lower downhill that receive this water e.g. all of NW3 and N6, to positively help protect the lower, receiving properties in NW3, NW6, NW5 and beyond.

Attenuation tanks (of sufficient volume) and use of grey water on-site for toilet flushing, house, yard and car washing and garden watering should be expected of all new properties and any property that is being extended. Thames Water could be prompted to provide grants towards this provision. *Any* soil removal for foundations or below-ground building should be *positively* mitigated for by tree canopy, shrubs, hedges and dual-purpose attenuation and grey water tanks, with a conditioned plan on how such tanks are used so as to be available for attenuation during storms.

Further Planning issues that impact on flooding

Camden's main basement evidence documents for Planning are within ARUP 2010, already 12 years since publication. Unfortunately, this is often the only document that developers use. There is a tendency to ignore

parts that don't support planning applications, for example figure 15 'Flood map' with respect to basement developments.

It is extremely rare for BIAs to refer to Camden's Flood Risk Management Strategy (2014) with its detailed maps such as

- figures 3 i-v 'Updated Flood maps for surface water flooding 3 July 2014',
- figures 3 vi-x 'Flood Hazard: I in 1000 year flood event,
- 2 July 2014' (though curiously this last map appears to be a desk-top study since it fails to include some areas that had flooded up to 3 times in the few decades before it was produced, including data from figures 3 i-v) and
- figure 4c 'British Geological Survey Infiltration SuDS map 3 July 2014'.

Quite a number of BIAs only refer to the sea and river flood map which are irrelevant to most of Camden.

We recommend that CFRMS 2022 includes encouragement for Planning documents, particularly ARUP 2010, to be updated and more specific about what is required to prevent or mitigate for flooding.

PARTNERSHIP

We fully support Camden's objective to increase awareness and understanding of the flood risk in Camden communities and to improve partnerships with stakeholders, engage the public and build strong relationships.

We are impressed with Camden's engagement with the South Hampstead Flood Action Group and we would like the Hampstead Neighbourhood Forum to also be seen as a stakeholder partner and source of information and public engagement.

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