ALISON BROOKS ARCHITECTS

Date: 04/12/19
Project: 2473_18a Frognal Gardens
Planning Reference: 2019/5348/P
File Ref: 18aFG_ABA_LLFA Response

Response to Lead Local Flood Authority Comments

1) Surface Water Flood Risk Measures

1.1
1.2a

- **The Akera report within the BIA documentation has not picked up on the local SW flood risk stated in the Strategic Flood Risk Assessment or the relevant local policies.**
- **The report refers to very low flood risk using the national definition…**

The surface water flooding risk has been considered in a Flood Risk Assessment (FRA) provided by Evans Rivers and Coastal, which forms part of the Basement Impact Assessment and is summarized in the Akera Engineers section of the report. The FRA has assessed the surface water flooding in detail and acknowledges in *Section 4.2* and *paragraph 4.4.2* (on page 6) that the site lies within the Critical Drainage Area. *Paragraph 4.4.3* discusses the past events across the area and that the Strategic Flood Risk Assessment shows that Frognal Gardens was affected during the 1975 year flood event.

The Flood Risk Assessment was completed using the Camden Strategic Flood Risk Assessment and Surface Water Management Plan, as well as the Environment Agency's online data such as the Long-Term Flood Risk Information / Surface Water Flood Risk Mapping.

These sources contain no further details relating to the depth of flooding along Frognal gardens during the 1975 event or other flood event characteristics at this specific location. There is also no evidence indicating the application site was affected.

The Environment Agency long term flood risk information/surface water flood risk mapping (Figure 3, on page 7 in the FRA) shows that the site itself has a very low surface water flood risk (i.e. chance less than 1 in 1000 years). There are no other reports of flooding at the site. Therefore, the evidence suggests that there is an overall very low surface water flood risk.

1.2b

… and does not address policy (CC3 and others) requirements to minimise flood risk and reduce strain on the sewer network

The very low surface water flood risk as described above would suggest that further mitigation measures in terms of surface water flood resistance and resilience do not apply.

Any risk to the proposal from surface water flooding the road is minimised by its position on the site. The ground floor of the proposal is raised 470mm above the level of the road and sits 430mm higher than the ground floor of its immediate neighbour No.18B. This reduces the risk of any surface water entering the ground floor.

The FRA assess the sewer flood risk in *paragraphs 4.4.7 – 4.4.11* (page 8) and includes mitigation measures which have been included in the design in line with Camden planning guidance for basements and other policies. A positive pumped device and non-return valve to reduce any potential of backflow into the property. This measure also assumes a worst-case scenario and mitigates the potential sewer flood risk from Frognal Gardens, which led to the flooding during the 1975 event as shown on the Strategic Flood Risk Assessment Maps.

The proposal for mitigating the impact of the proposed development to the local sewer network is through the attenuation and controlled release of surface water to the sewer. The discharge to the sewer has been designed to meet the criteria used for the original building and not add additional pressure on the existing system.

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1.3 - **The proposals should confirm that no vulnerable uses (habitable rooms, no gas-fired or major electrical equipment) are proposed for the basement or lower ground floors**

Please refer to para 1.2a where Evans Rivers and Coastal have advised risk of surface water flooding is low.

No habitable rooms are housed in the basement. A secondary flexible workspace and plant rooms are proposed on the ground floor. All main living, dining and sleeping accommodation is housed on the upper floors. The proposal replaces an existing ground floor bedroom.

1.4 - **Flood risk mitigation and coping measures should be put forward with respect to the most likely sources and of surface water**

Please refer to para 1.2a where Evans Rivers and Coastal have advised that the risk of surface water flooding is low and para 1.2b which details mitigation measures for sewer flooding.

1.5 - **No details of internal water efficiency (sanitaryware, greywater recycling etc.) to target 105 litres/person/day internal usage.**

Through specification we will be limiting the consumption of water by providing flow controls, such as spray shower heads and dual flush toilets, as well as restricting the height of overflows in baths and sinks to target 105 litres/person/day/ internal usage.

It is proposed to maintain a level of water at the bottom of the attenuation tank for the provision of harvested greywater to be used for irrigation of the green roofs and landscape gardens.

2) Drainage

2.1 - **Details of the flow controls on the green roofs are not provided in the Drainage Report.**

2.2 - **In line with the drainage hierarchy hybrid blue/green roofs should be looked into, in order to reasonably maximise their attenuation capacity, and reduce or eliminate the need for the attenuation tank.**

Of the 404m² of roof area 29m² of this is green roof that shall incorporate 175mm of vegetation/soil/substrate for extensive wild flower growth offering good water retention and release. The Camden Planning Guidance – Water & Flooding states that for storms more intense than a 1 in 10 year storm green roofs and harvesting tanks should be assumed as full. Therefore, for the purposes of our calculations and in line with the guidance in CIBSE Guide KS11 we have included 50% of the green roof area in the sizing of the rainwater attenuation tank. Due to the low infiltration rates measured on site there is little option other than the inclusion of a combined rainwater attenuation and harvesting tank meaning the addition of a blue roof system would be unnecessary as the capacity of the tank would be sized to meet the requirements of The Camden Planning Guidance. The tank will also be used for rainwater recycling to be used for irrigation of the garden and green roofs.

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2.3 - **Given the local enhanced flood risk, the drainage system should be designed to improve the development impacts further, by targeting greenfield rates of runoff for the 1:100 scenario with 40% climate change uplift.**

2.4 - **This is especially important as the permeable area is proposed to be reduced by the development.**

Please see the calculations and table shown on *page 5* of the drainage report where this allowance has been made:

NOMENCLATURE

$MX\text{-}D_{min}$; X=return period (years), D=storm duration (min)

$Z1$: rainfall factor taken from figure 1 and table 1 – BRE Digest 365

$Z2$: growth factor taken from table 2 – BRE Digest 365

d = discharge rate (l/s)

T = time (s)

I = inflow (m^3)

O = outflow (m^3)

S = storage (m^3)

EQUATIONS

$M5\text{-}D_{min} = M5\text{-}60_{\text{min rainfall}} \times Z1$

$M10\text{-}D_{min} = M5\text{-}D_{min} \times Z2$

$O = d \times M10\text{-}D_{min}$

$I = d \times T$

$I_{140\%} = I \times 1.4$

$S = I_{140\%} - O$

Area	Duration	Rainfall factor	M5 rainfalls	Growth factor	M10 year rainfall	Growth factor	M100 year rainfall	M100 year rainfall + 40%	Inflow	Inflow (@140%)	Outflow	Storage required
m^2		Z1	mm	Z2 (M10)	mm	Z2 (M100)	mm	mm	m^3	m^3	m^3	m^3
186.1	5 mins	0.38	7.6	1.19	9.0	1.96	14.9	20.9	2.8	3.9	1.0	2.9
	10 mins	0.53	10.6	1.22	12.9	2.00	21.2	29.7	3.9	5.5	1.9	3.6
	15 mins	0.64	12.8	1.24	15.9	1.96	25.1	35.1	4.7	6.5	2.9	3.7
	30 mins	0.81	16.2	1.24	20.1	2.00	32.4	45.4	6.0	8.4	5.8	2.7
	1 hour	1.00	20	1.24	24.8	2.03	40.6	56.8	7.6	10.6	11.5	0.0
	2 hours	1.20	24	1.22	29.3	2.01	48.2	67.5	9.0	12.6	23.1	0.0
	4 hours	1.42	28.4	1.19	33.8	1.97	55.9	78.3	10.4	14.6	46.1	0.0
	6 hours	1.57	31.4	1.17	36.7	1.96	61.5	86.2	11.5	16.0	69.2	0.0
	10 hours	1.74	34.8	1.14	39.7	1.92	66.8	93.5	12.4	17.4	115.3	0.0
	24 hours	2.16	43.2	1.13	48.8	1.86	80.4	112.5	15.0	20.9	276.7	0.0

2.5 - **Maintenance plans should be submitted, allocating tasks, timescales and responsibilities to ensure the drainage system is kept in adequate working order**

Agreed. *Page 7* of the drainage report illustrates the design intent whereby both the rainwater tank and drainage manhole will be accessed via 750x750 manhole covers. Access shall be provided to all valves, tanks and pumps for regular maintenance and replacement. All maintenance requirements shall be outlined within the O&M's and shall be designed to meet all CDM and Health & Safety guidelines.

2.6 - **The volume discharged to the street should be minimised by being dealt with on the site, using all available opportunities for sustainable drainage options.**

Page 3 of the drainage report illustrates the surface water run-off to the street has been calculated as:
Existing = 71.1m²
Proposed = 43.5m²
Therefore, the proposed layout will see less rainwater discharging to the street and shall be dealt with on site as suggested using a sustainable drainage solution.

2.7 - **Exceedance events should be looked at with drawings to demonstrate overland flows in these scenarios, and show no additional risk (reduced risk where possible) to public realm and neighbouring properties.**

In view of the comments in para 1.2 and 2.4 please could you clarify this requirement?

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