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QED Structures
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Your Ref: 18-20 Elsworthy Road
Our Ref: 1127/LJE141114

For the attention of: Andy Pocock

14 November 2014

18-20 Elsworthy Road BIA Review

Dear Andy,

Further to our discussions and the instruction to proceed on behalf your client (John Prens) I have undertaken a review of the Basement Impact Assessment (BIA) prepared by QED Structures and the supplement BIA prepared by Soiltechnics for the proposed 18-20 Elsworthy Road basement development.

I have reviewed the design of the proposed basement development, together with the information presented within the above documents, against the requirements of the Camden BIA guidance set out within DP27 and CPG4.

Chord Environmental specialise in the provision of hydrogeological services with extensive experience in the UK supporting both private and public sector clients. I am a geologist and hydrogeologist and have a BSc. in geology from the University of Bristol, a MSc. in hydrogeology from the University of East Anglia and am also a Chartered Geologist and fellow of the Geological Society. I am Managing Director at Chord Environmental and was previously a Technical Director with Paulex Environmental Consulting and managed Hyder Consulting (UK) Ltd's groundwater team.

I have been a hydrogeologist for 17 years. During that time I have advised on over 70 basement developments. Much of my career has been spent assessing the impact of development on the quality and quantity of groundwater resources. I have worked for both promoters and regulators of schemes and have acted as an expert witness for the Highways Agency and on BIA schemes.

Development proposal

I understand the proposed development comprises the demolition of the existing dwellings and the construction of a three storey building with a single storey deep basement extending approximately 3.4m below existing ground floor levels. The basement will extend beneath the proposed building and partially beneath the front and rear gardens.

Environmental Site Setting

The BIA screening assessment and site investigation interpretation has identified 18-20 Elsworthy Road to be underlain by the Eocene London Clay as shown on the British Geological Survey 1:50,000 scale map (Sheet 256 – North London) to a depth of over 50m. The London Clay is classified as Unproductive Strata by the Environment Agency, strata with low permeability that have negligible significance for water supply or river base flow. The very low permeability of the London Clay results in very low rates of rainfall infiltration and correspondingly, very high rates of rainfall runoff.

The site lies within Zone 2 of Source Protection Zone of a public groundwater borehole supply as delineated by the Environment Agency. The production borehole is located approximately 400m to the south of the site and is completed within the Chalk strata, designated a Principal Aquifer by the Agency. The London Clay, together with the clays of the Lambeth Group, acts as an effectively impermeable confining layer over the Chalk which lies at a depth of approximately 75m beneath the site.

There are no surface water features within 500m of the site, however Figure 11 of the “Camden Geological, Hydrogeological and Hydrological Study”, shows a tributary of the former Tyburn watercourse to have run approximately 300m west of the site. The Tyburn is now culverted beneath South Hampstead and discharges to the Thames.

Elsworthy Road does not lie within an area of flood risk as designated by the Environment Agency and it was not affected by the surface water flooding of the region during 1975 and 2003.

Surface Flow and Flooding Assessment

The BIA screening, scoping and risk assessments have followed the CPG4 guidance criteria and screening questions. The potential surface flow and flooding issue raised by the screening and scoping exercises have been appropriately addressed by Nigel Thornton (C.Eng) of Soiltechnics within the supplement BIA report and no areas of concern relating to the proposed development were identified.

Subterranean (Groundwater) Flow Screening Assessment

The BIA screening, scoping and risk assessments have followed the CPG4 guidance screening questions. I have commented on the answer to each question below.

- **Question 1a: Is the site located directly above an aquifer?**

As the Site is mapped as being underlain by a significant thickness of London Clay, designated as Unproductive Strata by the Environment Agency, I agree it is not located above an aquifer. The geology of the areas is well understood and the published geological map is based on extensive borehole data.

- **Question 1b: Will the proposed basement extend beneath the water table surface?**

The London Clay is not capable of transmitting groundwater but because it is predominantly clay, it does hold water. As such there is not generally a water table present within it. Monitoring boreholes drilled within the London Clay do slowly fill with groundwater over time; however there is little or no hydraulic continuity between boreholes due to the very low permeability of the clay and ability of the clay matrix to hold or adsorb water.

- **Question 2: Is the site within 100m of a watercourse, well (used/disused) or potential spring line?**

No surface water features are present within 500m of the site although a culverted tributary of the Tyburn is shown to flow c.300m to the west of the Site. The London Clay is not capable of providing groundwater baseflow to watercourses and is classified Unproductive Strata. The proposed basement would therefore not act to prevent groundwater flow to any watercourses, wells or springlines.

- **Question 3: Is the site within the catchment of the pond chains on Hampstead Heath?**

The Site is located c.1.6 km south, and down topographic gradient, of the Hampstead Heath ponds and therefore lies outside their hydrological catchment area.

- **Question 4: Will the proposed development result in a change in the proportion of hard surfaced / paved area?**

The proposed basement development does result in a net increase in building footprint. In relation to the assessment of the proposed development on groundwater flow, the purpose of this question is to determine whether rainfall recharge will be reduced. However, the London Clay's low permeability results in a negligible rate of rainfall infiltration and a correspondingly high rainfall runoff rate, therefore the proposed basement would not have an impact on groundwater resources.

- **Question 5: As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to ground (e.g. via soakaways and/or SUDS)?**

The lowly permeable nature of the London Clay strata is unsuitable for receiving surface water discharge to ground due to extremely low infiltration rates. The proposed use of permeable pavement and 1000mm of topsoil will however act to attenuate surface water runoff from the site during periods of heavy rainfall and would provide a net benefit to the existing condition.

- **Question 6: Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line?**

I agree there are no mapped local groundwater dependent ponds or spring lines present within 100m of the Site. This is consistent with the geology and hydrogeology of the area.

Slope Stability Assessment

The BIA screening, scoping and risk assessments have followed the CPG4 guidance criteria and screening questions. The potential slope stability issues raised by the screening and scoping exercises have been appropriately addressed by Nigel Thornton (C.Eng) of Soiltechnics within the supplement BIA report and no areas of concern relating to the proposed development were identified.

Conclusions

The BIA report has appropriately characterised 18-20 Elsworthy Road with respect to its geological and groundwater site setting. As the site is underlain by low permeability London Clay, the geological and hydrogeological setting of 18-20 Elsworthy Road is not sensitive with respect to groundwater resources or flow.

The purpose of the Basement Impact subterranean or groundwater flow assessments is to identify the potential for the proposed development to cause groundwater impacts and subsequently identify areas which require further investigation. The proposed development would be sited within a significant thickness of London Clay and no potential adverse impacts have been established by these assessments or within the interpretation of the site investigation information and subsequent impact assessment.

Yours sincerely,



John Evans BSc MSc CGeol.

Director

