Stephen Buss
Environmental Consulting Ltd

53-55 Chalton Street: Surface Water and Subsurface Flow Basement Impact Assessment: screening stage

Summer 2018 Update

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www.hydro-geology.co.uk

32 Port Hill Road, Shrewsbury SY3 8SA

Registered in England and Wales number 08595273

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1. Introduction

1.1 Background

This report presents the surface water and subsurface flow (groundwater) component of a basement impact assessment, to be submitted in support of a planning application for the basement development at 53-55 Chalton Street, Kings Cross, London NW1 1HY (Figure 1.1, national grid reference TQ 2977 8283). The local planning authority is Camden Borough Council.

Figure 1.1 Location of 53-55 Chalton Street

1.2 Basement Works

The site comprises 53-55 Chalton Street which is currently a three-storey building on the west side of the street. The property continues westwards with a rear entrance on 60 Church Way. To the east, south, and north of the site are neighbouring mixed commercial, retail and residential properties; to the west there are mostly blocks of flats. Numbers 57 and 51 Chalton Street adjoin the property, to the north and south respectively.

Plans for the new basement extension involve excavating down from the existing basement, and extending towards Church Way, out to the extent of the ground floor. The basement extension is to be roughly rectangular, with length c. 6 m and width c. 8 m. The finished floor level (FFL) of the refurbished basement and the basement extension will be approximately 1.0 m deeper than the current floor level.

Figure 1.2 shows scans of: the current and proposed basement plan (with Chalton Street to the right of the page) and section A-A' through the proposed development. The extent of the basement extension is hatched in the section.

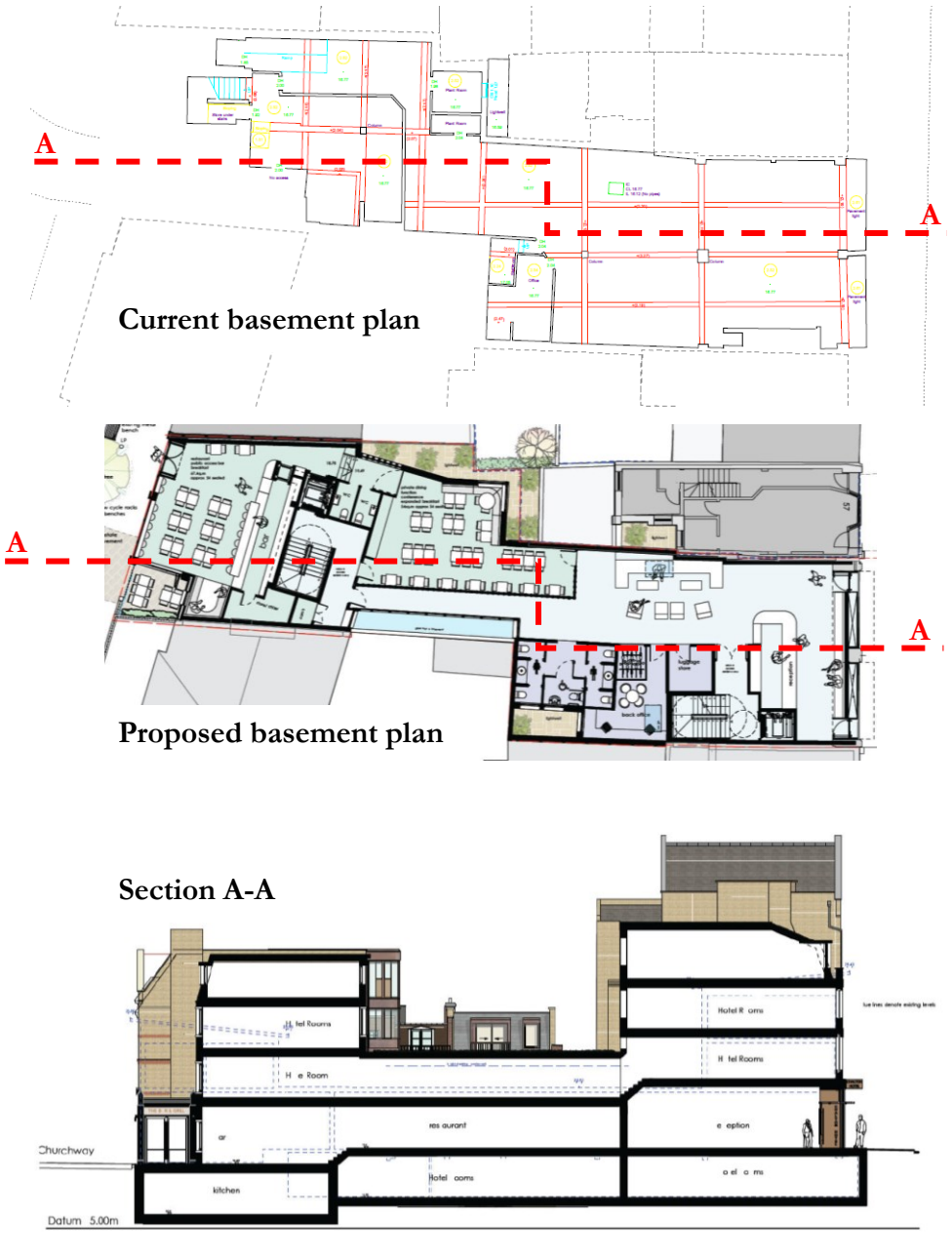

Figure 1.2 Plans and section of the proposed development (do not scale).

1.3 Scope of Report

This report presents the surface water, and sub-surface water, screening report for a basement development, that complies with CPG4 screening and scoping stages, and makes reference to the basement impact assessment guidance of ARUP (2010)[1].

1.4 Authorship of Report

Stephen Buss Environmental Consulting Ltd was instructed in June 2016 to complete this report, and in October 2018 to review the situation based on new drawings.

This report has been prepared by Dr Stephen Buss MA MSc CGeol. Dr Buss is a UK-based independent hydrogeologist with more than 17 years' consulting experience in solving groundwater issues for regulators, water companies and other private sector organisations. **Dr Buss is a Chartered Geologist with the Geological Society of London.** Dr Buss's CV and publications list is available at www.hydro-geology.co.uk.

Hydrology aspects of this report have been prepared by Rupert Evans MSc CEnv C.WEM MCIWEM AIEMA. Mr Evans is a UK-based independent hydrologist with more than 10 years' consultancy experience in flood risk assessment, surface water drainage schemes and hydrology/hydraulic modelling. **Mr Evans is a Chartered Water and Environmental Manager (C.WEM) and a Member of the Chartered Institution of Water and Environmental Management.**

[1] ARUP, 2010. Camden geological, hydrogeological and hydrological study. Guidance for subterranean development.

2. Basement Impact Assessment Screening: Surface Flow

Surface flow screening follows the procedure outlined in Figure 5: Surface flow and flooding screening chart of the Camden Planning Guidance 4 (CPG4) entitled Basements and Lightwells dated July 2015.

1) *Is the site within the catchment of the pond chains on Hampstead Heath?*

NO. Figure 14 of the Camden geological, hydrogeological and hydrological study – Guidance for subterranean development dated 2010, confirms that the site is not located within this catchment area.

2) *As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?*

No. The basement is entirely below the footprint of the existing building and therefore the existing drainage regime will remain the same.

The basement will be beneath the existing building, therefore the 1m distance between the roof of the basement and ground surface as recommended by the Arup report and para 2.16 of the CPG4 does not apply.

3) *Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?*

NO. There will not be an increase in impermeable area across the ground surface above the basement. The basement will be beneath the existing building footprint.

4) *Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?*

NO. There are negligible inflows from adjacent properties, and no flows to adjacent properties. The basement is entirely below the footprint of the existing building and therefore the existing drainage regime will remain the same.

5) *Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?*

NO. The proposals are very unlikely to result in any changes to the quality of surface water being received by adjacent properties or downstream watercourses as the surface water drainage regime will be unchanged and it will be unpolluted roof water or low pollution hazard land uses draining into the sewer system.

6) *Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk of flooding, for example because the proposed basement is below the static water level of nearby surface water feature?*

POSSIBLY. The findings of this BIA together with the Camden Flood Risk Management Strategy dated 2013 and Figures 3i, 4e, 5a and 5b of the SFRA dated 2014, in addition to the Environment Agency online flood maps show that the site has a low flooding risk from sewers, groundwater, reservoirs (and other artificial sources), fluvial/tidal watercourses and surface water (although the north western frontage of the site appears to have a low to medium risk of surface water flooding - Figure 2.1).

In accordance with paragraph 5.11 of the CPG a positive pumped device should be installed in the basement in order to further protect the site from sewer flooding.

Figure 2.1 Risk of surface water flooding

3. Basement Impact Assessment Screening: Groundwater

Subterranean (groundwater) screening follows the procedure outlined in Figure 3: Subterranean (ground water) flow screening chart of the Camden Planning Guidance 4 (CPG4) entitled Basements and Lightwells dated July 2015.

1a) Is the site located directly above an aquifer?

NO. The geological map and the nearest off-site boreholes and trial pits indicate that a continuous layer of permeable superficial deposits is not present beneath the site. Boreholes and trial pits show up to 1.5 m of 'brown clay' or 'yellow clay', over London Clay (Section 4.2). None of these can be considered an aquifer. Beneath these a significant thickness of London Clay isolates the deeper aquifer units of the London Basin aquifer from the surface.

1b) Will the proposed basement extend beneath the water table surface?

NO. The local water table is deep here, and within the Chalk aquifer, at more than 40 m depth. No water was observed in the London Clay, in local boreholes, until about 10-14 m depth (Section 4.2). It is typical of some boreholes in the London Clay to exhibit occasional seepages of water from horizons above low permeability bands; others remain dry to depth.

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

NO. There are no current surface water bodies within 100 m of the site. The site lies between the 'lost' River Tyburn (c. 2000 m to the west) and the River Fleet (c. 250 m to the south and east). There are no known water wells within 100 m of the site.

Geological conditions indicate that there is no potential for development of a spring line in the vicinity of the property, as the 1:50 000 geology map indicates that it is located upon the outcrop the London Clay, and there are no superficial deposits nearby.

3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?

NO. The development is entirely beneath the current footprint of the property, so surface water flows will be unchanged.

4) As part of the site drainage, will more surface water (e.g. rainfall and runoff) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?

NO. Discharge to the ground is not proposed.

5) 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 or spring line?

NO. The nearest water body is the Grand Union Canal, about 600 m to the north east. This is too far from the site to be a concern, especially given that there are not permeable superficial deposits beneath the site.

4. Conceptual Site Model

4.1 Drainage and Topography

Elevation of 53-55 Chalton Street is about 20.5 m above Ordnance Datum (m AOD) according Ordnance Survey Terrain 5 data. Ground surface around the site slopes gently eastwards (gradient from Ordnance Survey 10 m contours is about 0.012).

The property location is between two historical rivers, but these have been culverted beneath the city. These were the 'lost' River Tyburn (c. 2000 m to the west as Regent's Park Lake) and the River Fleet (c. 250-300 m to the south and east)[2] (Figure 2.1). The nearest current surface water feature is the Grand Union Canal, about 600 m to the north east of the site.

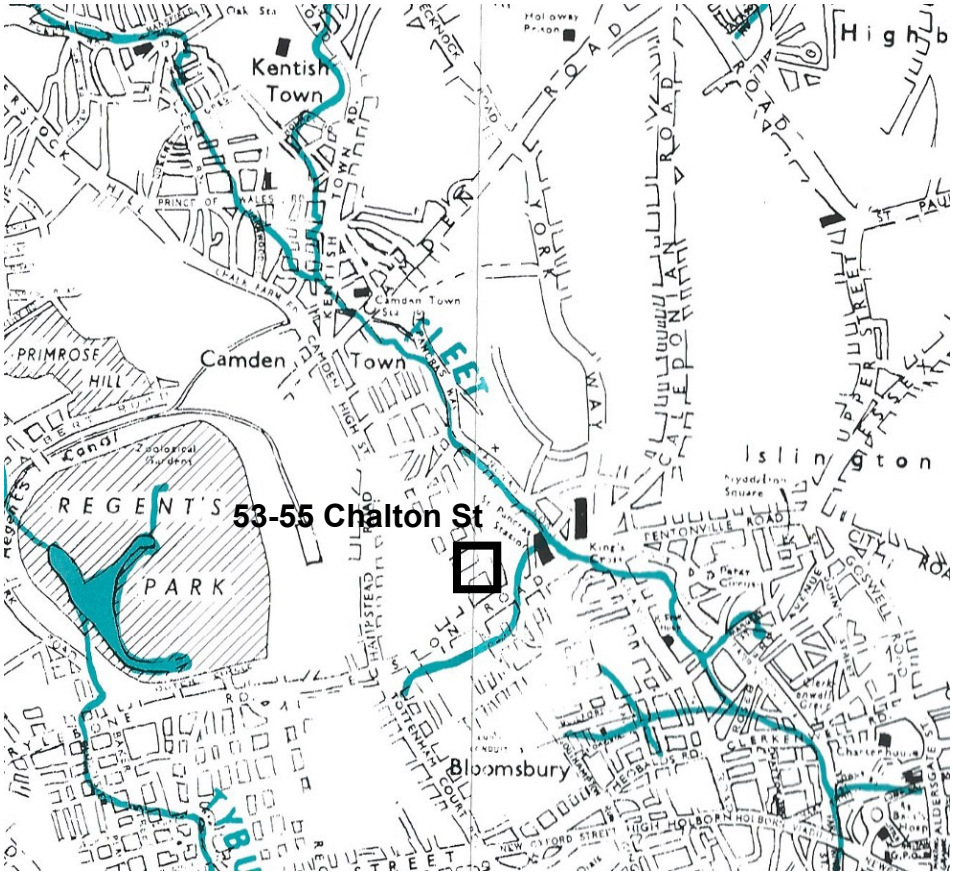

Figure 4.1 Location of tributaries of the River Tyburn (south west) and River Fleet (east)

4.2 Geology and Hydrogeology

Bedrock at the site comprises London Clay. The base of the London Clay is at about 18.2 m below ground level at the Victoria Tube #14 borehole[3] (about 30 m to the north west of the site) and isolates the main aquifer of the London Basin from the surface.

Nearby shallow borehole records available from the British Geological Survey show the absence of any thickness of permeable superficial deposits in the area:

[2] Barton, N.J., 1993. The Lost Rivers of London 3rd edition.
[3] http://scans.bgs.ac.uk/sobi_scans/boreholes/591872

- Victoria Tube #14 borehole, TQ28SE348, was drilled in December 1958. This shows a 1.5 m layer of 'soft to firm brown clay' over London Clay. This is probably mostly weathered London Clay.
- Four trial pits were dug at locations from about 30 m to 60 m north of the site[4], TQ28SE721, in 1956. All record 'brown clay' below made ground to a depth of 2.4 m. Two more trial pits about 60 – 100 m to the north of the site[5], TQ28SE677, show the presence of 'light clay' and 'yellow clay' to about 2 m depth, above the London Clay. These are probably superficial deposits rather than weathered London Clay.
- Whilst the geology map indicates outcrop of gravels about 200 m to the south of the site, borehole TQ28SE347 indicates[6] clay at the surface and London Clay at 1.5 m depth.

Referring back to the screening, a detailed assessment of the near-surface geology reinforces the view that there is not an aquifer directly beneath the site.

Groundwater levels

None of the boreholes described above refer to groundwater within 4 m of the ground surface (i.e. within the depth of influence of the basement). The two deeper boreholes nearest the site (TQ28SE348 and TQ28SE347) detected seepages in the London Clay at c. 13.6 m and 10 m depth respectively.

It is typical of some boreholes in the London Clay to exhibit occasional seepages of water from horizons above low permeability bands; others remain dry to significant depths. These are not instances of intercepting water tables, just pockets of water moving through the upper horizons.

In addition, the London Clay is not an aquifer, so there are not considerable amounts of water available.

4.3 Local basements

Other nearby properties on Chalton Street have basements that are likely to be at the same depth as that at number 53-55. Details of any other recent basement developments have searched for via the Camden Planning Portal but none have been identified, except changes of use of the existing basements.

[4] http://scans.bgs.ac.uk/sobi_scans/boreholes/592299
[5] http://scans.bgs.ac.uk/sobi_scans/boreholes/592248
[6] http://scans.bgs.ac.uk/sobi_scans/boreholes/591871

5. Conclusions

Potential environmental impacts of the basement extension at 53-55 Chalton Street have been considered. The following summary conclusions are made:

- There will be no increase in man-made impermeable area so the amount, timing and quality of surface water runoff will not be affected by the development. No water will go to ground as a result of the basement development.
- The site is adjacent to an area mapped as having a medium risk of surface water flooding. Basement development is not expected to exacerbate this risk.
- Available geological and hydrogeological information indicates that there is no permeable aquifer beneath the site that is capable of maintaining a significant water table. No water has been detected in local boreholes at depths comparable to the excavation depth of the basement.
- Given that there is not likely to be any groundwater at a depth to be intercepted by the proposed basement, and the London Clay is not an aquifer, it is considered that there is no risk of hydrogeological issues arising from the proposed development.

These conclusions are considered to be robust and no further investigations are needed to satisfy the screening criteria for sub-surface risk. In particular, it is considered that there will be no benefit to undertaking a site investigation for the purposes of this risk assessment; and the basement impact assessment does not need to go to scoping or impact assessment stages.