esi consulting

Applied Environmental Insight

10 Downside Crescent: Basement Impact Assessment

10 Downside Crescent: Basement Impact Assessment

Prepared for:
Asif Noor

Report reference:
65914R1 Rev1, August 2017

Report status:
FINAL

CONFIDENTIAL
Prepared by ESI Limited

t. 01743 276 100
e. info@esi-consulting.co.uk | www.esi-consulting.co.uk
@ESI_consulting
ESI Ltd., New Zealand House, 160-162 Abbey Foregate, Shrewsbury, Shropshire SY2 6FD

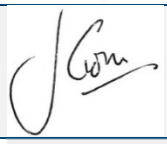
Shrewsbury 01743 276 100
Reading 01189 572 915
Cardiff 02920 660 144
Bristol 01179 229 930

10 Downside Crescent: Basement Impact Assessment

This report has been prepared by ESI Ltd. (ESI) in its professional capacity as soil and groundwater specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client, and is provided by ESI solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to ESI at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, ESI may, by prior written agreement, agree to such release, provided that it is acknowledged that ESI accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. ESI accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against ESI except as expressly agreed with ESI in writing.

	Name	Signature
Author	Morgan Singleton-Fookes	
Checked by	James Mortimer	
Reviewed by (Groundwater)	Joe Gomme (C.Geol)	
Reviewed by (Surface Water)	Helen Vonka (C.WEM)	

Revision record:

Issue	Date	Status	Comment	Author	Checker	Reviewer
1	April 2017	Final	-	MPS	JEM	JWG/HCV
2	July 2017	Rev1 Final	Following audit – changes to surface water only	TKT	JEM	HCV
3						
4						

Impact summary

The assessment findings are summarised as follows:

1. Impacts to surface water flows and related flooding	High	
	Med	
	Low	
2. Impacts to ground water flows and related flooding	High	
	Med	
	Low	
3. Overall risk posed by the Site	High	
	Med	
	Low	

Key:

High		*There is a high potential risk*
Med		*There is medium potential risk*
Low		*There is a low potential risk*

Summary

Based on the Site-specific data reviewed, it is considered that the proposed extension and basement will not cause significant impacts to the surface water and groundwater regimes at the Site.

There are no surface water courses within 500 m of the Site and whilst the overall impermeable surface area will increase, all additional runoff and half the existing runoff will pass through an attenuation tank before discharge to the existing sewer network. This will reduce the overall peak flow rates of surface water flow and therefore, potential flood risk to adjacent and downstream properties will decrease. No additional mitigation measure are considered necessary with regards to surface water.

No groundwater was observed during the recent Site investigation and all excavations remained dry throughout works. Whilst water was recorded during post-investigation monitoring rounds, the data suggest this is not representative of a groundwater table. Therefore, the proposed development is not expected to have any impact on the water table or groundwater flows. Based on this no mitigation measures are required to maintain groundwater flow.

A cumulative assessment has also been undertaken which has identified basement and lower ground floor structures in a few of the surrounding properties. However, given the absence of a groundwater table no cumulative impacts are expected. Therefore, no mitigation measures are required.

Contents

FIGURES

TABLES

APPENDICES

1 Introduction

1.1 Instruction

ESI Ltd. (ESI) was commissioned by Asif Noor (the Client) to undertake the surface water and groundwater aspects of a Basement Impact Assessment (BIA) for the proposed development at 10 Downside Crescent, London, NW3 2AP (the Site). The Site location is shown in Figure 1-1. Instruction to proceed in accordance with an ESI proposal dated 13th March 2017 (ref: 65914P1) was provided by the Client on 14th March 2017.

This document considers the potential impact relating to the proposed basement development in terms of surface water and groundwater flow and flooding and complies with the London Borough of Camden Planning Guidance (Camden Council, 2015).

1.2 Background

The Site is located in the London Borough of Camden (the Council) and comprises a three-storey semi-detached property. Based on Ordnance survey mapping the Site area is approximately 85 m Above Ordnance Datum (AOD). An application has been submitted for the construction of a new rear extension including a new basement and a BIA is required to demonstrate such subterranean development will not cause harm to the built and natural environment and local amenity.

A previous BIA was completed by Bow Tie Construction in August 2016 which was scrutinised by the Council's advisors (Campbell Reith) and rejected on the grounds that it lacked sufficient data to support the basement development and its impacts on the surrounding area. These reports are included in Appendix A.

1.3 Scope of works

The requested scope of works includes an assessment of the impacts of the proposed development on surface water and groundwater flow in accordance with the guidance published by Camden Council. This guidance has been used to provide the structure of this report. The work undertaken follows the procedure outlined below.

- Screening – this process aims to identify any matters of concern and determine whether or not a full BIA is required.
- Scoping – this process identifies the potential impacts of the proposed scheme.
- Site investigation and study – this is undertaken to develop an understanding of the Site and its immediate surroundings; the level of detail will depend on the matters of concern identified during the screening and scoping stages.
- Impact assessment – this involves evaluating the direct and indirect impacts of the scheme by comparing the current situation (the baseline) with the situation as it would be with the proposed basement in place.
- Recommendations – recommendations are made based on the outcome of the assessment.

This report considers the hydrological and hydrogeological conditions of relevance to construction of the basement at the Site. The site investigation and elements pertaining to ground stability have been undertaken by Site Analytical Services Ltd (SAS, ref: 1726538), which is included in Appendix B and should be read in conjunction with this report.

1.4 Proposed basement works

The proposed development involves the construction of a single-storey rear extension, the removal of the rear chimney breast and the excavation of a single-storey basement below the

proposed extension footprint. Works will also include construction of a rear patio and resurfacing of the front drive. Proposed development plans are included in Appendix C.

1.5 Surrounding basements

As part of the impact assessment, the surrounding structures were assessed for the presence of basements. Based on information provided by the Client and visual observations of houses fronting onto Downside Crescent, the majority of properties appear not to have lower ground floors/ basements. However, No.8 (immediately south of the Site) has a partial basement below a rear extension for which planning was granted in 2007 and No.23 (north of the Site) has a basement under the existing house and a rear extension for which planning was granted in 2014. Whilst no drawings were available for these properties, they are considered to be of similar construction to the development on Site and therefore it is assumed that the lower ground floors/ basements are within the footprint of the structure.

1.6 Surrounding infrastructure

The Site is located to the northeast of the Northern line approximately 100 m directly east of Belsize Park Station and 120 m south of the underground railway lines.

Figure 1-1 Site Location

2 Screening and scoping

2.1 Screening

The screening stage results are provided in Table 2-1 (surface water) and (groundwater) below.

Table 2-1 Surface water screening

Impact question	Answer	Justification	Reference
1) As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak runoff) be materially changed from the existing route?	**Yes**	The proposed design maintains the existing route for surface water disposal to the foul sewer. However, the area of impermeable cover will increase by 51 m^2 from an extension to the rear of the property including a basement and external patio area. A rainwater attenuation tank will be installed to the rear of the proposed extension and will receive surface water from all the proposed and half the existing impermeable areas.	Site Plans Client correspondence
2) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The proposed development will increase the property footprint with the basement being constructed under the proposed single storey extension. This extension will increase the proportion of impermeable areas.	Site plans Client correspondence
3) Will the proposed basement 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**	Whilst the proposed development will increase the impermeable areas, the surface water disposal route for the property will remain unchanged and therefore the inflows of surface water being received by adjacent properties will not change. There are no known watercourses within 500 m of the Site including 'Lost Rivers', therefore inflows to downstream water courses will remain unchanged.	Ordnance Survey Mapping Site plans Barton, 1992
4) Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**		
5) Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding?	**No**	The Site lies within Flood Zone 1 according to the Environment Agency (EA). The National Groundwater Flood Risk Map shows the Site to be in an area at negligible risk from groundwater flooding.	Environment Agency, 2017 GeoSmart, 2017

Table 2-2 Groundwater screening

Impact question	Answer	Justification	Reference
1a) Is the site located directly above an aquifer?	**No**	The Site is located on the London Clay Formation (see Figure 2-1), which is classified as Unproductive Strata (i.e. non-aquifer).	BGS, 2017
1b) Will the proposed basement extend beneath the water table surface?	**No**	Existing boreholes within the surrounding area published by the BGS extend into the London Clay Formation but none identify the presence of a groundwater table. During Site works each exploratory position was drilled into the London Clay Formation and remained dry throughout works. On return monitoring visits a water level was recorded in each exploratory position; however the levels are not consistent and therefore this is considered to represent incidental surface water and not representative of groundwater.	BGS, 2017 SAS, 2017
2) Is the site within 100 m of a watercourse, well (used/disused) or potential spring line?	**No**	There are no wells, watercourses or spring lines known to exist within 100 m of the Site.	BGS, 2017 Environment Agency, 2017 Ordnance Survey Mapping
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The proposed basement will extend beneath the footprint of the proposed rear extension, therefore the impermeable surface area at the Site will increase.	Site Plans
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**	There will be no increase in surface water runoff discharged to ground as a result of the development. Due to the underlying geology, there are no plans to utilise soakaways at the Site. The approved design discharges surface water to the existing foul sewer.	Site Plans Client correspondence
5) Is the lowest point of the proposed excavation close to, or lower than, the mean water level in any local pond or spring line?	**No**	No ponds or spring lines are present within 500 m of the Site.	Ordnance Survey Mapping. Site Plans

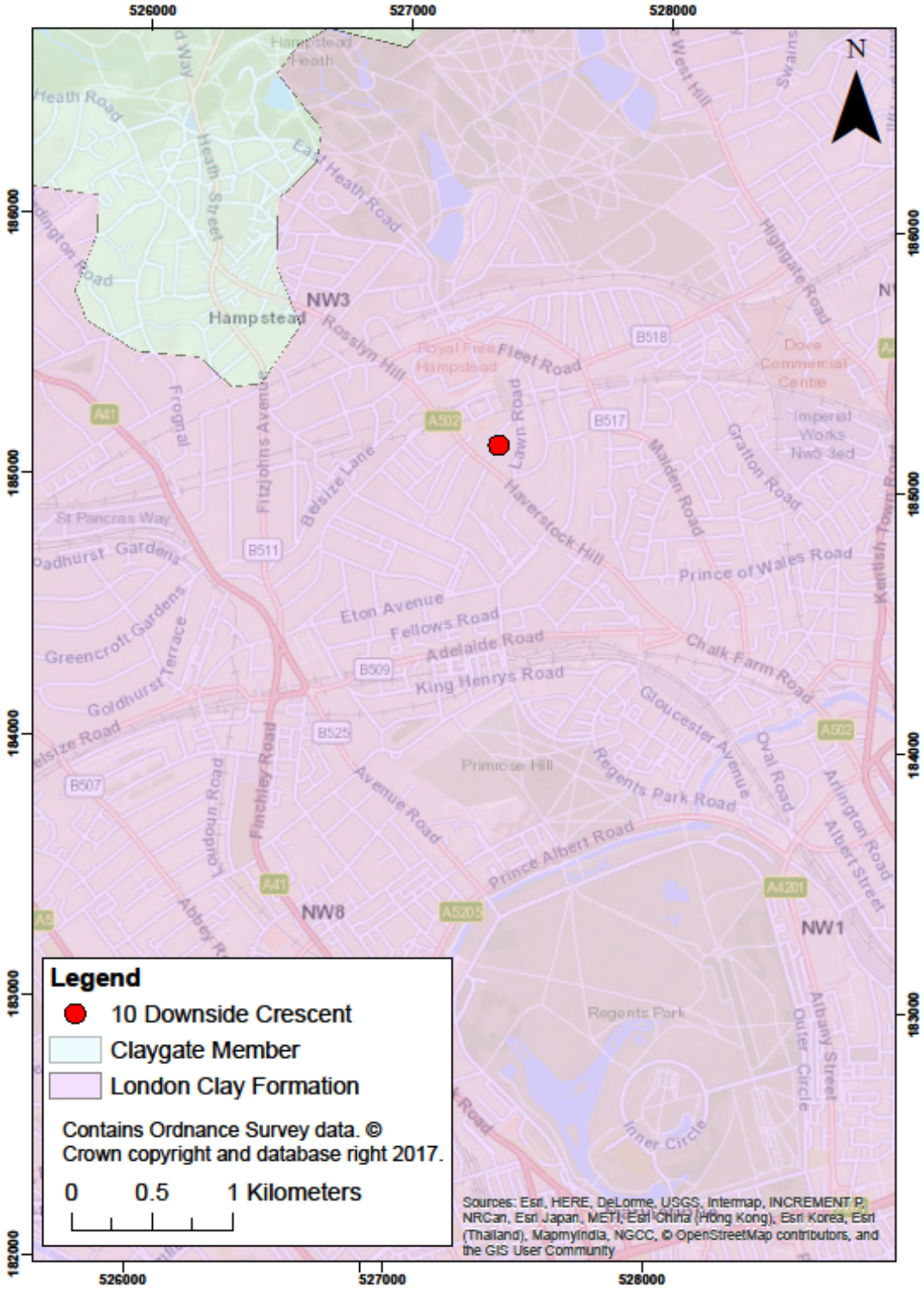


Figure 2-1 Bedrock geology

2.2 Scoping

Where impact questions could not be justified at the screening stage, they are taken forward to the Scoping stage for further assessment. Table 2-3 summarises the scoping assessment.

Table 2-3 Scoping

Impact question	Answer	Justification	Reference
Surface Water			
1) As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak runoff) be materially changed from the existing route?	**Yes**	The proposed development will increase the proportion of developed area on the Site by approximately 51 m^2 including the proposed extension and basement to the rear plus a patio area within the garden. The approved drainage design for the proposed development allows for all surface water to be discharged to the foul sewer which utilises the existing connection. A rainwater attenuation tank will be installed to the rear of the proposed extension and will receive surface water from all the proposed and half the existing impermeable areas. The 5,000 litre tank has been designed to attenuate a 1:100 year event, and release the run off at a controlled rate of 1.1 litres per second. This will reduce the proposed peak runoff rate to below the existing rate, therefore reducing the current potential impact to neighbouring properties.	Site Plans Client correspondence GeoSmart, 2017
2) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**		
Groundwater			
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The proposed development will cause an increase of impermeable areas on the Site. However, it is considered that this will have no effect on the local groundwater regime as, with the exception of incidental rainfall within the garden areas (as per baseline condition), no on-Site infiltration drainage is proposed. This is driven by the underlying geology (London Clay Formation) and approval to discharge to the foul sewer.	Site Plans BGS, 2016 Client correspondence

3 Site investigation

3.1 Introduction

The site investigation was scoped and undertaken by SAS (SAS, 2017) who were directly appointed by the Client to provide the required information including the land stability and ground movement elements of the BIA. Sections 3.2 and 3.3 summarise the findings of the investigation and details relevant to the groundwater and surface water elements of the BIA considered herein. The report by SAS should be read in conjunction with this report.

3.2 Ground conditions

The ground conditions encountered during the site investigation are summarised in Table 3-1 below.

Table 3-1 Ground conditions summary

Stratum	Thickness (m)	Description
Made Ground	0.6 - 1.8	Brick paving over dark brown/ black clayey silty sand containing occasional gravel and brick fragments
London Clay Formation	>8.2*	Firm to very stiff dark grey-brown silty sandy clay with occasional gypsum crystals

*Base of London Clay Formation not proven as part of this investigation

3.3 Monitoring results

During the Site investigation no evidence of groundwater including seepages was recorded and all excavations remained dry.

Two return monitoring visits were carried out by SAS on 6 and 19 April 2017 with the results summarised in Table 3-2 below.

Table 3-2 Groundwater monitoring summary

Borehole	Depth to base (m bgl)	Depth to water (m bgl)	
		6th April	19th April
BH1	7.93	3.61	2.24
BH2	7.91	1.74	1.86

4 Impact assessment

4.1 Introduction

The impact assessment considers the information reviewed as part of the Screening and Scoping stages and considers this in more detail, where an impact identified requires potential mitigation. Site-specific information is utilised including the results of the Site investigation and groundwater monitoring to confirm any further works required.

4.2 Surface water impacts

The Site is located within Flood Zone 1 as defined by the EA and is therefore at negligible to low risk from flooding from all sources. There are no surface water features including 'lost rivers' within 500 m of the Site. Furthermore, whilst the proposed extension will increase the proportion of impermeable surfaces, the runoff will be discharged via suitable attenuation to the existing sewer network as per the approved designs.

The system has been designed by the drainage engineer to attenuate surface water run-off from a 1:100 year event including a 40% increase as a result of climate change. The estimated peak run off volume for a 30 minute duration storm is calculated to be 2,700 litres which is just over 50% of the proposed attenuation tank capacity of 5,000 litres. The peak release rate from the attenuation tank to the existing sewer will be controlled at 1.1 litres per second. The proposed extension will increase the impermeable area by 51m^2, however, the attenuation tank will receive water from 100m^2. Therefore, the proposed works will act to reduce the current peak flows so that the overall risk of flooding to neighbouring properties is reduced and there will be no additional impact to surface water flows.

4.3 Groundwater impacts

During Site works, no groundwater was encountered in the exploratory positions and each remained dry throughout the works. During two return monitoring visits the water levels in each borehole were recorded (see Table 3-2). The water level was noted to rise by 1.37 m in BH1 and decreased by 0.12 m in BH2 over the thirteen days between monitoring visits.

The ground water monitoring results are variable both between wells and also between monitoring visits which indicates that the data is not representative of a true groundwater table. The water level in BH1 remained between 1.6 m and 3 m below the surface of the London Clay Formation and within BH2 was initially monitored as 0.06 m above the surface falling to 0.06 m below the surface of the London Clay Formation which confirms that it also does not comprise a perched groundwater table overlying the unproductive strata.

Therefore, the proposed development is not expected to have any impact on groundwater levels or flow and whilst a few surrounding properties have lower ground floors and/or basements the proposed development is not expected to generate significant cumulative impacts or have an impact on the existing neighbouring basements.

5 Conclusions

Potential hydrological and hydrogeological impacts of the proposed extension and basement at 10 Downside Crescent, London, NW3 2AP have been considered in accordance with the guidance produced by the Council. Based on the information available, the following summary conclusions are made.

- The Site is not at risk of flooding from any known sources.
- There are no surface water courses, including lost rivers, within 500 m which may be impacted by the development.
- The proposed development will increase the impermeable surface area of the Site. However, surface water runoff from the proposed extension and half the existing building will pass through an attenuation tank with a restricted release rate to the existing sewer. Therefore, it is considered that peak runoff and related flooding risk from the proposed development will be reduced.
- The Site inspection/ investigation undertaken by SAS in March 2017 did not record the presence of any groundwater or seepages. Follow-on monitoring visits identified water in each exploratory position; however this is likely due to influx of surface water. Therefore, the proposed development is not expected to have a significant impact on groundwater levels or flow.
- Whilst adjacent basements/ lower ground floors exist beneath a few surrounding properties, due to the lack of identified groundwater these are unlikely to be affected by the proposed basement extension since potential changes to groundwater flow and elevation are not envisaged.

6 References

Arup, 2010. Camden Geological, Hydrogeological and Hydrological Study.

Bow Tie Construction, 2016. 10 Downside Crescent, Basement Impact Assessment.

British Geological Survey, 2017. Retrieved March 2017 from

http://mapapps.bgs.ac.uk/geologyofbritain/home.html.

Camden Council, 2015. Camden Planning Guidance: Basements and Lightwells. London Borough of Camden, CPG4.

CampbellReith Consulting Engineers, 2016. Basement Impact Assessment Audit.

GeoSmart, 2017. Groundwater Flood Risk Map Gw5 Version 2.1 ©.

Ordnance survey mapping, 1:10,000. © Crown copyright. All rights reserved. Licence number AL 100015683.

Site Analytical Services, 2017. Desk Study, Factual Ground Investigation Report and Basement Impact Assessment, 17/26538