soils LIMITED

Flood Risk Assessment

at
163 Sumatra Road, West Hampstead, London, NW6 1PN

for
Drawing and Planning Ltd

Reference: 18224/FRA

February 2020

Control Document

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

AGS Association of Geotechnical & Geoenvironmental Specialists

Quality Systems Certifications Ltd ISO 9001 : 2015 REGISTERED FIRM

Quality Systems Certifications Ltd ISO 18001 : 2007 REGISTERED FIRM

BGA CORPORATE MEMBER 2018 www.britishgeotech.org.uk

Commission

Drawing and Planning Ltd commissioned Soils Limited by to undertake a Flood Risk Assessment on land at 163 Sumatra Road, West Hampstead, London, NW6 1PN. The scope of the investigation was outlined in the Soils Limited quotation reference Q22597 provided by email dated 14th February 2020.

Caveat

Whilst reasonable skill and care has been taken to prepare this report within the time and other constraints applied by the project, it should be appreciated that uncertainties may occur owing to factors including return period of events, seasonal fluctuations in groundwater level and inherent uncertainty of the effect of climate change.

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Section 1 Scope

This Flood Risk Assessment (FRA) provides an overview of the potential risks of flooding on land at 163 Sumatra Road, West Hampstead, London, NW6 1PN and the risks that development of the site poses to surrounding areas. The assessment follows the principals of National Planning Policy Framework DCLG June 2019 (ref. 9). This assessment highlights the potential flood risk posed to and by the site, and recommends likely further action required.

The report provides the following information:

1. An assessment of the flood risk posed to the site based on flood information and mapping provide by the EA and Strategic & Preliminary Flood Risk Assessments (SFRA & PFRA);

The Flood Risk Assessment is a live document to be updated as additional information becomes available and the evolving detailed design progresses.

Section 2 Introduction and Regulatory Background

2.1 Introduction

Drawing and Planning Ltd commissioned Soils Limited in February 2020 to undertake an FRA for the proposed development at 163 Sumatra Road, West Hampstead, London, NW6 1PN, referred to as 'the site' in this report.

This report has been prepared for Drawing and Planning Ltd and must not be relied upon by any other party without the explicit written permission of Soils Limited.

All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report.

Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never be subject to flood events in the future.

2.2 Regulatory Background

Details of the regulatory background used to undertake this FRA are outlined below

This FRA has been carried out in accordance with the 19th June 2019 National Planning Policy Framework (NPPF), elements of Planning Policy Statement (PPS) 25 Appendix B of the PPS25 Development and Flood Risk-Practice Guide (withdrawn), Planning Practice Guidance and Flood risk and coastal change (https://www.gov.uk/guidance/flood-risk-and-coastal-change). It is to be used to assist the Local Planning Authority (LPA) and Environment Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

This FRA considers the impact of the proposed development in addition to the common ways in which flooding can occur. The conditions currently existing in the location of the site are described, together with the methods used to identify and assess potential impacts caused from the development proposals. The mitigation measures proposed have been identified in order to avoid and/or reduce the impacts caused by introducing the development proposals.

The EA has produced guidance notes for different development scenarios, based on the size of the development and the location of the site. This assessment has been produced in accordance with; "Preparing a flood risk assessment: standing advice" https://www.gov.uk/guidance/flood-risk-assessment-standing-advice visited 22/02/2020.

2.3 National Planning Policy

The NPPF and accompanying Technical Guidance was published on the 19th June 2019. This superseded all Planning Policy Statements (PPS's) and remaining Planning Policy Guidance (PPG's). Flood risk is retained as a key development consideration and is incorporated within Section 10: "Meeting the challenge of climate change, flooding and coastal change": "Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere."

The Sequential and Exception Tests are retained as part of the NPPF. The accompanying NPPF Technical Guidance also includes Tables 2 and 3 (similar to Tables D2 & D3 of PPS25) to assist with flood risk vulnerability classifications and development suitability.

2.4 Local Policy

Local planning practice guidance considers flood risk through relevant environmental and climate change policies, which enforce the requirements of the NPPF. The site lies within the boundaries of the London Borough of Camden. In the production of this report the following documents from the relevant Local Authorities have been reviewed.

London Borough of Camden SFRA Strategic Flood Risk Assessment dated July 2014

Managing Flood risk in Camden, The London Borough of Camden flood risk management strategy

These documents expand on the basic information contained within the Environment Agency Flood Maps and provide a more detailed review of flood risks and local recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail is provided in the report where appropriate.

This assessment has been produced in accordance with the guidance set out in the Technical Guidance to the National Planning Policy Framework. DCLG March 2012 (ref 8) and elements of Planning Policy Statement 25 Appendix B of the PPS25 Development and Flood Risk-Practice Guide (Ref. 3).

2.5 Flood Risk

Camden is not at risk of flooding from the Thames or any other open rivers.
The main risk of flooding within the borough is from surface water after significant rainfall events, and incapacity in the combined sewer to remove rain water. Groundwater flooding is also a growing issue in Camden.

There have been two significant surface area flooding events in Camden in the past 40 years. The first occurred on 14th August 1975 and the second on 7th August 2002. Both events were caused by sudden extreme downpours.

2.6 Report Information Sources

The information source used to undertake this FRA has been collected from the following sources:

1. Envirocheck Flood Screening Report (Appendix A) Ordered February 2020;
2. British Geological Survey Website reviewed February 2020
3. Flood risk assessments: climate change allowances (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#types-of-allowances)
4. London Borough of Camden SFRA Strategic Flood Risk Assessment dated July 2014;
5. Managing Flood risk in Camden, The London Borough of Camden flood risk management strategy;
6. Google Earth mapping accessed February 2020.

Section 3 Site Details and Background Information

3.1 Site Details

The site comprised a terraced house with a small front yard and rear garden. The site was bordered by further residential properties, gardens and Sumatra Road to the north.

The rear garden was predominantly grass with bushes noted along the southern boundary of the property. A mature silver birch tree was noted on the pavement to the front of the property.

The site sloped down to the south, with the wider topography sloping at a shallow gradient down in a south / southwest direction, with an average gradient of <2°.

It is understood that the site was open land until the present house was constructed, circa 1890s. No discernible change to the property is noted up to the present day from information available to Soils Limited.

The roof of this building accounted for approximately 99m^2 impermeable site cover, which equated to 49% of total site area of 200m^2.

The garden area of the site covered an area of approximately 103m^2 or 51% of the total area of the site.

Vegetation on site was predominantly grass in the rear garden with a mature hedgerow along the southern boundary.

An aerial photograph of the site has been included in Figure 2

3.2 Proposed Development

At the time of reporting the development of the site comprised the re-building of the front elevation of building following partial collapse; an extension to the existing basement, including 2x front lightwells and 2x rear lightwells; rear extension to ground, first and second floors and roof level; alterations to fenestration, all in connection with conversion of former 1x 5-bed single family dwelling house to 3x 2-bed flats and 1x 3-bed flat
In compiling this report reliance was placed on drawing numbers 1817-S01 Rev. A to 1817-S03 Rev. A, dated July 2019 and prepared by RP Designs

These drawings superseded drawings SMTRD-S701-703 and P700-705, dated June 2015, on scaffolding drawing no. 18.072.TP-22, dated February 2018, and on emergency works drawings no. 18.165.TW-200 to 18.165.TW-206, dated May 2018. A preliminary structural scheme, released as a draft from Martin Redston Associates, including drawings no. 18.165.1 Rev.A to 18.165.6 Rev.A, dated May 2018 and not to be used for design and construction purposes, were also made available and showed the detail of underpinning foundations. All the documents were prepared and supplied by the

Client. Any change or deviation from the scheme outlined in these drawings could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.

The proposed development layout as provided by the Client are presented in Appendix D.

3.3 Anticipated Geology

The 1:50,000 BGS map showed the site to be located on bedrock of the London Clay Formation with no overlying superficial geology recorded.

3.3.1 London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

In the north London area, the upper part of the London Clay Formation has been disturbed by glacial action and may contain pockets of sand and gravel

3.4 Hydrogeology

The Environment Agency has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply and their role in supporting water bodies and wetland ecosystems.

The London groundwater model was generally split into three aquifers, the Upper, Intermediate and Lower Aquifer.

The Upper Aquifer was confined to the River Terrace Deposits, which were not anticipated onsite, overlying the London Clay Formation, which acts as an aquiclude.

The Intermediate Aquifer was generally associated with granular layers within the Lambeth Group.

The Lower Aquifer was principally associated with the Chalk but can include the Thanet Sand Formation.

Information presented by the Environment Agency classifies the London Clay Formation bedrock as unproductive strata.

Published geological data shows the site directly on the London Clay Formation, therefore the Upper Aquifer would not be present onsite. Any water infiltrating the London Clay Formation will generally tend to flow vertically downwards at a very slow rate towards the Intermediate and subsequently Lower Aquifer. Due to the predominantly cohesive nature of the soils, the groundwater flow rate is anticipated to be very slow. Published permeability data for the London Clay Formation indicates the horizontal permeability to generally range between 10-10 m/s and 10-8 m/s, with an even lower vertical permeability.

The Upper Aquifer, if present, would be considered to be relevant to the proposed development and should be confirmed via a ground investigation. The Intermediate and Lower Aquifers would not be affected in any way by the proposed works so were not considered further.

3.5 Hydrology

The nearest surface water feature was the Leg of Mutton Pond and associated spring line on West Hampstead Heath recorded 1.82 km northeast of the site. The site was recorded at an elevation of approximately 56 m AOD, and the Leg of Mutton Pond was at approximately 95 m AOD.

The site, however, lies within 100m of the Kilburn, one of the lost rivers of London, as reported in Figure 4, included within the Camden Geological, Hydrogeological and Hydrological Study produced by ARUP in 2010. (https://www.camden.gov.uk/documents/20142/1458280/Rivers+in+Camden.pdf/559155f8-645b-2e39-2669-3faacce135e6)

Section 4 Flood Risk

4.1 Introduction

The risk of flooding to the site is discussed in the following sections. In In assessing the potential risk from fluvial flooding, surface water flooding and groundwater flooding the plans included in the Envirocheck Flood Screening Report (Appendix A) have been reviewed.

4.2 Flood Map

The Environment Agency/Natural Resources Wales (EA/NRW) flood data map provided as part of the Environcheck Flood Risk Screening Report (presented in Appendix A) does not identify the site as being located in an area that could be impacted by flooding from Rivers or Sea without Defences (Zone 3) and Extreme Flooding from Rivers or Sea without Defences (Zone 2).

4.3 Surface Water Flooding

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. Increased run-off from developed areas consisting of impermeable surfaces can increase overland flows. If the flow paths of these overland flows are not carefully considered during detailed design and planning of the drainage and building design, flooding from overland flows may become a potential source of flooding.

The EA/NRW surface water 1000-year return depth map sourced from the Envirocheck Flood Screening Report, indicated that the site to be at risk from surface water in the southern half of the site.

A review of the EA/NRW Surface Water 1000 Year Return Velocity and Flow Direction Map indicates that the should a 1 in 1000 year surface water flooding event occur the flow of water would pass from the west down to the south behind the property along the railway line.

The EA/NRW Surface Water 1000 Year Return Hazard Rating Map indicates that the southern half of the site is a Moderate to Significant Hazard rating.

The supplied EA/NRW Historic Flood Map does not record any historic surface water flooding events within 500m of the site.

The EA/NRW surface water maps are provided in Appendix A.

4.4 Groundwater Flooding

Groundwater flooding can occur when water levels in the ground rise above surface elevations. Severe storm events or prolonged rainfall could cause groundwater levels to rise above ground level. Underlying geology is the principal factor that affects groundwater flooding. Groundwater flooding most commonly occurs in low-lying areas that are underlain by permeable rocks and / or aquifers.

The BGS groundwater flooding susceptibility map did not record any potential for groundwater flooding. The GeoSmart Information Groundwater Flood Map (1:50,000) indicated a negligible risk for Groundwater Flooding to Occur at Surface.

Probability of groundwater flooding – None (BGS). Negligible Risk (GEOSmart)

The BGS and GeoSmart maps are provided in Appendix A.

4.5 JBA Risk Management Limited Data

This information is provided in the Comprehensive Flood Map (CFM) data from JBA Risk Management Limited. The data is based upon the likelihood of a flood occurrence for flood return periods of 75 years, 100 years, 200 years and 1000 years. For each return period the following three sources of flooding are identified, surface water or pluvial flooding, undefended river flooding or fluvial flooding and undefended coastal flooding. Further information including Canal Failure and Dam Breaches are also covered within this report. As the site is not situated near the coast, Coastal Flooding have been discounted within the dataset supplied

The information from the CFM identified the following risks

The south of the site is at **risk of Pluvial flooding of greater than 0.3m and Less than or equal to 1.00m in a 75-year return (undefended)**

The west of the site is at **risk of Pluvial flooding of greater than 0.1m and Less than or equal to 0.30m in a 75-year return (undefended)**

The south of the site is at **risk of Pluvial flooding of greater than 0.1m and Less than or equal to 0.30m in a 200-year return (undefended)**

The west of the site is at **risk of Pluvial flooding of greater than 0.3m and Less than or equal to 1.00m in a 200-year return (undefended)**

The north west of the site is at **risk of Pluvial flooding of greater than 0.1m and Less than or equal to 0.30m in a 1000-year return (undefended)**

The south of the site is at **risk of Pluvial flooding of greater than 0.3m and Less than or equal to 1.00m in a 1000-year return (undefended)**

JBA Canal Failure – None

JBA Dam Break – None

4.6 Local Infrastructure and Flood Defences

There were no artificial sources of water (e.g. reservoirs impounding water above ground level) in vicinity to the site.

Local infrastructure flooding - None

4.7 Historic Flooding

The EA/NRW Historic Flood Event Data does not record any Historic Flood Events or Historical Flood Liabilities within 250m of the site.

The London Borough of Camden SFRA Strategic Flood Risk Assessment dated July 2014 produced by URS indicated that Sumatra Road flooded during 2002. The report does not record any historic surface water flooding on the site or its immediate surroundings. The addendum to the London Borough of Camden Preliminary Flood Risk Assessment Report (2011) produced in 2017 indicated no historical flooding events since 2002