Flood Risk Assessment

Eton Avenue, London, NW3 3HL

Final v1.0

November 2010



thomas mackay

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DOCUMENT CONTROL

SIGNATURE SHEET

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1 INTRODUCTION

1.1 BACKGROUND

A planning application has been submitted for the construction of a garden flat in the basement of a single family dwelling house at 32 Eton Avenue, London. The application (reference 2010/3196/P) was granted on the 10th August 2010 with the condition that a flood risk assessment is undertaken for approval by the local authority. The condition is reproduced below and the full approval is presented in **Appendix A**.

Table 1.Planning Consent Condition

Condition 3 (Application 2010/3196/P)

No development shall take place until the applicant has submitted a detailed flood risk assessment for the development for approval by the Council. Such assessment to include evidence and analysis from trial pits and/or boreholes as necessary and shall make recommendations for any remediation measures (if necessary). All approved remediation measures shall be implemented strictly in accordance with the approved details.

Reason: To ensure that the development does not cause harm to the water environment, water quality or drainage systems and prevents or mitigates flooding, in accordance with policy SD9b of the London Borough of Camden Replacement Unitary Development Plan 2006.

The development site is located within Flood Zone 1 (showing areas with a low probability of flooding). PPS25¹ (the planning policy statement guiding development and flood risk in England) and Environment Agency flood risk standing advice specify that flood risk assessments are only required for significant developments within this flood zone (covering areas greater than 1 hectare). However, discussions with the local authority confirmed that the requirement for the flood risk assessment is driven by a general awareness of surface water flooding problems in the district and the proximity of the property to one of London's Lost Rivers.

1.2 APPROACH

The approach taken when preparing this FRA was to investigate all potential sources of flooding to the site. The objectives of the study are to:

- Undertake literature review regarding all potential flooding sources.
- Collate and review available data including Environment Agency data, Thames Water data, site ground investigation and the local Strategic Flood Risk Assessment.
- Visit the site and surrounding area.
- With reference to the above information, determine the perceived risk of flooding to the proposed development.
- Propose appropriate mitigation, if required.

¹ Planning Policy Statement 25: Development and Flood Risk, Communities and Local Government, Revised March 2010







2 SITE DESCRIPTION AND BACKGROUND INFORMATION

2.1 SITE LOCATION

32, Eton Avenue is located in the vicinity of Hampstead in the London Borough of Camden. The post code for the property is NW3 3HL and the numeric grid reference is 527130, 184500. The location of the property is shown in **Figure 1** below and a detailed location plan is provided in **Appendix B**. The property is located on the north side of Eton Road and has been converted into apartments which are set in extensive grounds.



Image produced from Ordnance Survey's Get-a-map service. Image reproduced with permission of Ordnance Survey and Ordnance Survey of Northern Ireland.

2.2 PROPOSALS

It is proposed to extend the basement of the existing apartment located on the north eastern wing of the house at the rear of the property. The existing configuration of the apartment includes dining, kitchen and reception rooms on the ground floor with an existing basement which contains bedrooms and bathrooms.

The basement extension will extend beyond the footprint of the ground floor to the north in order to construct a garden / play room. The excavation will also extend to the west to allow for the construction of a light well. Detailed drawings of the existing and proposed site layouts submitted as part of the planning application are presented in **Appendix B**.

2.3 SITE TOPOGRAPHY AND GEOLOGY

A review of the Ordnance Survey map shows the land elevations around the site to be in excess of 55mAOD with land elevations increasing to the north and falling to the south closer to the Thames. The site is also located on a watershed with Eton Road in front of the development falling in elevations both to the east and west.

Soils in the area are clay in nature as identified during the ground investigation (discussed in Section 2.4.5 of this report).



2.4 AVAILABLE DATA

The following data has been used in preparing this flood risk assessment.

2.4.1 Environment Agency Data

Data was obtained from the Environment Agency (Reference NE25223MR) and this included a detailed copy of the Environment Agency flood map covering the study area. The Environment Agency also confirmed that it holds no records of flooding at the site. The Environment Agency flood map is presented in **Appendix C**.

2.4.2 Local Planning Authority Data

The Strategic Flood Risk Assessment (SFRA) for the North of London prepared by Mouchel (2008) covers the London Borough of Camden and was obtained to inform this flood risk assessment. The flooding incidents map and source – pathway receptor model from the SFRA are presented in **Appendix D**. A report on the 2002 flooding in the borough of Camden was also obtained from the local authority website² and a map showing flooded areas from the 1975 and 2002 floods is also presented in **Appendix D** along with an annotated map identifying a possible path of one of the 'Lost Rivers' of London which was also obtained from Camden Borough Council.

2.4.3 Thames Water Sewer Plan

An extended sewer plan of the area was obtained in order to inform the site visit and flood risk investigations. Relevant sections of this are included within **Appendix E**.

2.4.4 Site Visit

A site walkover was undertaken on 12th October 2010 to investigate any possible evidence of flooding or concealed watercourses in the study area.

2.4.5 Ground investigation Report

A ground investigation report by Herts and Essex Site Investigations was commissioned by the Xul Architects in order to inform the specification for the foundation requirements. The report included details of three trial pits and boreholes constructed on site. The location of these trial pits are shown in **Appendix F**.

2.4.6 Literature and Internet Review

An internet and literature review was undertaken in order to investigate the location of the "Lost Rivers" in relation to the site.

² London Borough of Camden (June 2003) Floods in Camden – Report of the Floods Scrutiny Panel





3 DISCUSSION OF FLOOD RISK

3.1 FLOOD MAP AND FLOOD ZONE

The Environment Agency flood map is presented in **Appendix C** and shows the site to be located within Flood Zone 1. Flood Zone 1 is defined as an area of low probability of flooding. This means that the site is not understood to be at significant risk from either fluvial or coastal flooding. This is confirmed by the SFRA Source Pathway Receptor Model matrix which identifies that flood risk for Camden borough in general and is summarised below in **Table 2**.

Table 2. Summary of Source Pathway Receptor Model from SFRA (Table 17)

Source of Flooding	Scale of Consequence to Camden Borough in general
Fluvial Flooding from River Lee and Tributaries	Not applicable
Fluvial Flooding from River Brent and tributaries	Not applicable
Tidal flooding from River Lee	Not applicable
Surface Water / combined Sewer / Overland flow	Medium scale of consequence
Groundwater flooding	Very small scale of consequence
Infrastructure failure	Medium scale of consequence

Consequently, this assessment will concentrate on other potential sources of flooding to the property.

3.2 SURFACE WATER FLOODING

In highly urbanised areas, surface water flooding and combined sewer flooding may often be considered together. The SFRA includes research into historic flooding incidents in the North London area. This information is collated and presented in a map in the SFRA, an annotated extract of which is presented in **Figure 2** overleaf with the full map reproduced in **Appendix D**. This map shows a 'London Fire Brigade' marker close to the development site on Eton Avenue. Flooding incidents annotated as 'London Fire Brigade' were identified within the SFRA from filtering flooding related fire brigade responses which corresponded to significant rainfall events. The SFRA notes that a small number of events are located in Camden and are associated with the Camden flood of 2002.

The 2002 floods were significant in Camden and are described within the Camden (June 2003) flooding report. This report identified that approximately 60mm of rainfall falling in a period of less than one hour on the 7th August 2003. Referring to the Flood Estimation Handbook (FEH) Depth Duration Frequency tables for the North London area shows that such a rainfall depth indicates a return period of at least 1 in 140 years. The report also includes a detailed breakdown of streets which were impacted both during the 2002 floods and during similar floods in 1975. Eton Avenue is not highlighted as being impacted by either event, although Lancaster Grove (to the north of the property) is identified as being affected by both. An extract from the map from the flooding report showing areas that flooded is presented in **Figure 3** overleaf and presented in full in **Appendix D**. The current owners have not known the site to have flooded³.

³ Telephone discussion between Xul Architecture and Thomas Mackay (4/11/2010)







Figure 2. Flooding Incidents Identified in SFRA









Whilst both maps indicate that surface water flooding may have occurred close to the development site, any impact is controlled in particular by local topographic features and drainage routes. A review of the topography shows that development site is located close to a natural catchment divide as illustrated in **Figure 4**. This shows the direction of slope of Lancaster Grove to the north and Eton Road which both fall away from the property to the east and west.



Figure 4. Annotated 1:25k Ordnance Survey Map

The sewer plan obtained from Thames water (presented in full in **Appendix E**) shows the direction of flow within the combined sewer, although it is noted that these are often buried at considerable depth and do not always follow local ground topography. The sewer plan shows the flows drain from east to west along Lancaster Grove (away from the development site) and east to west along Eton road. The above described surface topography means that in the event of surface water systems' capacity being exceeded, (as in August 2002) it is anticipated that the road network will direct surface water flows away from the site. This was confirmed during the site walkover. **Consequently, the site is not considered to be at significant flood risk from surface water or sewer flooding**.

3.3 GROUNDWATER FLOODING

The SFRA notes that the consequences of groundwater flooding are likely to be small in scale and no records of groundwater flooding close to the development site are identified in the SFRA. The ground investigation confirmed the presence of clay on the site from the excavated trial pits and boreholes with their locations relative to the current building shown in **Appendix F**. This layer of clay acts as an aquiclude and will prevent significant groundwater flows. Furthermore, no water was encountered within the trial pits /boreholes which were excavated to a depth of 2m and 3m and beneath the invert of the basement. The ground investigation report is dated from March 2010 and reflects a period when water tables are generally at their highest. **Consequently, the risk of groundwater flooding to the property is not considered to be significant**.





3.4 OTHER SOURCES OF FLOODING

The Regents Canal is located within Camden and crosses the borough as shown in **Figure 2** (page 6). The canal is located at elevations below 40mAOD and consequently does not pose a risk of flooding to the property.

3.5 LOST RIVERS OF LONDON

Part of the justification for need for this FRA was that the local authority had identified the course of one of London's lost rivers within close proximity of the development site, as shown in **Appendix D**⁴. The local authority's records noted that this figure may have been taken from "The Lost Rivers of London" by (Burton N, 1962) and transcribed onto an early black and white street map of London. The Lost Rivers of London include the tributaries of the River Thames through London which were either redirected or built over during the growth of the urban area of London, with engineering works extending back many hundreds of years.

The "Lost River" within the vicinity of the property is identified as the River Tyburn, which rose in two locations on the hills of South Hampstead. **Appendix C** shows the eastern branch previously rising in the grounds of the former Belsize Manor, which has long since disappeared. An internet search⁵ revealed the Tyburn stream was progressively culverted and canalised and now is completely buried and incorporated into the main sewer network. Returned websites include local historian maps showing the western wing of the main River Tyburn now located under the Fitzjohns Avenue and College Crescent roads forming a main artery of Thames Water's sewer system, though the eastern branch is not shown. Inspection of Thames' sewer plan shows a number of significantly sized sewers including under Eton Road, Belsize Park Gardens and Primrose Hill Road all approximately 1.2m wide. Given that the course of the western arm is shown to be realigned under the current road system and the history of extensive channelization and realignment of the watercourse, it is reasonable to assume that the smaller eastern branch of the Tyburn has also been realigned from the natural course shown by the planning authority map and incorporated into the combined sewer system.

No evidence was found from the site visit of the natural course of the Lost River. As noted earlier, the site is close to the watershed on Eton Road and the natural route of the watercourse would have been further to the west of that shown on the 'Lost Rivers' map in **Appendix D**. This is likely to be due to the resolution of the source data and the backdrop map.

On this basis, evidence suggests that any watercourse in the vicinity of the property has been culverted and incorporated into the sewer system. No sewer is shown to flow underneath the development property and any sewers locally are confined to under the road network.

http://undercitylondonstories.blogspot.com/2009/03/londons-underground-tyburn-river.html

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⁴ Telephone conversation between John Jepps (Thomas Mackay Ltd) and Gavin Sexton (Camden Borough Council) on 20th September 2010

⁵ http://londonist.com/2008/11/lost rivers from above the tyburn p.php



3.6 MITIGATION

As no significant flood risk has been identified to the development, no specific mitigation is proposed to protect against flood risk above normal construction practice for development of habitable dwellings under ground level to protect against ingress of natural and fluctuating moisture levels within the surrounding soil.





4 SUMMARY

Planning permission has been granted for an extension to an existing basement in a duplex flat at 32, Eton Road, Camden NW3 3HL. The planning application reference is 2010/3196/P. A condition of this permission is that a flood risk assessment should be undertaken prior to the commencement of works on site. This is required in response to wider concerns about surface water flooding in Camden and a council archive map showing the original course of one of the Lost Rivers of London to be close to the property.

The property is located in Flood Zone 1 (low probability of flooding) as shown on the Environment Agency flood map and this means the site is not at significant risk of flooding from main river or estuary sources. The Environment Agency also confirmed that they have no record of flooding at the property.

Surface water / combined sewer flooding (in combination with sewer flooding) in recent years has affected the wider area of Camden town (in 2002 and 1975 as reported in the SFRA). The floods of 2002 prompted a study by a scrutiny panel which produced a comprehensive report on the extent of flooding within the borough. This report showed that Eton Road was not affected by either 1975 or 2002 floods, though other roads around the property were affected (including Lancaster Grove to the immediate north). Inspection of topographical maps and the site walkover indicated that in the event of surface water flooding, water is likely to drain away from the site as it is located close to the watershed on Eton road.

The original course of the River Tyburn, one of London's 'Lost Rivers', is shown on council archive maps to be close to the development site. A literature and internet review was undertaken which reported that the River Tyburn had been extensively channelised and integrated into London's sewer system over many centuries. The internet review provided a map of the modern day course of the western branch of the Tyburn which is now located under Fitzjohns Road and College Crescent adjacent to the development site.

Groundwater flooding is not considered to be a significant threat due to the presence of clays at the development site. Trail pits/boreholes excavated at the site to a depth in of over 2m did not identify problems with groundwater and confirmed the presence of clay soil.

No other sources of flooding were considered to present a significant risk to the property. Given the above, no specific mitigation is proposed to protect against flood risk.

In summary, the property is considered to be at a low risk of flooding and the proposed basement extension is considered appropriate from a flood risk perspective.





APPENDIX A PLANNING APPROVAL WITH CONDITIONS







amden

Development Control Planning Services London Borough of Camden Town Hall Argyle Street London WC1H 8ND

Tel 020 7974 4444 Fax 020 7974 1680 Textlink 020 7974 6866

env.devcon@camden.gov.uk www.camden.gov.uk/planning

Application Ref: **2010/3196/P** Please ask for: **Gavin Sexton** Telephone: 020 7974 **3231**

10 August 2010

Dear Sir/Madam

Mr Sebastian Sandler Xul Architecture

102 Belsize Lane

London NW3 5BB

DECISION

Town and Country Planning Acts 1990 (as amended) Town and Country Planning (General Development Procedure) Order 1995 Town and Country Planning (Applications) Regulations 1988

Householder Application Granted

Address: Garden Flat 32 Eton Avenue London NW32HL

Proposal:

Addition of basement to single family dwelling house (Class C3). Drawing Nos: Site Location Plan; E.SP-01; EX-102; 103; 104; 105; 106; 107; 108; PA-101; 102; 103; 104; 105; 106; 107; 108; PH-01; P.SP-01;

The Council has considered your application and decided to grant permission subject to the following condition(s):

Condition(s) and Reason(s):

1 The development hereby permitted must be begun not later than the end of three years from the date of this permission.

Reason: In order to comply with the provisions of Section 91 of the Town and Country Planning Act 1990 (as amended).



2 All new external work shall be carried out in materials that resemble, as closely as possible, in colour and texture those of the existing building, unless otherwise specified in the approved application.

Reason: To safeguard the appearance of the premises and the character of the immediate area in accordance with the requirements of policies B1 and B7 of the London Borough of Camden Replacement Unitary Development Plan 2006.

3 No development shall take place until the applicant has submitted a detailed flood risk assessment for the development for approval by the Council. Such assessment to include evidence and analysis from trial pits and/or boreholes as necessary and shall make recommendations for any remediation measures (if necessary). All approved remediation measures shall be implemented strictly in accordance with the approved details.

Reason: To ensure that the development does not cause harm to the water environment, water quality or drainage systems and prevents or mitigates flooding, in accordance with policy SD9b of the London Borough of Camden Replacement Unitary Development Plan 2006.

4 All work shall be carried out in accordance with the Councils document "Guide for Contractors Working In Camden (Feb 2008)" and the Mayor of London's best practice document "The control of dust and emissions from construction and demolition".

Reason: To ensure the preservation of the amenity and health of neighbours in accordance with the requirements of policies SD1, SD6 and SD8b of the London Borough of Camden Replacement Unitary Development Plan 2006.

Informative(s):

1 Reasons for granting permission.

The proposed development is in general accordance with the policy requirements of the London Borough of Camden Replacement Unitary Development Plan 2006, with particular regard to policies B1 (General Design Principles), B3 (Alterations and Extensions), B7 (Conservation Areas), SD1 (Quality of life), SD6 (Amenity for Occupiers and Neighbours), SD8b (Disturbance from demolition and construction) and SD9B (Energy and Resources Water). For a more detailed understanding of the reasons for the granting of this planning permission, please refer to the officers report.

2 Your proposals may be subject to control under the Party Wall etc Act 1996 which covers party wall matters, boundary walls and excavations near neighbouring buildings. You are advised to consult a suitably qualified and experienced Building Engineer.

- Noise from demolition and construction works is subject to control under the Control of Pollution Act 1974. You must carry out any building works that can be heard at the boundary of the site only between 08.00 and 18.00 hours Monday to Friday and 08.00 to 13.00 on Saturday and not at all on Sundays and Public Holidays. You are advised to consult the Council's Planning and Public Protection Division (Compliance and Enforcement Team), Camden Town Hall, Argyle Street, WC1H 8EQ (Tel. No. 020 7974 5613 or by email ppp@camden.gov.uk or on the website www.camden.gov.uk/pollution) or seek prior approval under Section 61 of the Act if you anticipate any difficulty in carrying out construction other than within the hours stated above.
- 4 You are advised that Thames Water recommend the incorporation of means of protection for your property, by way of installing for example, a non-return valve or other suitable device to avoid the risk of backflow at a later date, on the assumption that the sewerage network may surcharge to ground level during storm conditions.

You are advised to contact Thames Water for more details.

Your attention is drawn to the notes attached to this notice which tell you about your Rights of Appeal and other information.

Yours faithfully

whil &

Rachel Stopard Director of Culture & Environment

It's easy to make, pay for, track and comment on planning applications on line. Just go to <u>www.camden.gov.uk/planning</u>.



Refusal of planning permission or grant of permission subject to conditions and other information.

The applicant's right to appeal and other information

1. Appeals to the Secretary of State •

If you are unhappy about the Council's decision to refuse planning permission or to grant it subject to conditions, then you can appeal to the Secretary of State under section 78 of the Town and Country

You must submit your appeal within 6 months of the date of decision, unless it is an appeal against a decision to refuse planning permission for a householder application, or an appeal where the same or substantially the same development is subject to an enforcement

For appeals against a decision to refuse planning permission for a householder application you must submit your appeal within 12 weeks

For appeals against a decision to refuse planning permission where the same or substantially the same land and development is subject to an

- enforcement notice, you must submit your appeal either: within 28 days of the date of decision or the expiry of the period

 - which the Council had to decide the application; or within 28 days from the date the enforcement notice is served 2 providing this does not extend the period beyond the time limit
- for appeals which do not involve an enforcement notice. Appeals must be made using a form which you can get from the Planning Inspectorate at Temple Quay House, 2 The Square, Temple
- Quay, Bristol BS1 6PN or online at www.planningportal.gov.uk/pcs. The Secretary of State can allow a longer period for giving notice of an appeal, but will not normally use this power unless there are special
- circumstances which excuse the delay in giving notice of appeal. The Secretary of State need not consider an appeal if it seems to him that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order.
- In practice, the Secretary of State does not refuse to consider appeals solely because the local planning authority based their decision on a direction given by him.

Note: Refusal of planning permission includes refusal of applications for non material amendments, extension of time limits and variation of conditions including minor material amendments.



APPENDIX B DIAGRAMS FROM PLANNING APPLICATION

Detailed site plan Existing Site Layout Proposed Site Layout









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	ARC	HITECTURE	
	Ground	d Floor Office	
	102	Belsize Lane	
	Lon	don NW35BB	
	Office:	+44 (0) 207 431 9014	
	s.sand	II e r@xularchitecture.co.uk	
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APPENDIX C ENVIRONMENT AGENCY FLOOD MAP

