

Seven Sisters/ Eade Road: Planning Application for new warehouse living buildings

1547-LSL-XX-XX-RP-C-FRA

Flood Risk Assessment

January 2023



DOCUMENT CONTROL

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FOR NEW WAREHOUSE LIVING BUILDINGS

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1.0 Introduction

1.1 Scope

London Structures Lab was commissioned by Provewell Limited (the Applicant) to provide structural and civil engineering services for the proposed development located at the junction of Seven Sisters and Eade Roads, Haringey, London N15 6RD.

This report has been produced in support of a planning application and should be read in conjunction with the other planning documents.

1.2 Sources of Information

This report has been prepared based on the following set of information:

- Topographical Survey by Point 2 Surveyors Limited, drawing reference LS2583/T 2 dated October 2022
- Building Layout proposed by Morris and Company, drawing numbers 05001 dated September 2022
- Landscape proposal by Campbell Cadey Architects, drawing numbers 2205_PL_001 to 006 dated January 2023
- Utilities records – Thames Water record reference ALS/ALS Standard/2022_4631067, dated April 2022
- Haringey Warehouse District Stage 1 report by Morris and Company, reference A343-10.01-018, dated May 2022
- Utilities Report by Landmark Information Group, report reference LM / 107336 dated May 2022
- Haringey Warehouse District Sustainable Drainage Strategy report by Expedition, dated August 2021
- Environment Agency (EA) online flood maps at <https://flood-map-for-planning.service.gov.uk/>
- British Geological Survey online mapping available at https://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.111570884.1580712057.1616278391-1852494143.1597654958
- Magic website mapping available at <https://magic.defra.gov.uk/magicmap.aspx>



- Guidance on Flood risk and coastal change – UK Government, available from <https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-3-Flood-risk-vulnerability>
- Lead Local Flood Authority (LLFA) information – Strategic Flood Risk Assessment (c) dated March 2015 available at https://www.haringey.gov.uk/sites/haringeygovuk/files/2014s1700_haringeycouncil_sfra_v4_0_issue.pdf
- Lead Local Flood Authority (LLFA) information – London Borough of Haringey SuDS Design requirements for LLFA Technical Assessment version 1.0 dated 2016 available at https://www.haringey.gov.uk/sites/haringeygovuk/files/haringey_suds_guide_-_requirements_for_llfa_ta_issued_living_draft_final.pdf
- Lead Local Flood Authority (LLFA) information – London Borough of Haringey SuDS Design & Evaluation Guide, 2018, McCloy Consulting & Robert Bray Associates, https://www.haringey.gov.uk/sites/haringeygovuk/files/haringey_suds_design_evaluation.pdf

1.3 Limitations

This report has been prepared in accordance with the NPPF and Local Planning Policy. The proposed flood management (including ground floor level recommendations) and surface water management strategies are based on the relevant British Standards (BS8533), the standing advice provided by the EA or based on common practice. The findings of this report are based on the information available at the time of the production.

The Construction (Design and Management) Regulations 2015 (CDM Regulations) will apply to any future development of this site which involves “construction” work, as defined by the CDM Regulations. As such it is the responsibility of the proposed developer (ultimate client) to fulfil its duties under the CDM Regulations.



2.0 Site Setting

2.1 Site Description

The site covers approximately 0.25 24 ha in area and located within the London Borough of Haringey (the Council). The site is partially developed, occupied by Cara House live-work building, a car park, a mechanics workshop and a Victorian end-terrace. The site is bounded by Seven Sister's Road and Eade Road to the south, existing development to the north and west and Tewkesbury Road and access stairs to the east. The approximate grid reference for the site is 532710E, 187980N.

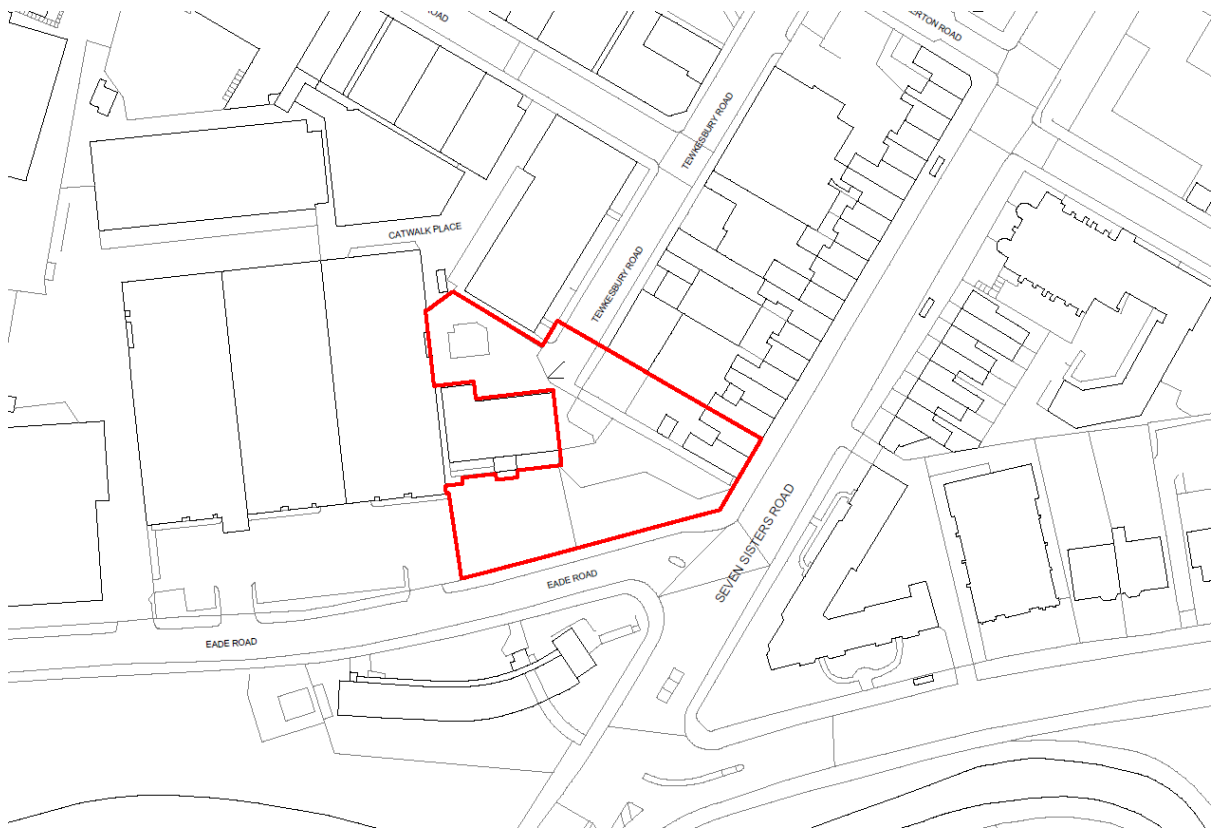


Figure 2.1 – Site location plan

2.2 Proposed Development

The proposed development comprises two buildings – Block A to the east and Block B to the west. The buildings will be occupied by commercial and back-of-house areas at the ground and lower ground levels, with warehouse living accommodation at upper levels. Blue roofs are proposed for both blocks. 10 shipping containers stacked to two storeys will provide workspace/artist studios, toilet facilities and associated waste collection and cycle parking.



Across the site, hard and soft landscaping improvements are proposed. An improved connection between Seven Sisters Road and Tewkesbury Road is central to the scheme, with the existing Breaker's Yard developed to provide small commercial units and public amenity space.

2.3 Topography

The site has complex topography with levels generally dropping from south to north-east. The levels along the southern boundary adjacent to Eade Road and Seven Sisters Road 26.49 to 26.80 m AOD from west to east. The access from Tewkesbury Road is around 19.30 m AOD near the site boundary to the east. Currently there is a set of stairs connecting Seven Sisters Road with Tewkesbury Road with the levels drop of 3.77 m.

2.4 Hydrology

Ordnance Survey (OS) mapping and the EA's web-based mapping indicate that the River Lea is located approximately 850 m to the northeast of the site. New River water transfer structure is located approximately 80 m south-southwest of the site, which feeds into East Reservoir approximately 265 m south of the site. West Warwick Reservoir is a water-body located approximately 1.6 km to the east of the site.

2.5 Geology

Based on the information available from BGS online mapping:

- Bedrock geology description - London Clay Formation - Clay, silt and sand. Sedimentary bedrock formed between 56 and 47.8 million years ago during the Palaeogene period.
- Superficial deposits – none recorded.

The nearest borehole records with similar geological profiles to the site available from this website are summarised below.

- TQ38NW468, approximately 130 m west of the site, dated 1992 - indicated uppermost 12 m made ground, with London clay between 12 to 42.5 m, with Reading Beds between 42.5 to 50.75 m, and Thanet Sands from 50.75 m to a drilled depth of 66 m. The cover level of the borehole was at 26.25 m AOD, with water rest level recorded at a depth of 47.74 m below cover level i.e. -21.49 m AOD.
- TQ38NW280, approximately 120 m south of the site, dated 1972 – indicated uppermost 2 m made ground, with stiff brown fissured clay with sulphate crystals and occasional pockets of orange silt between 2 to 10.10 m, and stiff blue fissured clay from



10.10 m to a drilled depth of 11.70 m. The cover level of the borehole was at 10.06 m AOD. Groundwater was not encountered at this borehole.

- TQ38NW95, approximately 125 m northeast of the site, undated – indicated uppermost 1.6 m made ground, with firm to stiff fissured brown silty clay with occasional gypsum crystals between 0.6 to 6.7 m, and stiff to very stiff fissured grey silty clay (London clay) from 6.7 m to a drilled depth of 26.5 m. The cover level of the borehole was at 18.7 m AOD. Groundwater was not encountered at this borehole.

Soilscape information available from Magic Maps service indicate this area as:

- Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils

At the time of the report production, no detailed site investigation works has taken place.

2.6 Hydrogeology

The following hydrogeological information was obtained from the online Magic Maps service.

- Aquifer destination (Bedrock) – Unproductive
- Aquifer Designation Map (Superficial Drift) – no features found
- Groundwater Vulnerability – Unproductive

BGS boreholes TQ38NW468 recorded rest water level at 47.74 m below a cover level of 26.25 m AOD. Groundwater was not encountered at BGS boreholes TQ38NW280 and TQ38NW95. The borehole depths were 11.70 m and 26.5 m respectively.

2.7 Existing Drainage

A schematic excerpt from Thames Water record reference ALS/ALS Standard/2022_4668973 is shown in Figure 2.2.

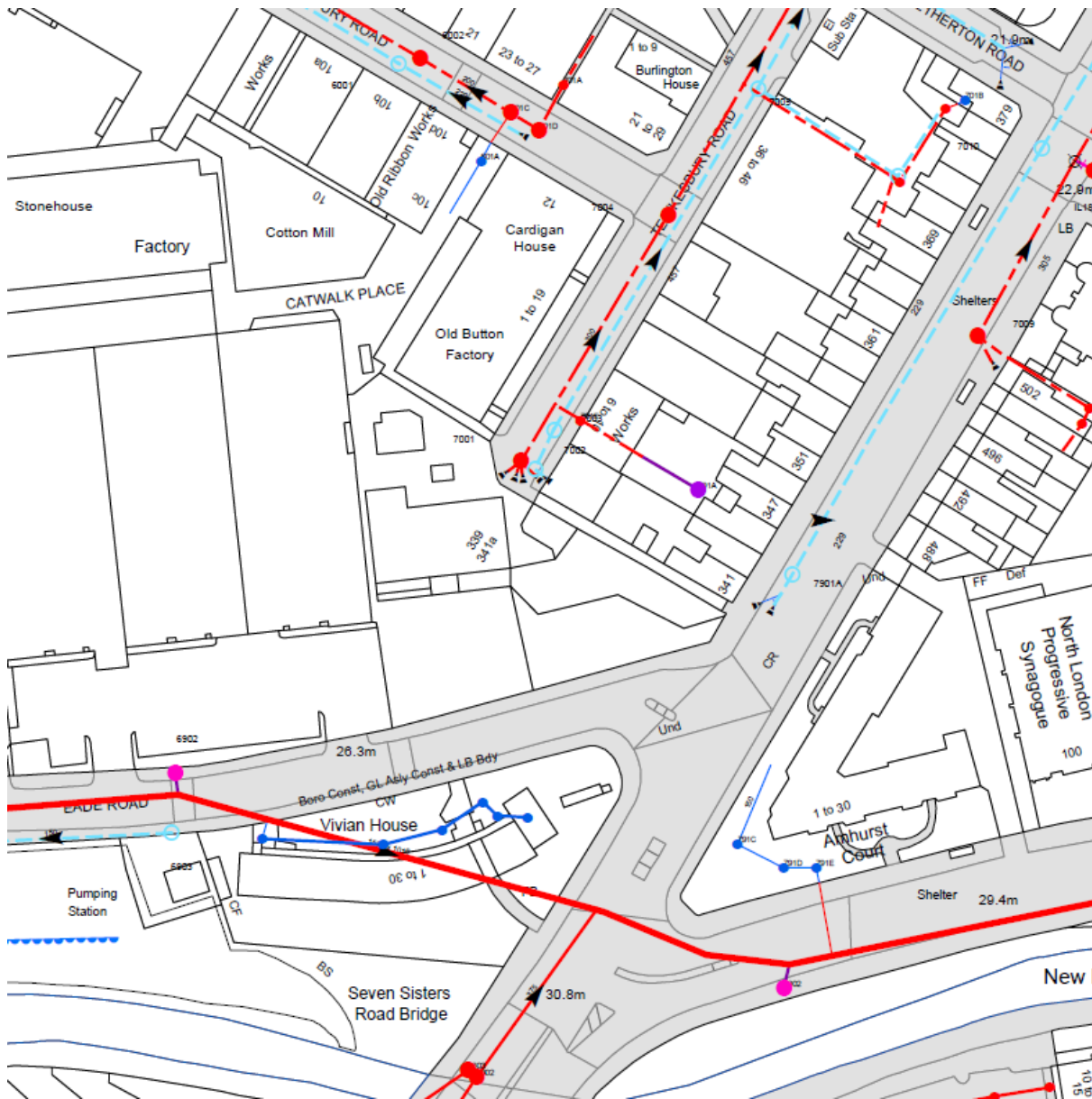


Figure 2.2 – Thames Water asset record reference ALS/ALS Standard/2022_4631067, dated April 2022

The Thames Water asset record shows that there is a combined sewer and surface water sewer located on Eade Road approximately 50 m southwest of the site, with a surface water sewer located on Seven Sister's Road approximately 15 m east of the site. Separate foul and surface water sewers run parallel along Tewkesbury to the north of the site.

Table 2.1 – Existing Thames Water manholes

Thames Water MH Ref	Location	Cover Level	Invert Level
6902 Combined Trunk Main	Eade Road	25.3	N/A
6903 SW	Eade Road	25.62	24.27



Thames Water MH Ref	Location	Cover Level	Invert Level
7901A SW	Seven Sister's Road	26.2	25.23
7001 FW	Tewkesbury Road	19.46	16.9
7002 SW	Tewkesbury Road	19.47	16.42



3.0 Flood Risk

3.1 Criteria

The flood risk elements that need to be considered for any site are defined in BS 8533- 'Assessing and managing flood risk in development Code of practice' (October 2011) as the “Forms of Flooding” which are listed as:

- Flooding from rivers (fluvial flood risk)
- Flooding from the sea (tidal flood risk)
- Flooding from the land/surface water (pluvial flood risk)
- Flooding from groundwater
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc)
- Flooding from reservoirs, canals and other artificial structures

The following section reviews each of these in respect of the subject site.

3.2 Fluvial Flood Risk

The latest EA published flood zone map (Figure 3.1) shows that the site lies within Flood Zone 1, i.e. land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding.

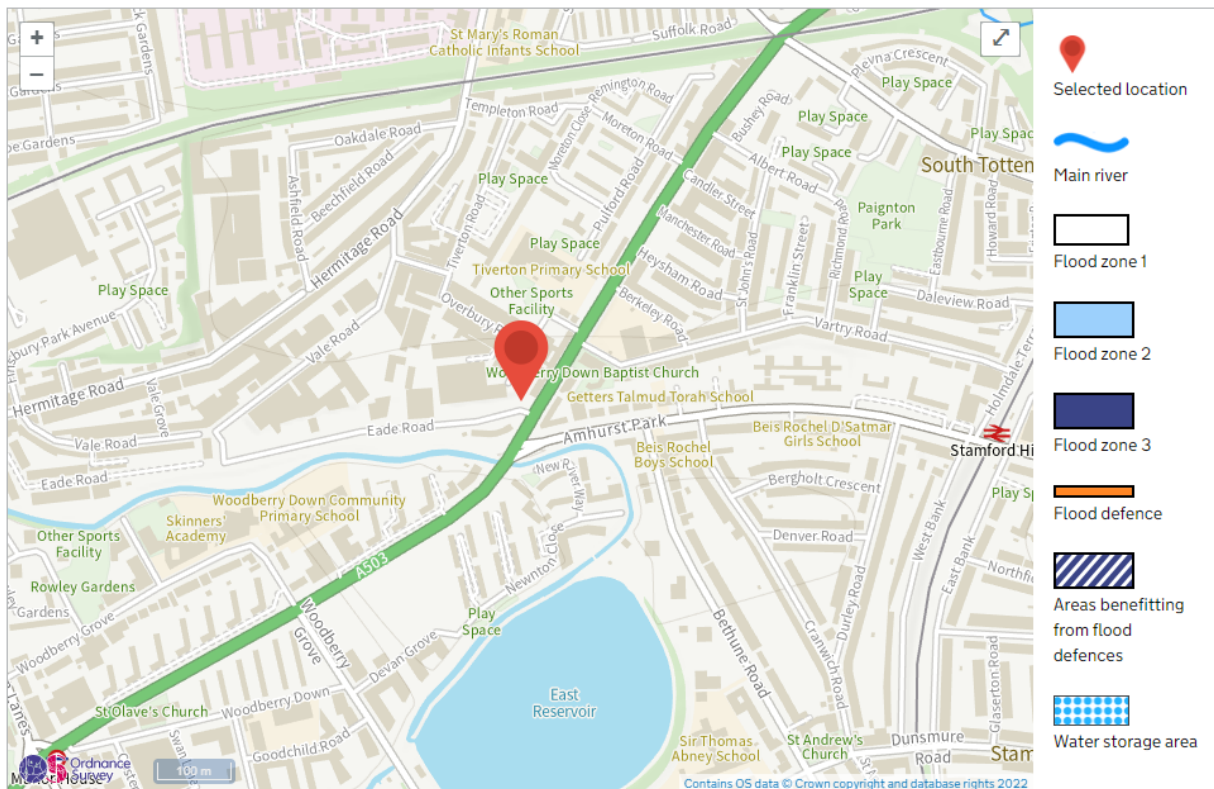


Figure 3.1 – EA fluvial flood risk map



As the site is within Flood Zone 1, there is a low risk of fluvial flooding to the site. Based on the above, the risk of flooding from rivers is considered very low.

3.3 Tidal Flood Risk

The site is located inland and approximately 1.67 km west of the River Lea and 7.58 km north of the River Thames. Therefore, there is very low risk of flooding from this source.

3.4 Pluvial Flood Risk

Surface water flooding occurs when the rainwater does not drain away through the normal drainage system or infiltrate the ground, but instead lies on or flows over the ground.

Surface water flood risk to the site has been assessed using EA mapping. The maps were produced using 'direct rainfall' modelling. Although they consider local drainage capacity, non-surface water influences such as rivers, seas or groundwater are not considered. The map is based on LIDAR topographic data which is not suitable for site specific assessment and therefore, where available, topographic survey data should be used to provide a more accurate understanding of potential flow paths.



Figure 3.2 – EA mapping for surface water



EA surface water flood mapping does not indicate surface water flooding affecting the site area. Some localised surface water flooding is indicated along Eade Road and Seven Sisters Road. Hence the risk of surface water flooding is considered very low.

3.5 Groundwater Flood Risk

Appraisal of BGS borehole logs from the closest available records with similar geology to the site informed that water was struck at approximately -21.49 m AOD for borehole reference TQ38NW468. This is a significant depth below the proposed lower basement level for the living-commercial block. Based on the evidence available at the time of assessment, the risk of ground water flooding to the site is considered to be low. At the time of the report production, no detailed site investigation works has taken place.

3.6 Sewer/Drainage Flood Risk

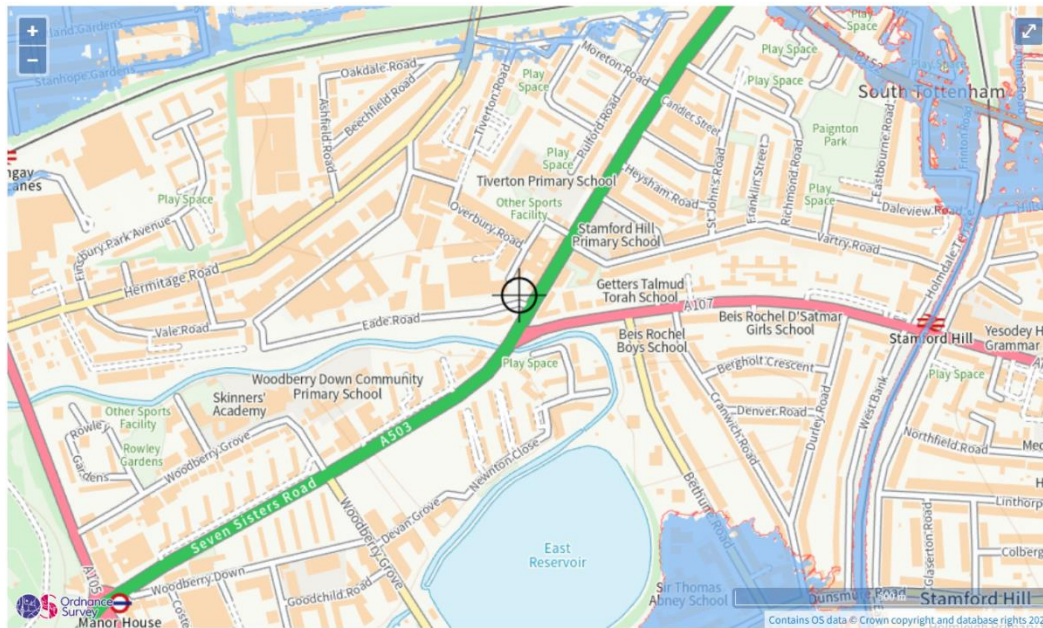
Sewer flooding is often caused by excess surface water entering the drainage system when there is insufficient sewer capacity to cope with this excess water, but also due to 'one off' events such as blockages.

Thames Water is the statutory undertaker for the local public sewer network. There are limited drainage networks running in the vicinity of the site and there are no adopted sewers identified within the site boundary.

Based on the Thames Water records, the risk of sewer flooding to the site is considered to be low.

3.7 Reservoirs/Canal Flood Risk

The EA has produced a Reservoir Flood Map (Figure 3.3) that shows that the site is not at risk from reservoir flooding.



Maximum extent of flooding from reservoirs:

● when river levels are normal ● when there is also flooding from rivers ⊕ Location you selected

Figure 3.3 – EA reservoir flood risk map

It should also be emphasised that the risk of flooding from reservoir breach is very small since the EA is the enforcement authority for the Reservoirs Act (1975) and all large raised reservoirs are inspected and supervised by reservoir panel engineers.

On this basis, the risk from reservoir flooding to the site is considered to be negligible.

3.8 Summary of Flood Risk

The following table provides a summary of flood risk for the site. Please refer to the Flood Risk Assessment prepared by London Structures Lab for further details about the flood risk.

Table 3.1 – Summary of sources of flood risk

Source of Flooding	Risk Level	Source of Data	Comments, Mitigation Requirements
Fluvial	Low	EA mapping	Flood zone 1
Tidal	Low	EA mapping	Inland location
Surface water (Pluvial)	Low	EA mapping	EA surface water flood mapping indicates some limited localised surface water flooding along Eade Road and Seven Sister's Road adjacent to the southern site boundary. However, surface water flooding is not indicated within the development area,



Source of Flooding	Risk Level	Source of Data	Comments, Mitigation Requirements
			therefore the risk from surface water flooding is considered low.
Groundwater	Low	BGS mapping	Appraisal of BGS borehole logs from the closest available records to the site informed that water was struck at -21.49 m AOD at TQ38NW468, approximately 130 m west of the site. Groundwater was not encountered at BGS boreholes TQ38NW280 and TQ38NW95. The borehole depths were 11.70 m and 26.5 m respectively. Hence, the risk of ground water flooding to the site is considered to be low at this stage.
Sewers	Low	LLFA information	At the time of report production, no records within any local flooding and drainage documents of sewer flooding in the area localised to the site were identified. Therefore, the risk of sewer flooding to the site is considered to be low.
Reservoirs, Canals	Low	EA mapping	Site not affected

Key	Description
	Low/Negligible Risk – No noticeable impact to site and not considered to be a constraint to development.
	Medium Risk – Issue requires consideration but not a significant constraint to development
	High Risk – Major constraint to development requiring active consideration in mitigation proposals



4.0 Flood Risk Mitigation

Appropriate flood mitigation measures are to be considered when developing the design for the site.

4.1 Climate Change Allowances

Appropriate climate change allowances should be applied when developing the surface water drainage design. In line with the latest government guidance system must be able to cater a rainfall event up to and including the 1 in 100 year + 40 % allowance for climate change at this location.

4.2 Overland Flow

EA mapping does not identify any overland flows through the site. SuDS measures are to be provided on site to control and store the surface water as a part of the surface water design for the development, as required. Surface flows may be generated on site due to drainage capacity exceedance, which can be conveyed into the SuDS features via surface flows along the hard standing and roof areas.

Please refer to Surface Water Drainage Strategy report (Ref: 1547-LSL-XX-XX-RP-C-SWS) for further details on proposed arrangements for accommodating surface water flow paths and SuDS strategy.

4.3 Finished Floor Levels

As this site is unlikely to be affected by fluvial flooding there is no need to incorporate any freeboard levels into the finished floor levels of the design. Low lying areas that could lead to ponding of surface flows will be avoided by careful design of finished levels. If practicable, it would be beneficial to raise ground floor levels at least 150 mm above surrounding land to protect against ingress of ponded surface water or groundwater. However, consideration should be given to the access requirements and tie in levels when assessing proposed finished floor levels.

4.4 Flood Compensation

The site is shown to be outside the 1 in 100-year climate change floodplain, so floodplain compensatory measures are not deemed necessary.

4.5 Safe Access/Egress

Flood Zone 1 refers to land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1 %) i.e. lowest risk level. As the site is lies outside of the 1 in 1,000-year flood extent, safe access and egress will be available up to this extreme storm event.



5.0 Planning Context

5.1 Land Use Vulnerability

Table 3 of the Planning Practice Guidance (PPG) indicates the compatibility of various land uses in each flood zone, dependent on their vulnerability to flooding. Figure 5.1 below is reproduced from Table 3 of PPG.

Figure 5.1 – Table 3 of PPG detailing Flood Risk Vulnerability Classification

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Annex 3 of the PPG classifies ‘Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels’ as more vulnerable. This classification of development is appropriate for areas within Flood Zone 1 and therefore appropriate for the subject site.

5.2 Sequential Test

The Sequential Test aims to direct new development to areas with the lowest probability of flooding. The site has been identified as located within Flood Zone 1 with no other significant flooding issues from other sources. It is therefore considered to pass the Sequential Test.

5.3 Exception Test

In accordance with Table 3 of PPG, there is no requirement to apply the Exception Test for a ‘more vulnerable’ development within Flood Zone 1.



6.0 Conclusion

This FRA has been undertaken for the proposed development located at the junction of Seven Sisters and Eade Roads, Haringey, London N15 6RD. The site covers approximately 0.24 ha in area and currently contains commercial/residential buildings and car parking. The proposed development comprises two live-work buildings; Block A to the east and Block B to the west. It will also contain workspaces/studies constructed from shipping containers.

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in relation to the proposed development. It is also consistent with the Local Planning Authority requirements with regards to flood risk.

The proposed development site lies in an area designated by the EA as Flood Zone 1, and is outlined to have a chance of fluvial flooding of less than 1 in 1,000 (<0.1%) in any year. A summary of the flood risk and any associated mitigation measures are summarised in Table 6.1.

Table 6.1 – Flood risk summary

Source of Flooding	Risk Level	Mitigation
Fluvial	Low	N/A
Tidal	Low	N/A
Surface water (Pluvial)	Low	N/A
Groundwater	Low	N/A
Sewers	Low	N/A
Reservoirs, Canals	Negligible	N/A

The surface water drainage design for the site is to be developed in line with the LLFA requirements and applying appropriate mitigation factors. The LLFA requires a system that caters for a 1 in 100 year rainfall event + 40 % allowance for climate change. This is to be addressed as a part of the surface water drainage strategy for the scheme.

Overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.