

EVOLVE

**Big Yellow,
Staples Corner, Brent
Cross**

Flood Risk Assessment

3727-EVE-XX-XX-T-C-0001

Revision C
11/12/2023

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Revision	Date	Prepared By	Checked By	Purpose
A	27/10/23	PW	LG	Issued for Planning
B	07/12/23	PW	JT	Issued for Planning
C	11/12/23	PW	LG	Revised to latest drawings

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1 Introduction

1.1 Site Proposals

Evolve Consulting Engineers Limited has been appointed by .Big Yellow Self Storage Company Limited in respect to the proposed development centred at approximate National Grid Reference TQ 22620 87382 (E 522620, N 187382) What3Words chains.drama.rats Renault/ Dacia, Staples Corner, North Circular Road, Brent Cross, NW2 1LY. Refer to Appendix A – Site Location Plan.

The planning application area is 0.84 ha

The proposed development comprises the demolition of the existing building and the construction of a self-storage facility (Use Class B8), with flexible office space (Use Class E(g)(i)) and external storage units (Use Class B8), with associated parking and servicing areas.

1.2 Planning Policy

The aim of the Flood Risk Assessment (FRA) is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk. The report has been prepared in accordance with the guidance detailed in the National Planning Policy Framework July 2021 (NPPF) and the associated Planning Practice Guidance 2016 (PPG).

Reference has also been made to the CIRIA SuDS manual (C753), London Boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow Strategic Flood Risk Assessment - Level 1 (2018), London Borough of Barnet Strategic Flood Risk Assessment - Level 2 (2021) and the London Borough of Barnet Surface Water Management Plan Volume 1 and Volume 2 (2011)

The desk study was undertaken by reference to information provided / published by the following bodies:

- Environment Agency (EA)
- British Geological Survey (BGS)
- Ordnance Survey (OS)
- Thames Water.
- Defra

2 Introduction

2.1 Existing Site

The site is located approximately 1.1 kilometres (km) south-southeast of Hendon train station and 2.23km northeast of Neasden tube station.

The area of the site is 8444m² with this being split into 2,411m² of roof area, 5,585m² of hardstanding and 448m² soft landscaping.

According to the London Borough of Barnet Surface Water Management Plan (SWMP) there are 33 Critical Drainage Areas (CDA) within the London Borough of Barnet. Reference to the SWMP shows that the site is not shown to be located in a CDA.

2.2 Topography

The topographical site survey shows that the site is generally flat with the existing building FFL at 40.400mAOD. The levels along the boundary vary between 39.800 and 40.200mAOD.

3 Hydrogeological Setting

3.1 Groundwater and Water Resources

The BGS's online geology map shows the superficial geology to be Alluvium, this member is formed of clay, silt, sand and gravel. The bedrock geology is shown to be London Clay underlying the Gravel Member as expected. This member comprises blue/grey clay with silt and sandy layers common.

There are two historical borehole records within the site boundary on the BGS website. The closest to the centre of the site shows the following geology.

Ground Type	Elevation (mAOD)	Depth (mbgl)	Thickness (m)	Description
Made Ground	40.17	0.00	3.55	Gravel, ash, broken glass & rubble.
Alluvium	36.62	3.55	1.00	Stiff to Firm slightly fissured silty CLAY.
Gravel	35.62	4.55	0.75	Medium dense to dense, coarse to medium very sandy GRAVEL
London Clay Formation	34.87	5.30	Not Proven	Firm to stiff, brown locally mottled orangish brown slightly silty fissured CLAY

The Alluvium member is classified as a Secondary A Aquifer, defined as containing permeable layers capable of supporting water supplies at a local rather than strategic scale, in some cases forming an important source of base flow to rivers. These strata are aquifers formerly classified as Minor Aquifers.

Groundwater provides a third of the drinking water in England and Wales and maintains the flow in many of our rivers. In some areas of Southern England, groundwater supplies up to 80% of the drinking water, therefore it is crucial that these sources are looked after thus ensuring that the water is completely safe to drink.

The Environment Agency has identified Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied to a groundwater source.

According to Environment agency data, the site is not located in a groundwater Source Protection Zone (SPZ) and there are no SPZs recorded within 500m.

3.2 Groundwater Levels

Groundwater levels are subjected to variations caused by changes in the local drainage conditions and also by seasonal effects. Due to the hydraulic properties of the underlying London Clay, perched water levels could be present within the Alluvium and made ground. However, perched water levels can vary seasonally and are prone to rapid changes through heavy rain events on permeable surfaces, accidental events (such as burst water mains) and the introduction of new underground construction causing blockages to natural perched water flow.

4 Hydrological Setting

4.1 Nearby Watercourses

Reference to OS Mapping shows that the River Brent flows broadly west directly adjacent to the northern boundary of the site. The river discharges into the Brent Reservoir some 500m to the west of the site.

4.2 Existing Flood Protection Measures

The Environment Agency (EA) defines a Flood Warning Area as “geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater.”

The EA shows areas of land that benefit from flood defences built to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The EA’s website indicates that the site is not currently protected by formal flood defences however results provided by the EA (see Appendix C) show the site to be defended. We have written this report based on an undefended site which is the worst case scenario.

4.3 Fluvial Flooding

Fluvial sources include rivers, streams, and ditches. Fluvial flooding occurs when a river cannot cope with the amount of water draining into it from the surrounding land.

The development boundary for the site sits within Flood Zone 2 and Flood Zone 3 as identified on the EA flood zone mapping showing areas at risk of flooding from rivers or sea.

Refer to EA Flood Map in Appendix B.

Areas deemed to be in flood zone 2 have been shown to have between 0.1% – 1% chance of flooding from rivers in any year (between 1:1000 and 1:100 chance). Areas within flood zone 3 have been shown to be at a 1% or greater probability of flooding from rivers in any year.

The extents of the current flood zones across the site are tabulated below and can be seen in Appendix B

Flood Zone	1	2	3a	Total
Extent (ha)	0.0	0.7867	0.0577	0.8444
Coverage (%)	0.0	93.2	6.8	

The flood zone 2 & 3 areas that are shown are associated to River Brent adjacent to the site.

The Environment Agency were contacted to provide flood levels and data. Refer to Appendix C for EA data provided.

4.3.1 Fluvial Flood Levels

The 4 nodes shown in the table below are from within the channel of the River Brent directly adjacent to the northern boundary of the site. The closest node is highlighted.

Node ID	Easting	Northing	MODELLED Flood Level for Annual Exceedance Probability Shown in MAOD				
			10% AEP	5% AEP	1% AEP	1%AEP Plus 20% Climate Change	0.1% AEP
06238MN_B.205d	522505	187368	38.83	38.83	39.06	39.20	39.89
06238MN_B.205u	522515	187376	38.78	38.82	39.28	39.49	40.27
06238MN_B.207	522604	187441	38.71	38.96	39.50	39.79	40.56
06238MN_B.208d	522618	187452	38.75	39.00	39.56	39.96	40.68

4.4 Costal/Tidal Flooding

Tidal flooding happens when there are high tides and stormy conditions.

The site is not located in an area close to a tidal body of water. The EA flood map shows that the site is not at risk from tidal flooding.

Refer to EA Flood Map in Appendix B

4.5 Groundwater

The London Boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow April 2018 Strategic Flood Risk Assessment - Level 1 states that a majority of the sub-region is underlain by Thames Group (also referred to as London Clay) bedrock, a composition of silty clay/mudstone, sandy silts and sandy clayey silts of marine origin. This geological unit generally has a low hydraulic conductivity which means water does not easily move through it. However, because of this characteristic and poor drainage, ponding can occur if London Clay is downhill of aquifer outcrops.

The Environment Agency's Areas Susceptible to Groundwater Flooding (AStGWf) shows that the site is generally at low risk from groundwater flooding with the site shown to be in an area with less than a 25% chance of being affected by groundwater flooding.

Groundwater flooding can occur when groundwater rises up from the underlying aquifer to flood subsurface infrastructure or to emerge at the ground surface. This is generally caused by the rise of groundwater levels to extreme high levels in permeable consolidated aquifers (primarily chalk) in response to prolonged above average rainfall, or from hydraulic continuity with high water levels in adjacent rivers. Given the widespread London Clay with the overlying superficial deposits to be a Secondary A Aquifer, this site has a low probability of being at risk of flooding from this source.

4.6 Surface Water Overland Flow

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.

Reference to the Defra Risk of Surface Water Flooding (RoFSW) data contained in tile TQ28.

Event AEP	3.33% (1:30)	1% (1:100)	0.1% (1:1000)
Extent (ha)	0.0539	0.1575	0.5012
Coverage (%)	6.38	18.65	59.35

The site is affected by surface water flooding for the 1:30yr, 1:100yr and 1:1000yr events based on the information taken from the RoFSW. With approx. 59.3% of the site is at risk of surface water flooding from a 0.1% (1 in 1000) AEP event.

The EA shows the site to be at low risk from surface water flooding with a depth of water between 300mm and 900mm which is a standard interval set by the EA. This means that each year this area has a chance of flooding between 0.1% and 1%. The mapping shows that the surface water runoff is caused by the River Brent overtopping.

Refer to EA Risk of Surface Water Flooding and Extent maps in Appendix B.

4.7 Sewer Flow

Sewer flooding is often caused by excess surface water entering the drainage network. Water companies, in this case Thames Water, are obliged under the Water Industry Act to facilitate drainage of surface water up to a 1 in 20-year return period event.

The West London SFRA online mapping shows the site to be in an area with no instances of sewer flooding. The postcodes listed are not in the vicinity of the site so a low risk can be assumed.

4.8 Reservoir Failure and Other Artificial Resources

The West London SFRA online mapping shows potential reservoir breach inundation mapping, which displays the largest area that could potentially flood if a reservoir were to fail and release the water it holds.

Flooding associated with the Brent reservoir is shown to encroach onto the site along the northern boundary with the same footprint as that shown for fluvial flood zone 3. The remainder of the site is not shown to be at risk from reservoir flooding.

Flood risks from the water supply network are predominantly from burst water mains. Flooding from burst water mains is very difficult to predict.

Refer to EA Risk of Flooding from Reservoir Failure map in Appendix B

4.9 Land Drainage

There is no known land drainage on the site.

4.10 Hydraulic Structures

No hydraulic structures are present on-site.

5 Flood Risk and Mitigation

5.1 Fluvial/Tidal Flooding

- The EA Flood Map for Planning shows the site is located within Flood Zone 2 and Flood Zone 3a.
- The PPG details the suitability of different land uses within each flood zone. The proposed land uses are classified as 'less vulnerable' and such uses are generally considered appropriate within Flood Zone 2 and 3a subject to passing the Exception Test. See section 6.
- A no build zone area (easement) of 8m from the river has been established, where a small portion of the site sits in flood zone 3a.

Mitigation required. All floor levels must be a minimum of 300mm above the 1% (1 in 100+20%) AEP river flood level, including climate change. The EA data shows a flood level of 39.960mAOD for node 06238MN_B.208d. Therefore, the finished floor level of the development will be set at 40.260mAOD minimum.

5.2 Groundwater Flooding

- The majority of the district is underlain by unproductive strata (which has a negligible significance on water supply or river base flows) and the risk of the flooding from groundwater sources is noted to be low due to the geology of the area.
- The Environment Agency's Areas Susceptible to Groundwater Flooding (ASStGWf) shows that the site is generally at low risk from groundwater flooding with the site shown to be in an area with less than a 25% chance of being affected by groundwater flooding.
- No basements are planned as part of the development and any new structures within the ground will be designed and constructed considering the local groundwater levels.

No mitigation is considered necessary in relation to groundwater flood risk.

5.3 Surface Water Flooding

- The EA shows the site to be at low risk from surface water flooding with a depth of water between 300mm and 900mm which is a standard interval set by the EA. This means that each year this area has a chance of flooding between 0.1% and 1%.

No mitigation is required in relation to surface water flood risk.

Priority will be given to use of SuDS. Runoff from the site (post development) will not exceed greenfield runoff rates, where feasible. Refer to Evolve Drainage Strategy document 3727-EVE-XX-XX-T-C-0002 for further details.

5.4 Sewer Flooding

- The site is in area where no recorded incidents of sewer flooding affecting properties internally or externally have been recorded.
- The discharge rate to the existing sewer will be agreed with Thames Water to ensure that there is capacity to receive discharge from the site without significantly increasing flood risk.

No mitigation is considered necessary in relation to sewer flood risk.

6 Sequential and Exception Test

The Sequential Test is used to ensure that areas at little or no risk of flooding are developed in preference to areas of higher risk. A sequential test is often required when the proposed development site is within Flood Zones 2 or 3. In this case, the site is located within Flood Zone 2 and Flood Zone 3.

The NPPF requires that, if following the application of the Sequential Test, it is not possible for development to be located in lower risk zones then the Exception Test must be applied where development is more vulnerable to flooding.

6.1 Sequential Test

Sequential Test	Response
Site	Renault/ Dacia, Staples Corner, North Circular Road, Brent Cross, NW2 1LY
Allocation	Commercial/Business
Flood Zone	Zone 2 & 3a
Reasonable alternative site available in same or lower flood zone?	No. There are no reasonable alternatives located within the area.

Overall, given that the site is not at a significant risk of flooding and is therefore already in a sequentially preferable location, the site is considered to pass the Sequential Test.

6.2 Exception Test

The development of the proposed site to be used as a commercial/business development is classed as Less Vulnerable according to Annex 3: Flood risk vulnerability classification of the NPPF. Reference to table 3 of the NPPF shows that Less vulnerable development in flood zone 2 and 3a is appropriate and does not require an exception test.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	Development is Appropriate	Development is Appropriate	Development is Appropriate	Development is Appropriate	Development is Appropriate
Zone 2	Development is Appropriate	Development is Appropriate	Exception Test Required	Development is Appropriate	Development is Appropriate
Zone 3a	Exception Test Required	Development is Appropriate	Development Not Permitted	Exception Test Required	Development is Appropriate
Zone 3b	Exception Test Required	Development is Appropriate	Development Not Permitted	Development Not Permitted	Development Not Permitted

The Exception Test is not required, and the development is appropriate in flood zone 2 and 3a with the proposed mitigations taken into account.

7 Floodplain Compensation Storage

Planning policy requires that new developments cannot cause detrimental flooding impacts to areas upstream or downstream of a site.

Developments within a surface water floodplain may remove areas where floodwater is stored during a flood and can displace floodwaters. There is thus the potential that flood levels surrounding the site could be increased without careful design consideration.

To ensure there is not a detrimental surface water flood risk impact to neighbouring areas, any development resulting in a loss of floodplain storage may be required to provide compensatory storage to negate these potential impacts.

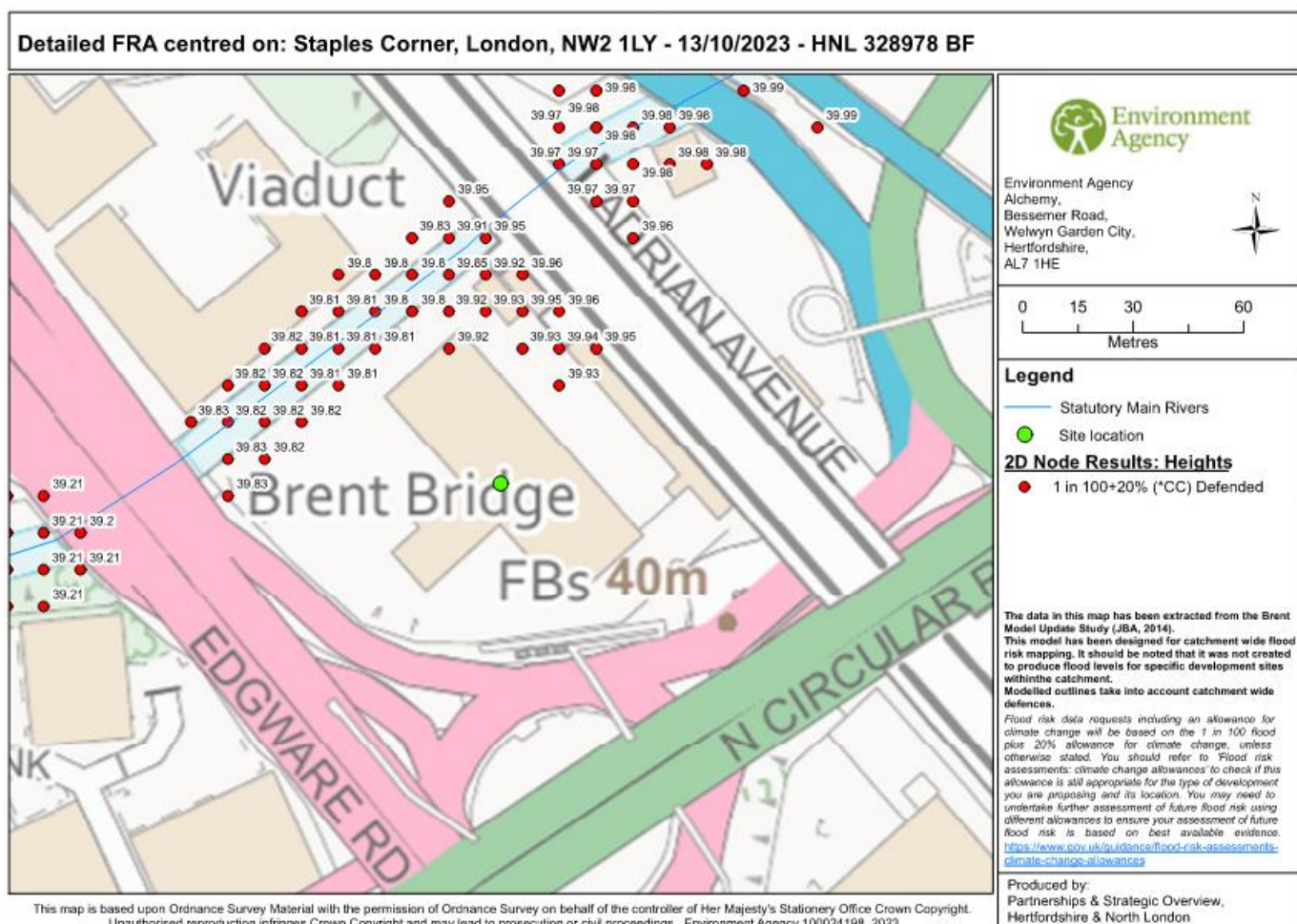
The amount of compensation required is dependent on

- the footprint of any development within the floodplain, and
- the potential depth of flooding in these areas.

Together these factors indicate the potential volume of floodwater that could be displaced by development.

An assessment of surface water flood storage compensation has been carried out based on the finished floor level set at the recommended minimum level of 40.260m AOD (giving a 300mm freeboard to the Node 06238MN_B.208d for the 100yr + 20% level) and the external levels set using maximum permissible falls (1:40) set by the client.

The EA Product 4 Data shows the following predicted flood depths on the site:



As the levels shown differ across the floodplain footprint within our site, we have modelled 3 separate scenarios to ascertain the impact using the following levels; 39.81m AOD being the lowest level, 39.85m AOD which is an average level and 39.96m AOD, the highest level shown within the site boundary.

The topographical survey has been modelled to create a 3D surface and compared to the existing contour area for each of the three scenarios.

- Floodplain at 39.81mAOD 111m³ of flood volume within the site boundary for the existing levels and building locations.
- Floodplain at 39.85mAOD 166m³ of flood volume within the site boundary for the existing levels and building locations.
- Floodplain at 39.96mAOD 399m³ of flood volume within the site boundary for the existing levels and building locations.

The proposed levels were then modelled to create a 3D surface and compared to the proposed contour area for each of the three scenarios. An area adjacent to the river has been relevelled to 30.65mAOD to match the lowest point along the river wall where the floodwater enters and exits the site. This is a direct or 'level for level' compensation area where the levels are lowered to ensure that the same volume of flood storage is available at all levels of flooding and existing flood flow routes are protected to maintain ingress and egress of the surface water. The following volumes are available on the site post development.

- Floodplain at 39.81mAOD 146m³ of flood volume within the site boundary for the proposed levels and building location.
- Floodplain at 39.85mAOD 197m³ of flood volume within the site boundary for the proposed levels and building location.
- Floodplain at 39.96mAOD 365m³ of flood volume within the site boundary for the proposed levels and building location.

Following development, the site impacts the floodplain as follows:

- Floodplain at 39.81mAOD An additional 35m³ of floodplain storage for the 100yr + 20% event.
- Floodplain at 39.85mAOD An additional 31m³ of floodplain storage for the 100yr + 20% event.
- Floodplain at 39.96mAOD Removal of 34m³ of floodplain storage for the 100yr + 20% event.

The level at 39.96mAOD is considerably higher than surrounding levels and could possibly be an anomaly therefore we have based the calculations on an average flood plain level resulting in net floodplain volume benefit to the site, it is concluded that the proposed design of the development will not adversely impact flooding either on or offsite.

However, we would welcome a discussion with EA/LLFA to the findings of the floodplain compensation calculations if required.

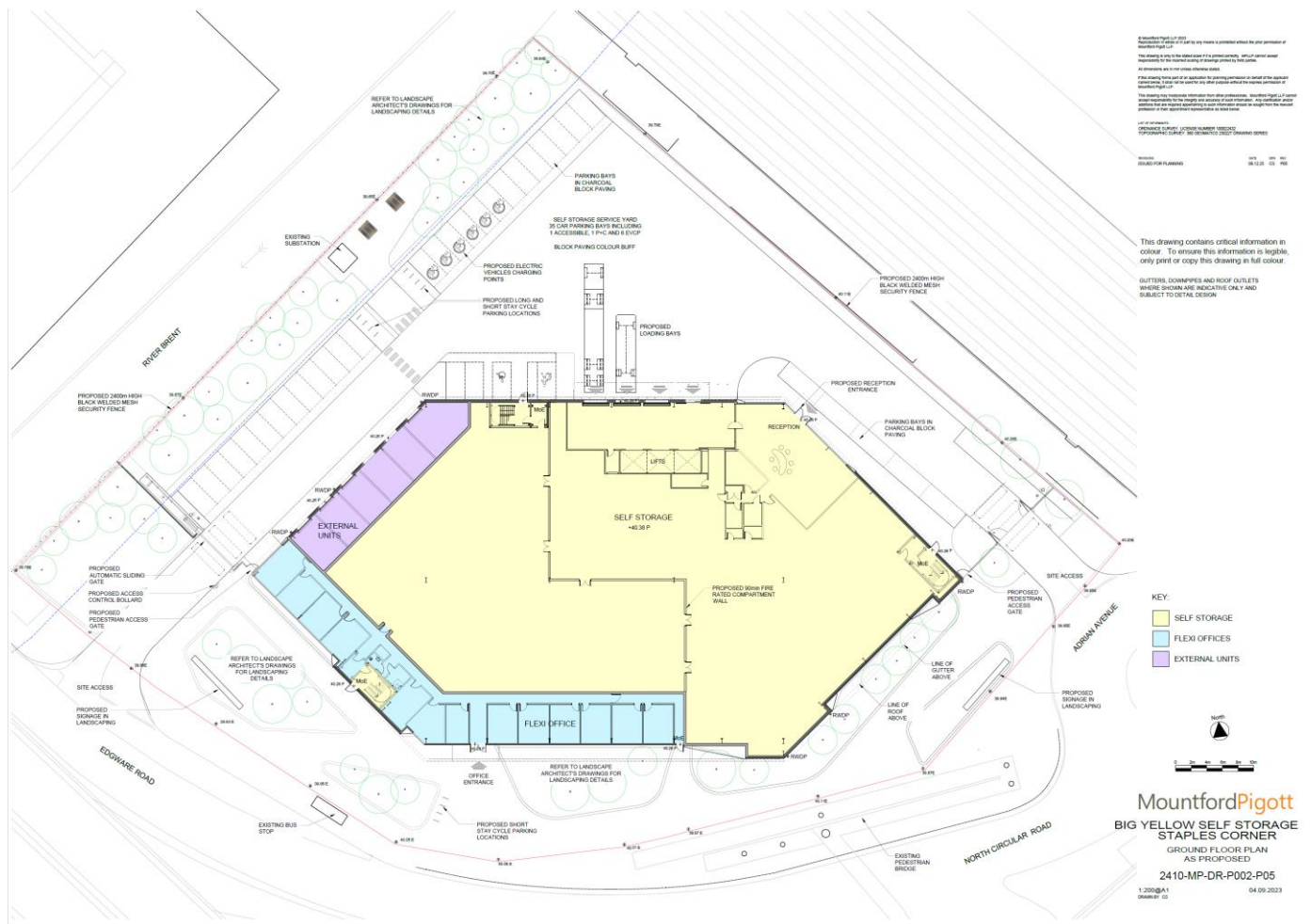
Refer to Appendix D for flood modelling drawings.

8 Conclusion

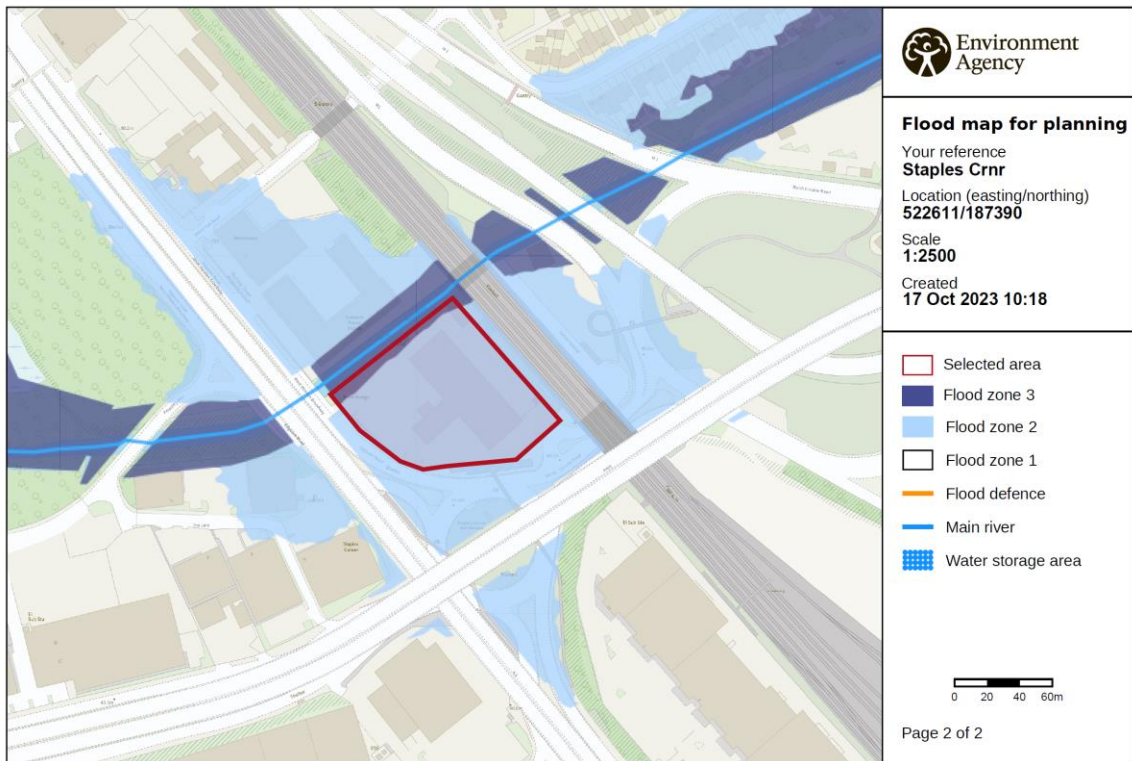
- The FFL of the building will be set at 40.26mAOD (minimum) protecting the building from flooding.
- Attenuation and flow rate restriction should be considered for the proposed surface water drainage to achieve a significant reduction on the existing runoff rates. Refer to Evolve Drainage Strategy for further details.
- The proposals satisfy relevant national and local policy.
- A no build zone area (easement) of 8m from the river has been established, where a small portion of the site sits in flood zone 3a.
- An additional 31m³ of flood storage would be achieved with an average flood level of 39.85m AOD.
- Based on the calculations for the average flood plain level resulting in net benefit to the site, it is concluded that the proposed development of the design will not adversely impact flooding on or offsite.

The Flood Risk Assessment demonstrates that the Proposed Development would be safe, without increasing flood risk elsewhere, and that a positive reduction in flood risk would be achieved through the inclusion of surface water attenuation in accordance with national policy.

Appendix A – Site Plan



Appendix B – Flood Risk Mapping



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Flood risk

Extent of flooding

Location

Enter a place or postcode

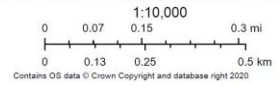


West London SFRA



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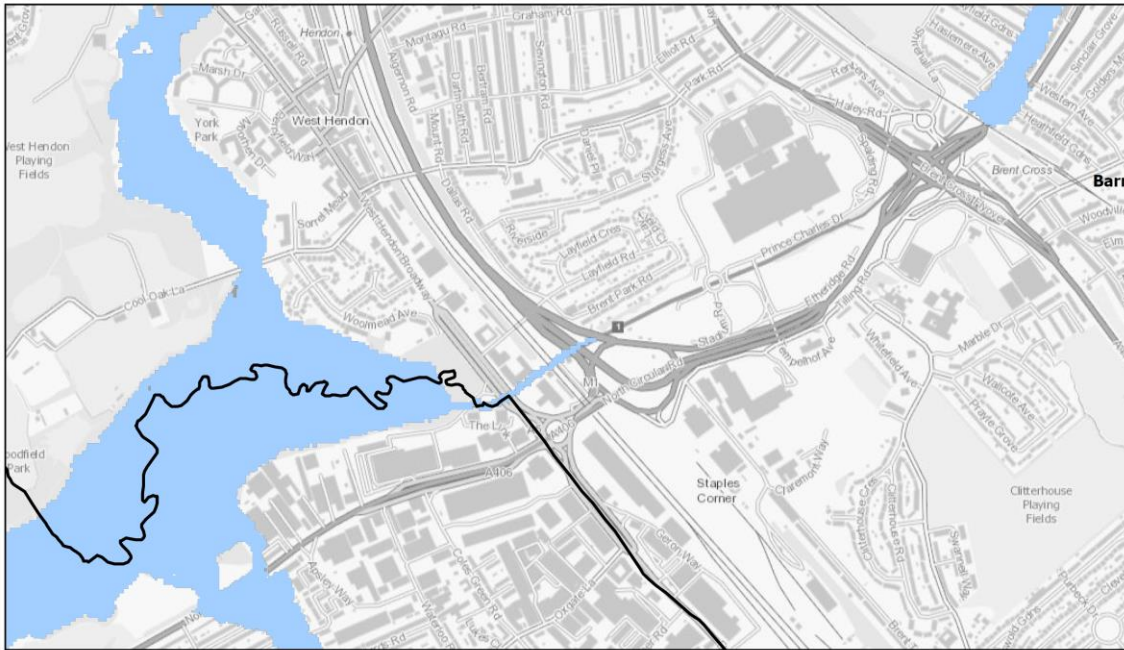
- Borough Boundary
- Study Area Boundary
- EA 2017 - Susceptibility to Groundwater Flooding**
- < 25%
- >= 25% < 50%



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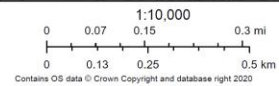
London Boroughs of Brent, Barnet, Harrow, Hillingdon, Hounslow and Ealing

West London SFRA



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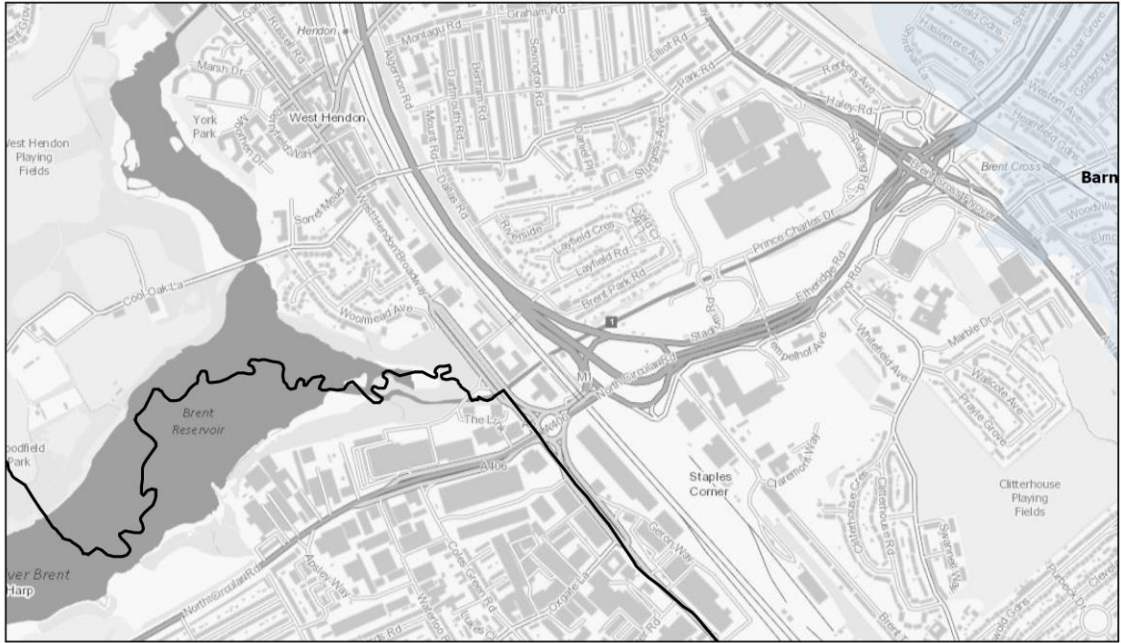
- Borough Boundary
- Study Area Boundary
- Maximum extent of flooding
- Risk_of Flooding_from Reservoirs_Maximum Flood Extent**



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London Boroughs of Brent, Barnet, Harrow, Hillingdon, Hounslow and Ealing

West London SFRA



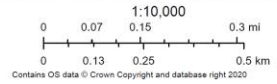
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Borough Boundary

Study Area Boundary

Thames Water 2017 - Sewer Flooding Records (No. of Instances)

1 - 20



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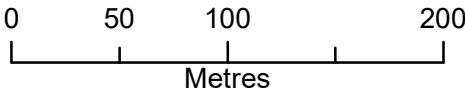
London Boroughs of Brent, Barnet, Harrow, Hillingdon, Hounslow and Ealing

Appendix C – EA Flooding Data

Detailed FRA centred on: Staples Corner, London, NW2 1LY - 13/10/2023 - HNL 328978 BF



Environment Agency
 Alchemy,
 Bessemer Road,
 Welwyn Garden City,
 Hertfordshire,
 AL7 1HE



Legend

- Statutory Main Rivers
- Site location

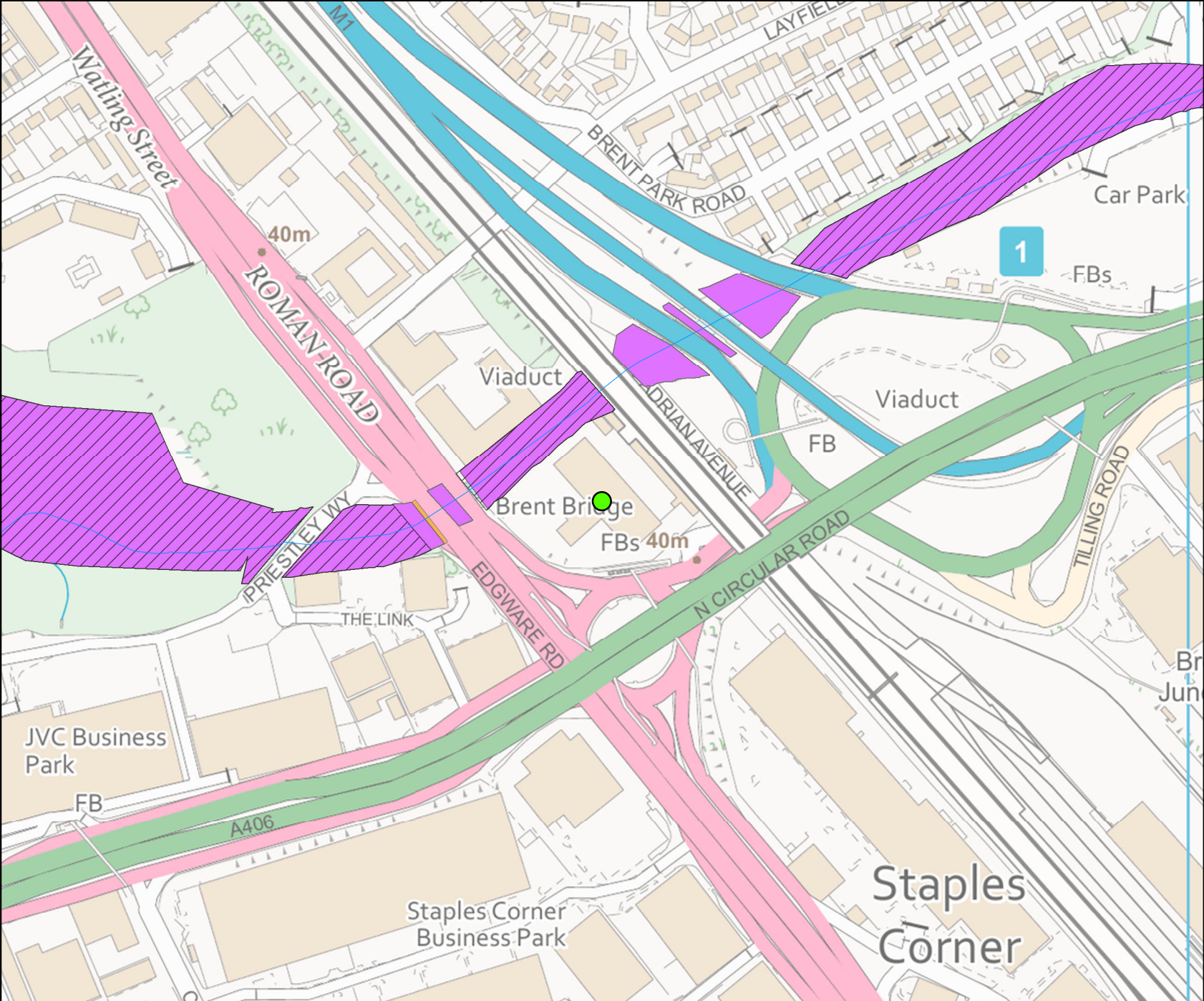
Defended Flood Outlines

- 1 in 5 (20%) Defended
- 1 in 10 (10%) Defended
- 1 in 20 (5%) Defended

The data in this map has been extracted from the Brent Model Update Study (JBA, 2014). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

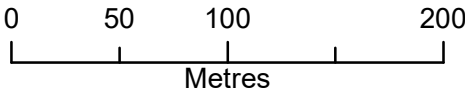
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Detailed FRA centred on: Staples Corner, London, NW2 1LY - 13/10/2023 - HNL 328978 BF



Environment Agency
 Alchemy,
 Bessemer Road,
 Welwyn Garden City,
 Hertfordshire,
 AL7 1HE



Legend

- Statutory Main Rivers
- Site location

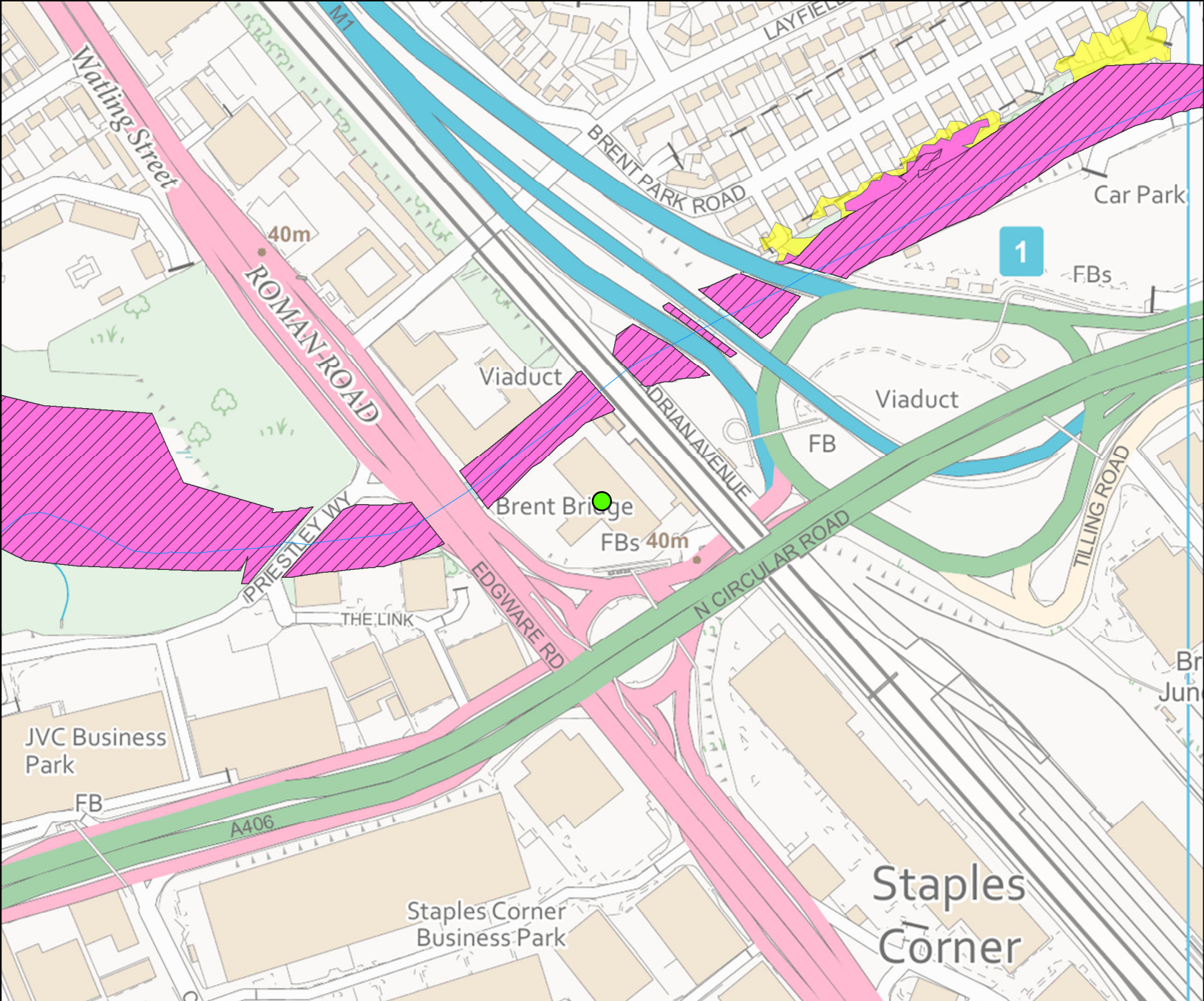
Defended Flood Outlines

- 1 in 50 (2%) Defended
- 1 in 70 (1.4%) Defended
- 1 in 100 (1%) Defended

The data in this map has been extracted from the Brent Model Update Study (JBA, 2014). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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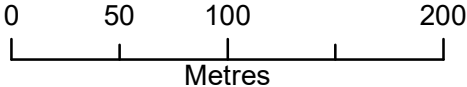


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Detailed FRA centred on: Staples Corner, London, NW2 1LY - 13/10/2023 - HNL 328978 BF



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 Hertfordshire,
 AL7 1HE



Legend

- Statutory Main Rivers
- Site location

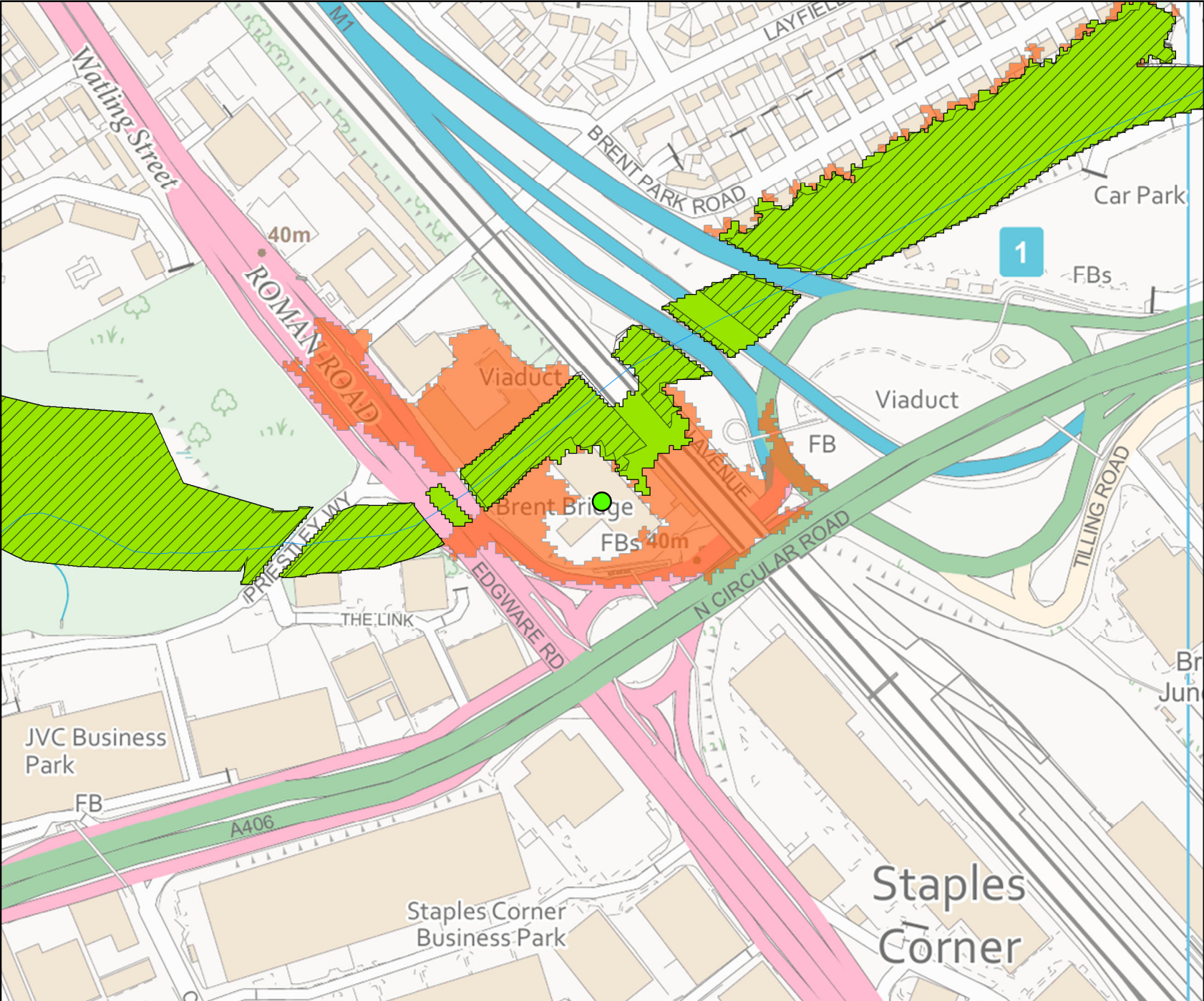
Defended Flood Outlines

- 1 in 100+20% (*CC) Defended
- 1 in 100+25% (*CC) Defended
- 1 in 100+35% (*CC) Defended

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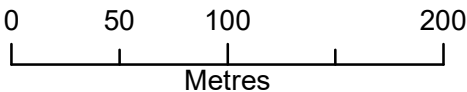


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Legend

- Statutory Main Rivers
- Site location

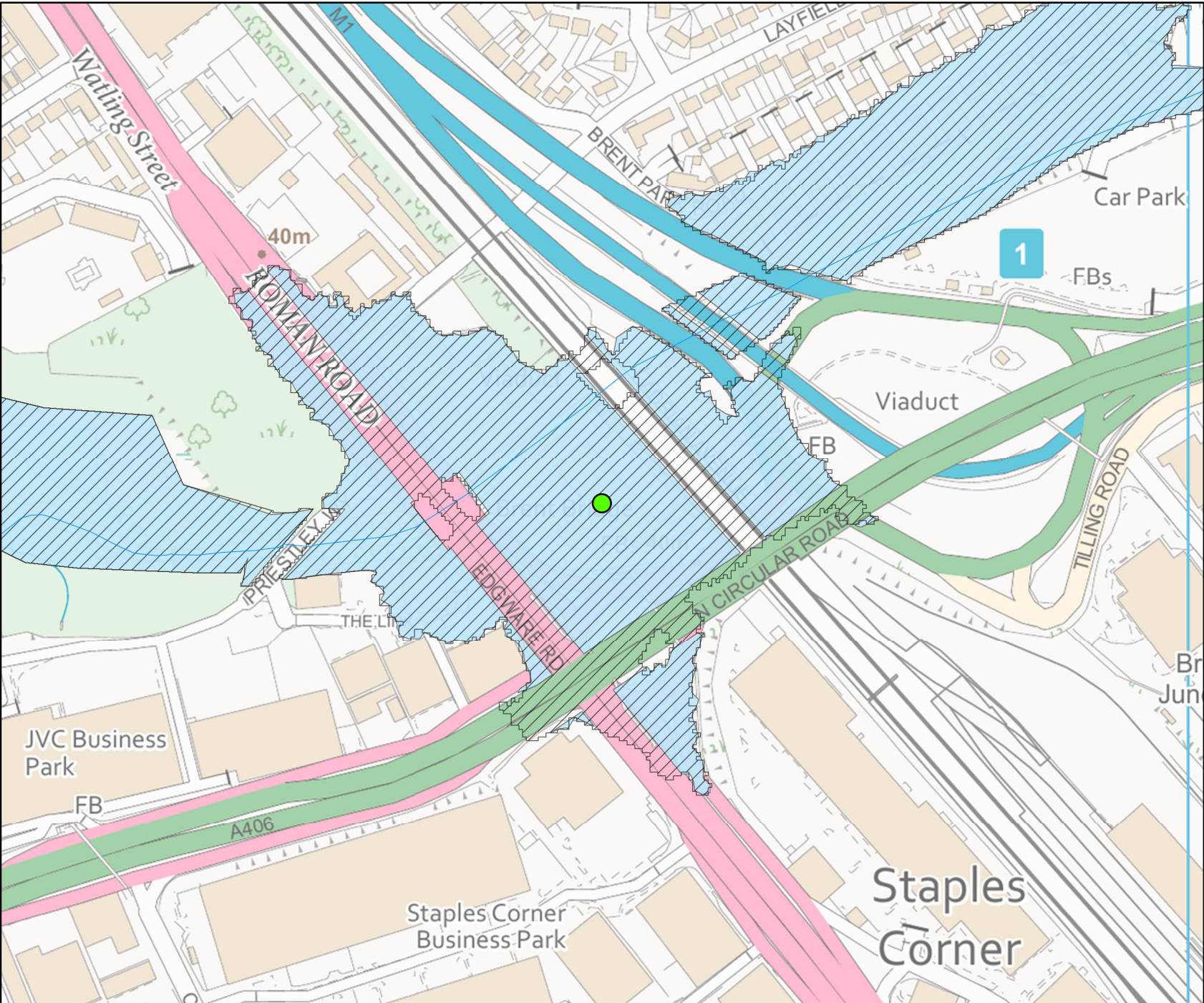
Defended Flood Outlines

- 1 in 100+70% (*CC) Defended
- 1 in 1000 (0.1%) Defended

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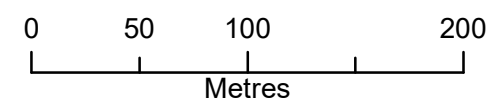


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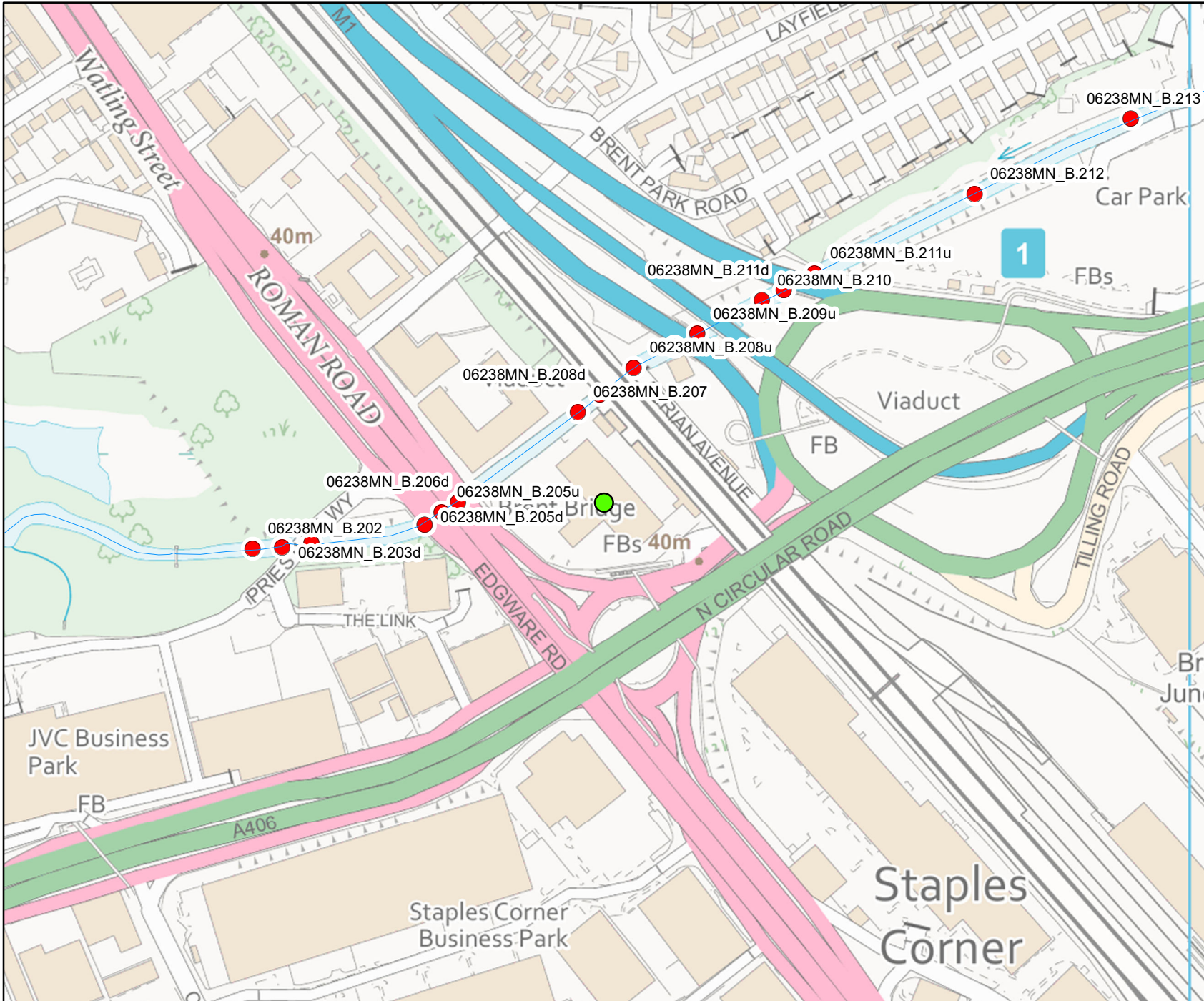
Legend

- Statutory Main Rivers
- Site location
- 1D Node Results**
- Node Results

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Environment Agency ref: HNL 328978 BF

The following information has been extracted from the Brent Model Update Study (JBA, 2014).

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Caution:

This model has been used to define flood outlines on the River Brent and specified tributaries at a catchment wide scale. Before it is used for any other purpose (e.g. flood warning, flood defence scheme design, flood risk assessment), it is recommended that a review of the hydrological and hydraulic models be undertaken to ensure they are adaptable for the proposed use.

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

MODELLED FLOOD LEVEL

Node Label	Easting	Northing	Return Period													
			5 yr	10 yr	20 yr	30 yr	50 yr	70 yr	75 yr	100 yr	100 yr + 20%	100 yr + 25%	100 yr + 35%	100 yr + 70%	250 yr	1000 yr
06238MN_B.214d	523016	187652	38.57	38.95	39.26	39.40	39.63	39.72	39.75	39.89	40.24	40.48	40.63	41.07	40.34	40.93
06238MN_B.213	522962	187631	38.53	38.91	39.22	39.36	39.61	39.71	39.75	39.90	40.27	40.36	40.51	40.92	40.37	40.97
06238MN_B.212	522861	187582	38.48	38.88	39.19	39.33	39.57	39.67	39.70	39.85	40.22	40.32	40.47	40.89	40.33	40.94
06238MN_B.211u	522757	187531	38.48	38.88	39.19	39.33	39.57	39.67	39.70	39.84	40.21	40.31	40.46	40.87	40.32	40.92
06238MN_B.210	522723	187513	38.50	38.78	39.05	39.18	39.41	39.49	39.53	39.65	39.99	40.08	40.24	40.59	40.09	40.59
06238MN_B.211d	522737	187520	38.47	38.82	39.11	39.25	39.48	39.58	39.61	39.74	40.09	40.08	40.24	40.59	40.19	40.72
06238MN_B.209d	522666	187483	38.49	38.78	39.05	39.18	39.41	39.49	39.52	39.65	39.98	40.07	40.23	40.58	40.08	40.58
06238MN_B.209u	522681	187492	38.49	38.78	39.05	39.18	39.41	39.49	39.52	39.65	39.98	40.07	40.23	40.58	40.08	40.58
06238MN_B.208u	522640	187470	38.51	38.75	39.00	39.13	39.34	39.42	39.45	39.56	39.96	40.08	40.27	40.66	40.09	40.68
06238MN_B.207	522604	187441	38.55	38.71	38.96	39.08	39.29	39.36	39.39	39.50	39.79	39.88	40.10	40.55	39.89	40.56
06238MN_B.208d	522618	187452	38.51	38.75	39.00	39.13	39.34	39.42	39.45	39.56	39.96	39.88	40.10	40.55	40.09	40.68
06238MN_B.206d	522526	187383	38.62	38.62	38.82	38.94	39.13	39.18	39.20	39.28	39.48	39.92	40.11	40.62	39.55	40.32
06238MN_B.206u	522536	187390	38.61	38.71	38.96	39.09	39.30	39.37	39.40	39.52	39.83	39.92	40.11	40.62	39.93	40.64
06238MN_B.205d	522505	187368	38.83	38.83	38.83	38.83	38.96	38.99	39.01	39.06	39.20	39.56	39.70	40.28	39.25	39.89
06238MN_B.205u	522515	187376	38.78	38.78	38.82	38.94	39.13	39.18	39.20	39.28	39.49	39.56	39.70	40.28	39.56	40.27
06238MN_B.203u	522431	187356	38.09	38.56	38.71	38.82	38.99	39.02	39.04	39.10	39.24	39.28	39.39	39.92	39.28	39.86
06238MN_B.202	522393	187353	38.01	38.49	38.57	38.68	38.80	38.81	38.82	38.84	38.90	38.92	39.02	39.53	38.91	39.39
06238MN_B.203d	522412	187354	38.02	38.49	38.59	38.69	38.82	38.84	38.84	38.87	38.94	38.92	39.02	39.53	38.96	39.43

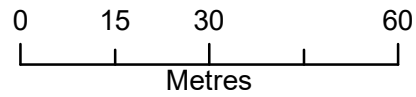
MODELLED FLOW

Node Label	Easting	Northing	Return Period													
			5 yr	10 yr	20 yr	30 yr	50 yr	70 yr	75 yr	100 yr	100 yr + 20%	100 + 25%	100 yr + 35%	100 yr + 70%	250 yr	1000 yr
06238MN_B.214d	523016	187652	24.39	30.55	37.44	40.99	46.19	50.50	51.36	55.36	65.85	68.46	73.69	90.89	68.88	96.51
06238MN_B.213	522962	187631	24.38	30.52	37.42	40.96	46.14	50.43	51.29	54.99	65.13	67.80	73.08	91.21	68.19	96.66
06238MN_B.212	522861	187582	24.36	30.46	37.36	40.89	46.03	50.30	51.15	54.74	64.52	67.00	71.69	86.28	67.35	90.96
06238MN_B.211u	522757	187531	24.34	30.40	37.31	40.82	45.93	50.18	50.98	54.64	65.62	68.34	73.41	90.22	68.80	95.78
06238MN_B.210	522723	187513	24.33	30.39	37.31	40.81	45.92	50.16	50.97	54.63	65.63	68.33	73.40	90.21	68.80	95.78
06238MN_B.211d	522737	187520	24.34	30.40	37.31	40.82	45.93	50.18	50.98	54.64	65.62	68.33	73.40	90.21	68.80	95.78
06238MN_B.209d	522666	187483	24.33	30.37	37.29	40.80	45.89	50.14	50.94	54.60	65.63	68.33	73.40	90.19	68.79	95.76
06238MN_B.209u	522681	187492	24.33	30.37	37.29	40.80	45.89	50.14	50.94	54.60	65.63	68.33	73.40	90.19	68.79	95.76
06238MN_B.208u	522640	187470	24.32	30.36	37.29	40.79	45.88	50.12	50.93	54.59	65.50	67.55	70.39	80.80	67.83	85.22
06238MN_B.207	522604	187441	24.32	30.35	37.28	40.78	45.87	50.11	50.91	54.57	65.61	67.81	70.75	77.63	68.17	81.08
06238MN_B.208d	522618	187452	24.32	30.36	37.29	40.79	45.88	50.12	50.93	54.59	65.50	67.81	70.75	77.63	67.83	85.22
06238MN_B.206d	522526	187383	24.30	30.31	37.26	40.75	45.83	50.07	50.86	54.52	65.62	68.27	72.53	75.59	68.72	77.16
06238MN_B.206u	522536	187390	24.30	30.31	37.26	40.75	45.83	50.07	50.86	54.52	65.62	68.27	72.53	75.59	68.72	77.16
06238MN_B.205d	522505	187368	24.30	30.30	37.25	40.74	45.82	50.05	50.85	54.51	65.62	68.27	72.58	77.96	68.71	79.87
06238MN_B.205u	522515	187376	24.30	30.30	37.25	40.74	45.82	50.05	50.85	54.51	65.62	68.27	72.58	77.96	68.71	79.87
06238MN_B.203u	522431	187356	33.94	33.94	37.22	40.70	45.76	49.99	50.78	54.47	65.62	68.27	72.65	88.74	68.71	94.35
06238MN_B.202	522393	187353	34.24	34.24	37.21	40.68	45.74	49.97	50.75	54.47	65.62	68.27	72.64	88.72	68.71	94.32
06238MN_B.203d	522412	187354	33.94	33.94	37.22	40.70	45.76	49.99	50.78	54.47	65.62	68.27	72.64	88.72	68.71	94.35

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Legend

- Statutory Main Rivers
- Site location

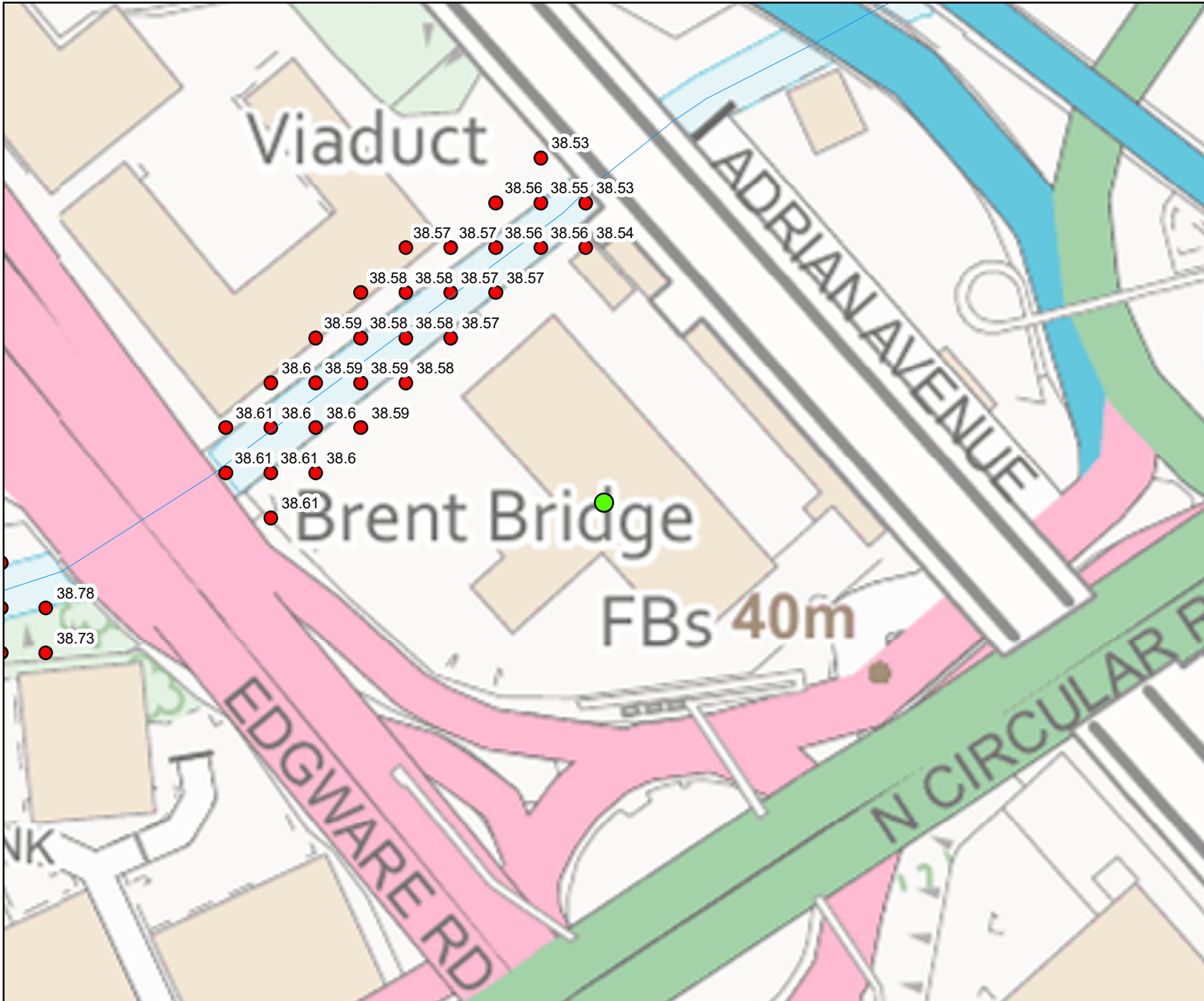
2D Node Results: Heights

- 1 in 5 (20%) Defended

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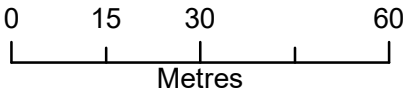


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Legend

- Statutory Main Rivers
- Site location

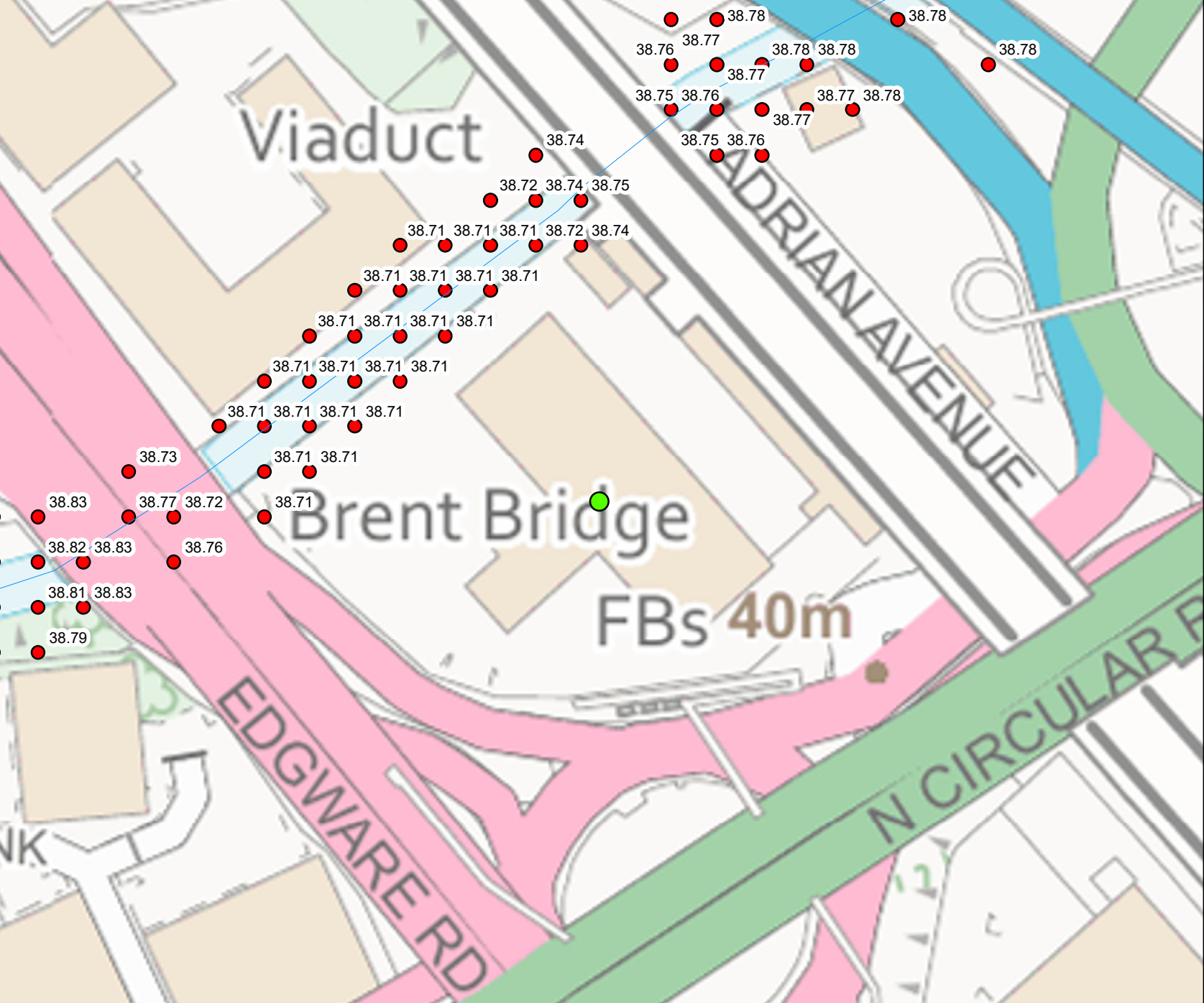
2D Node Results: Heights

- 1 in 10 (10%) Defended

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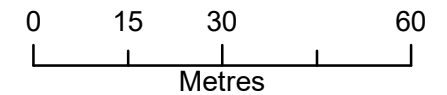


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Legend

Statutory Main Rivers

Site location

2D Node Results: Heights

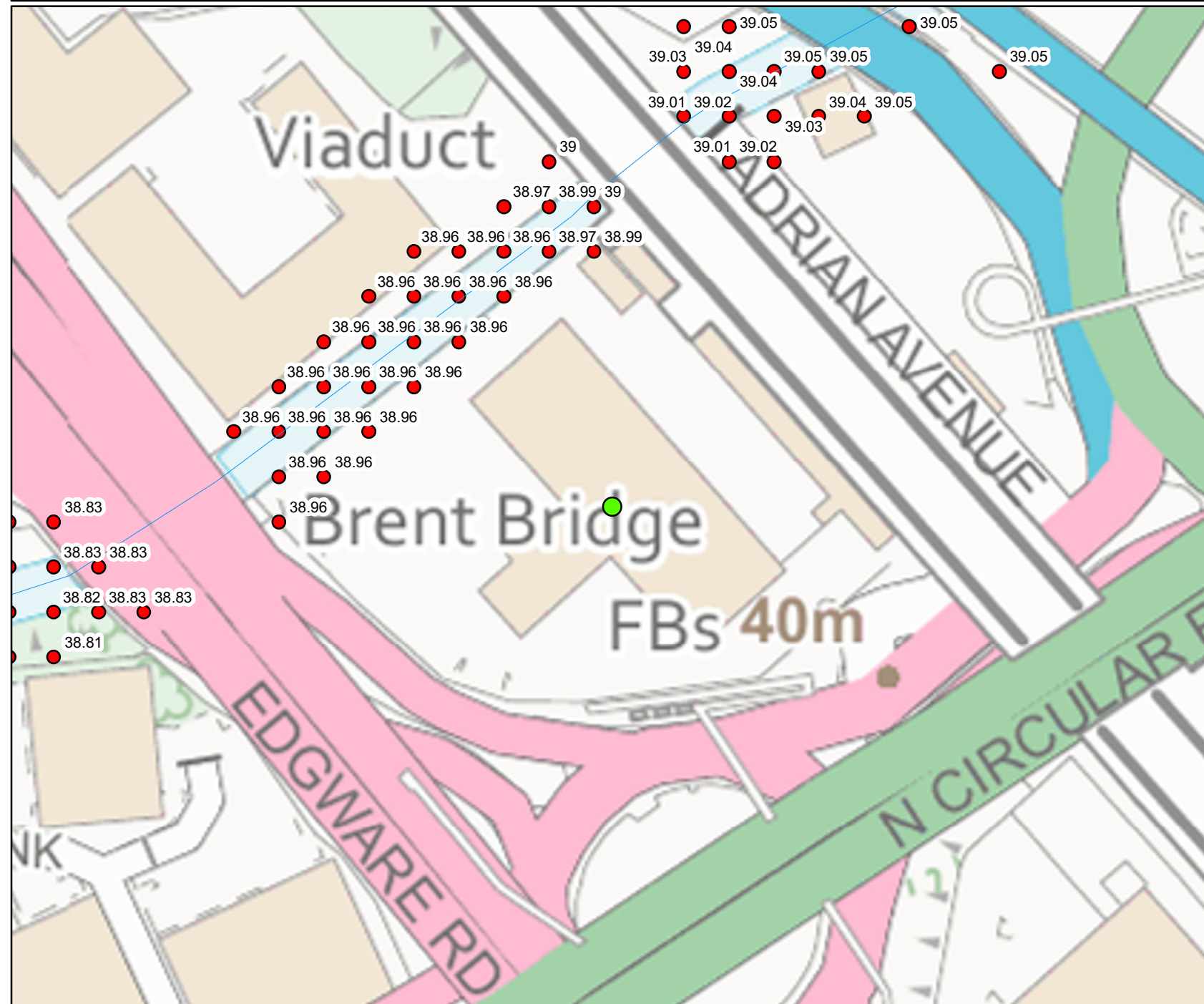
1 in 20 (5%) Defended

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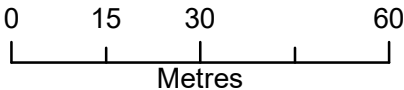
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Legend

- Statutory Main Rivers
- Site location

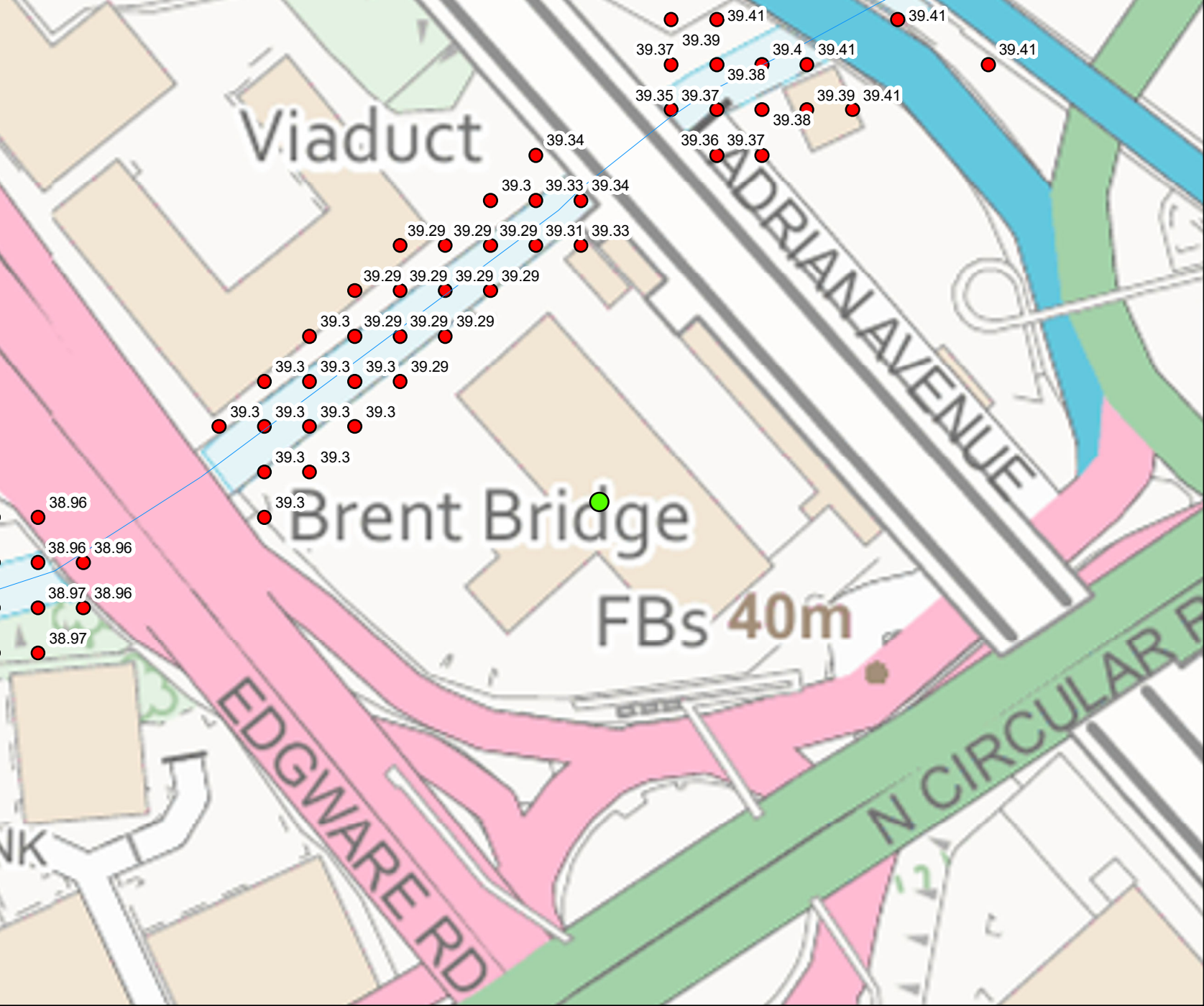
2D Node Results: Heights

- 1 in 50 (2%) Defended

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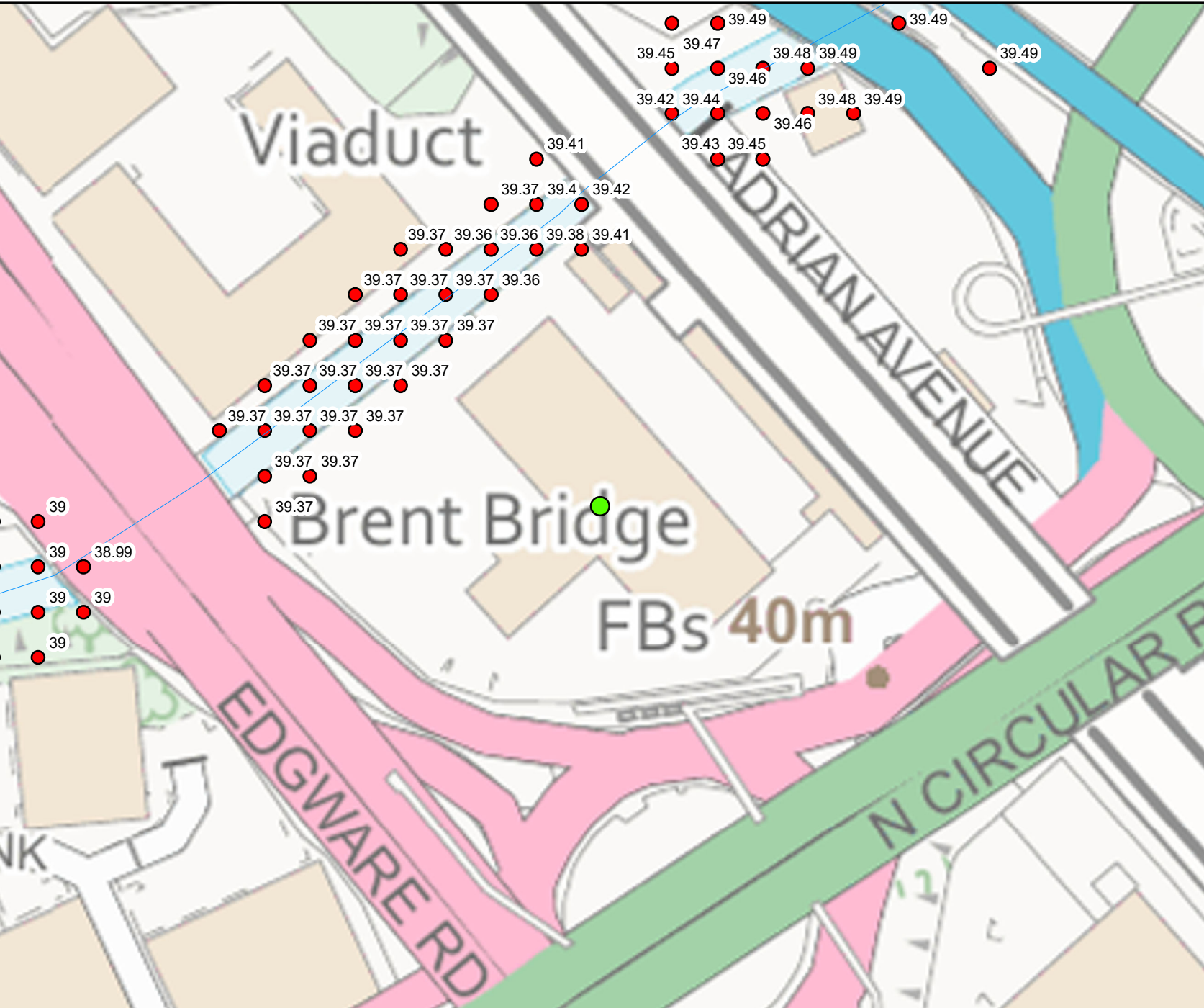
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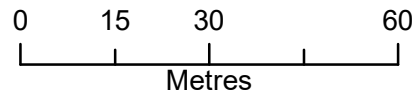


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Legend

- Statutory Main Rivers
- Site location

2D Node Results: Heights

- 1 in 70 (1.4%) Defended

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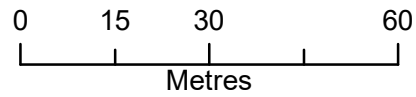
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Legend

- Statutory Main Rivers
- Site location

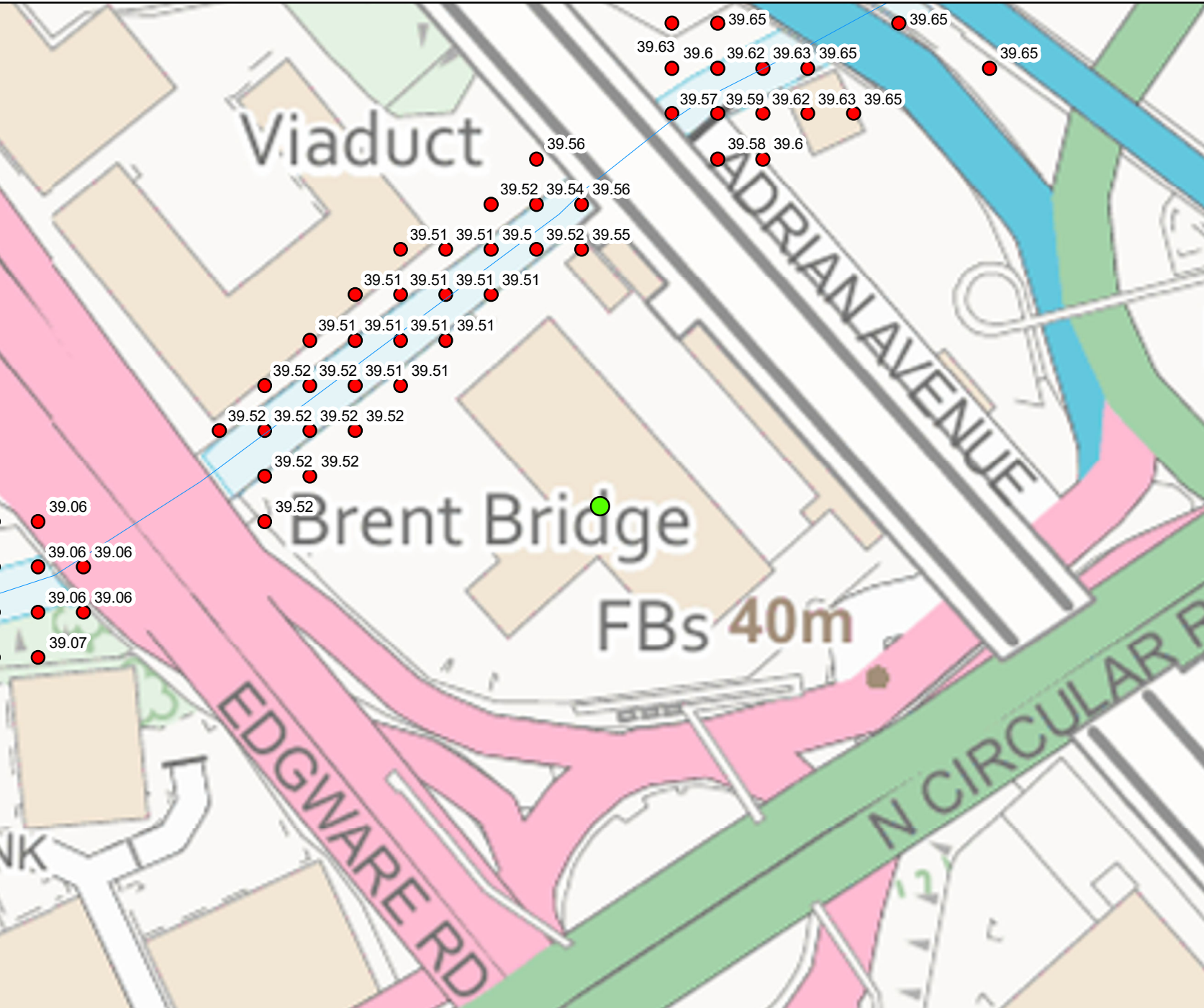
2D Node Results: Heights

- 1 in 100 (1%) Defended

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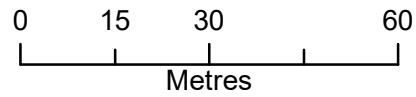


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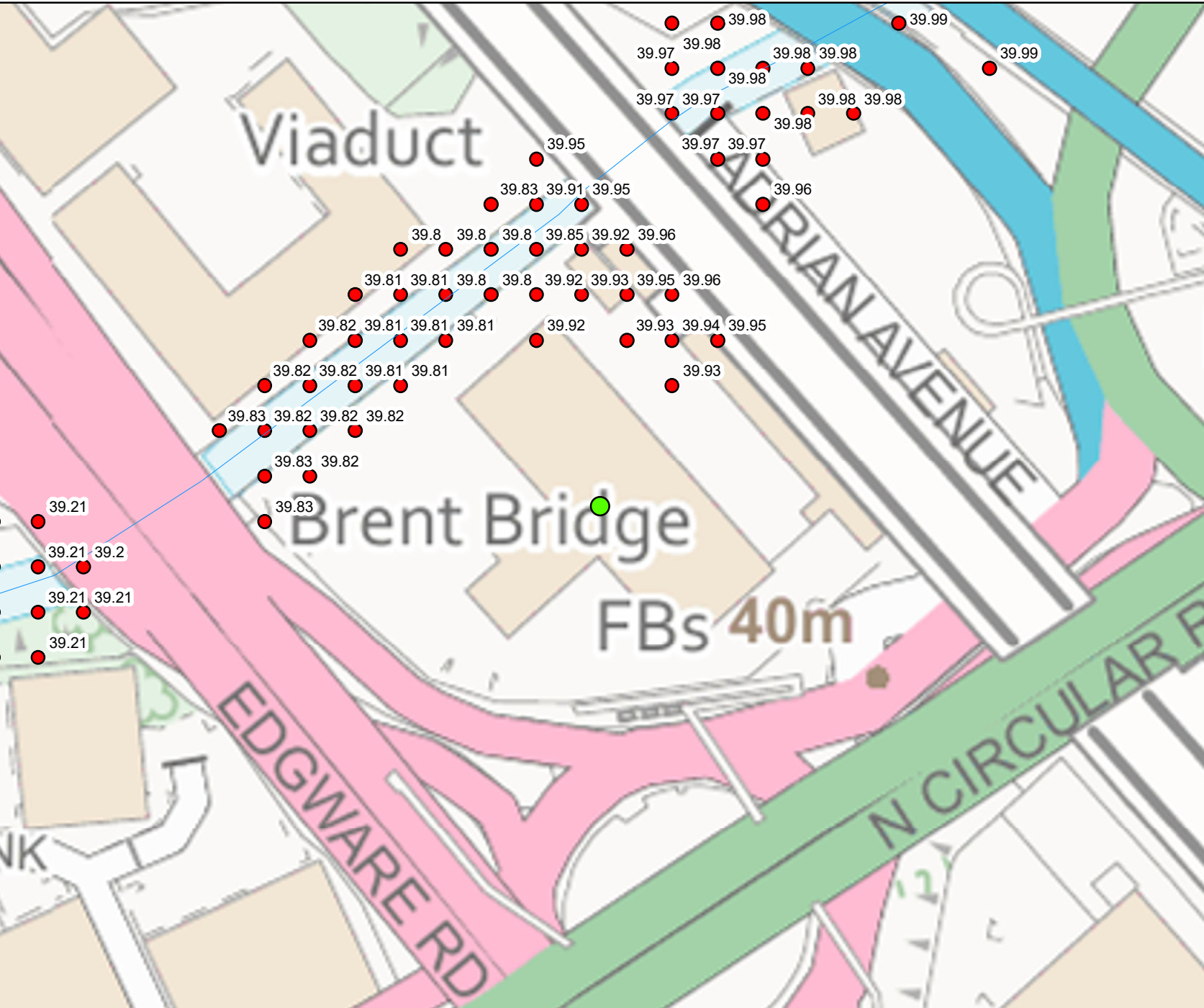
Legend

- Statutory Main Rivers
- Site location
- 2D Node Results: Heights**
- 1 in 100+20% (*CC) Defended

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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 Partnerships & Strategic Overview,
 Hertfordshire & North London

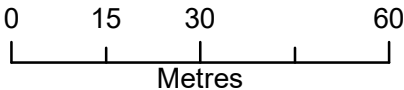


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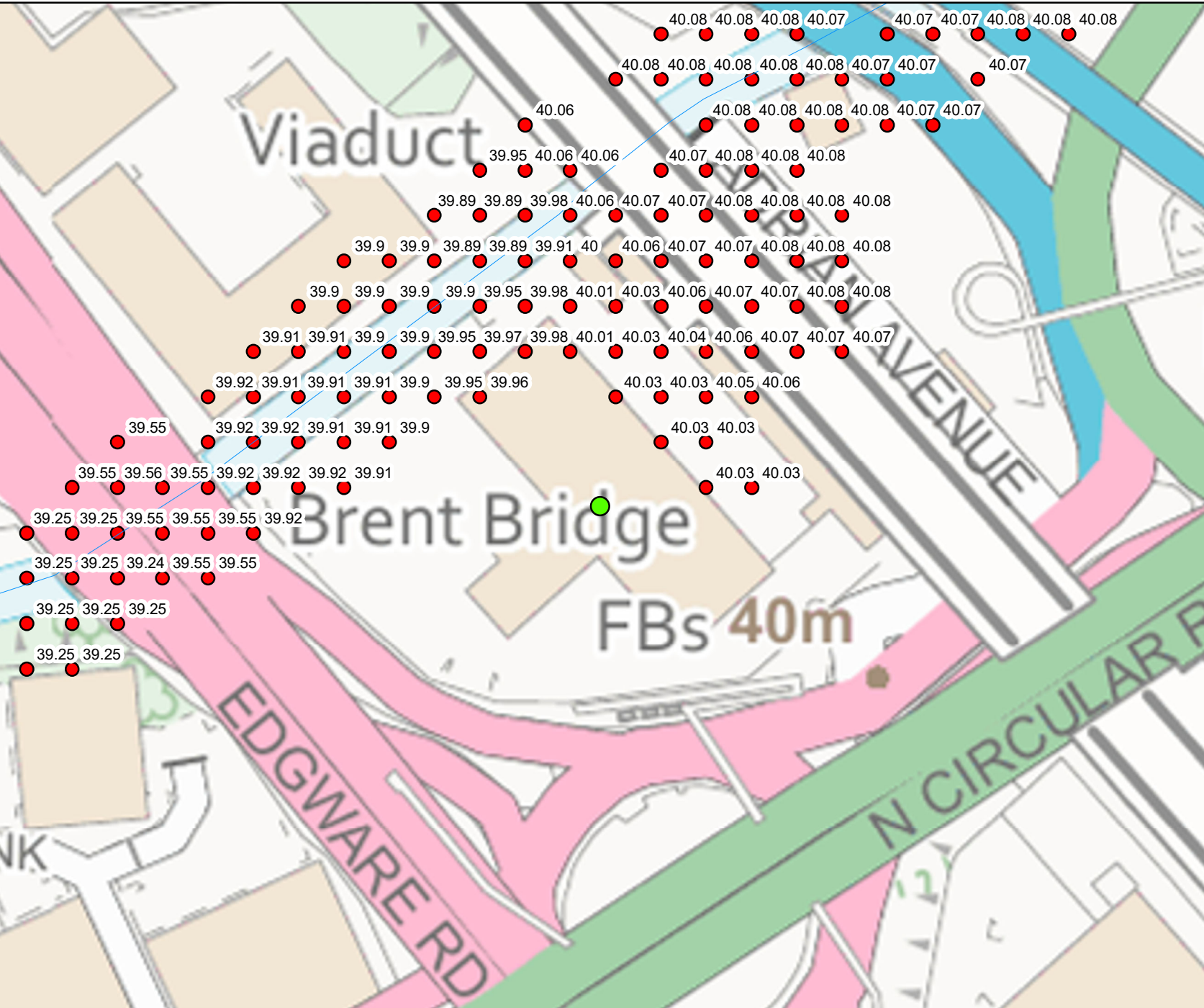
Legend

- Statutory Main Rivers
- Site location
- 2D Node Results: Heights**
- 1 in 100+25% (*CC) Defended

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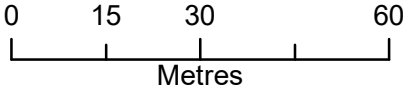


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 AL7 1HE



Legend

- Statutory Main Rivers
- Site location
- 1 in 100+35% (*CC) Defended

2D Node Results: Heights

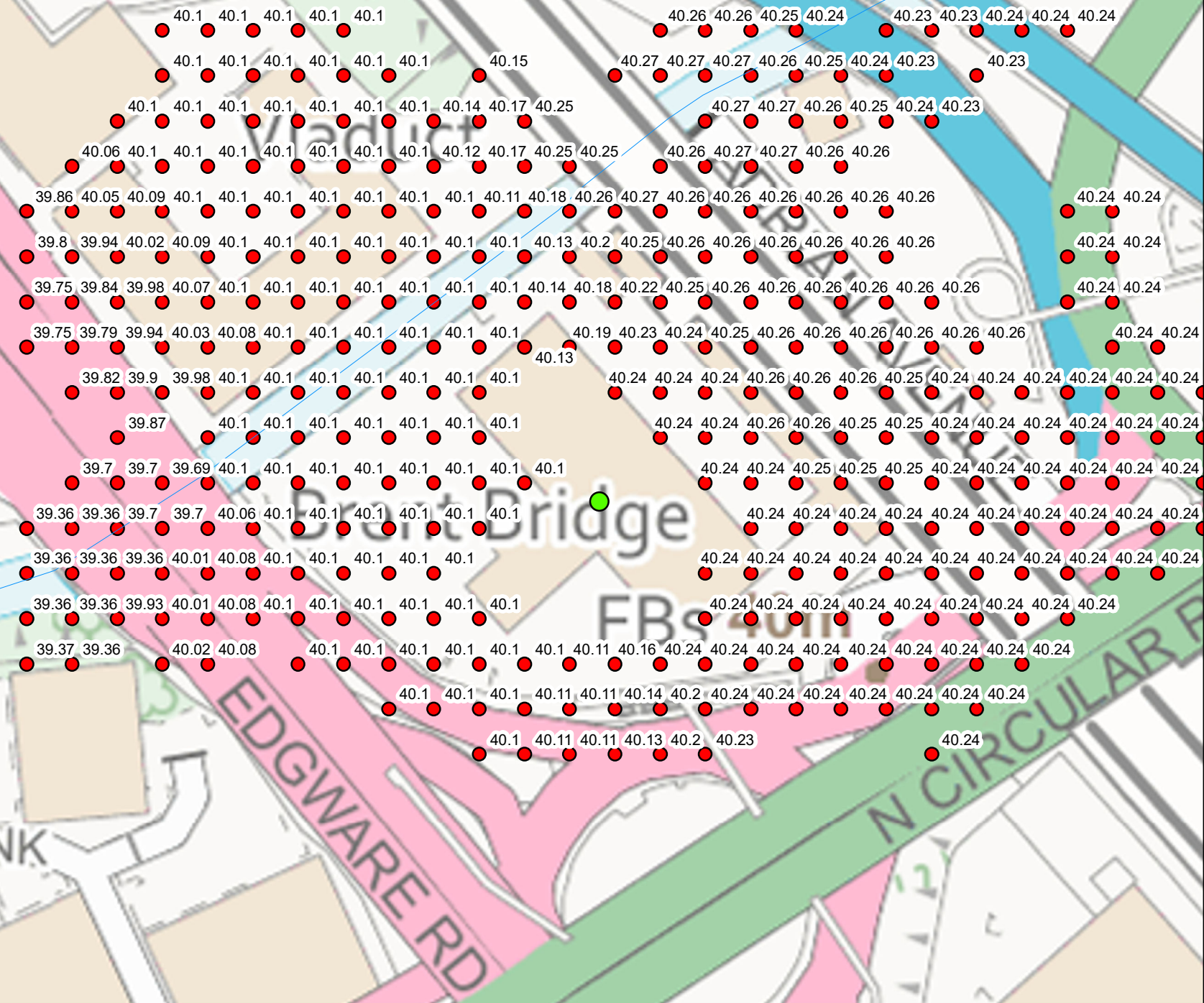
- 1 in 100+35% (*CC) Defended

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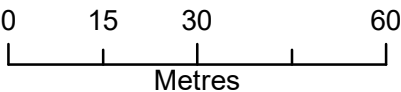


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Legend

- Statutory Main Rivers
- Site location

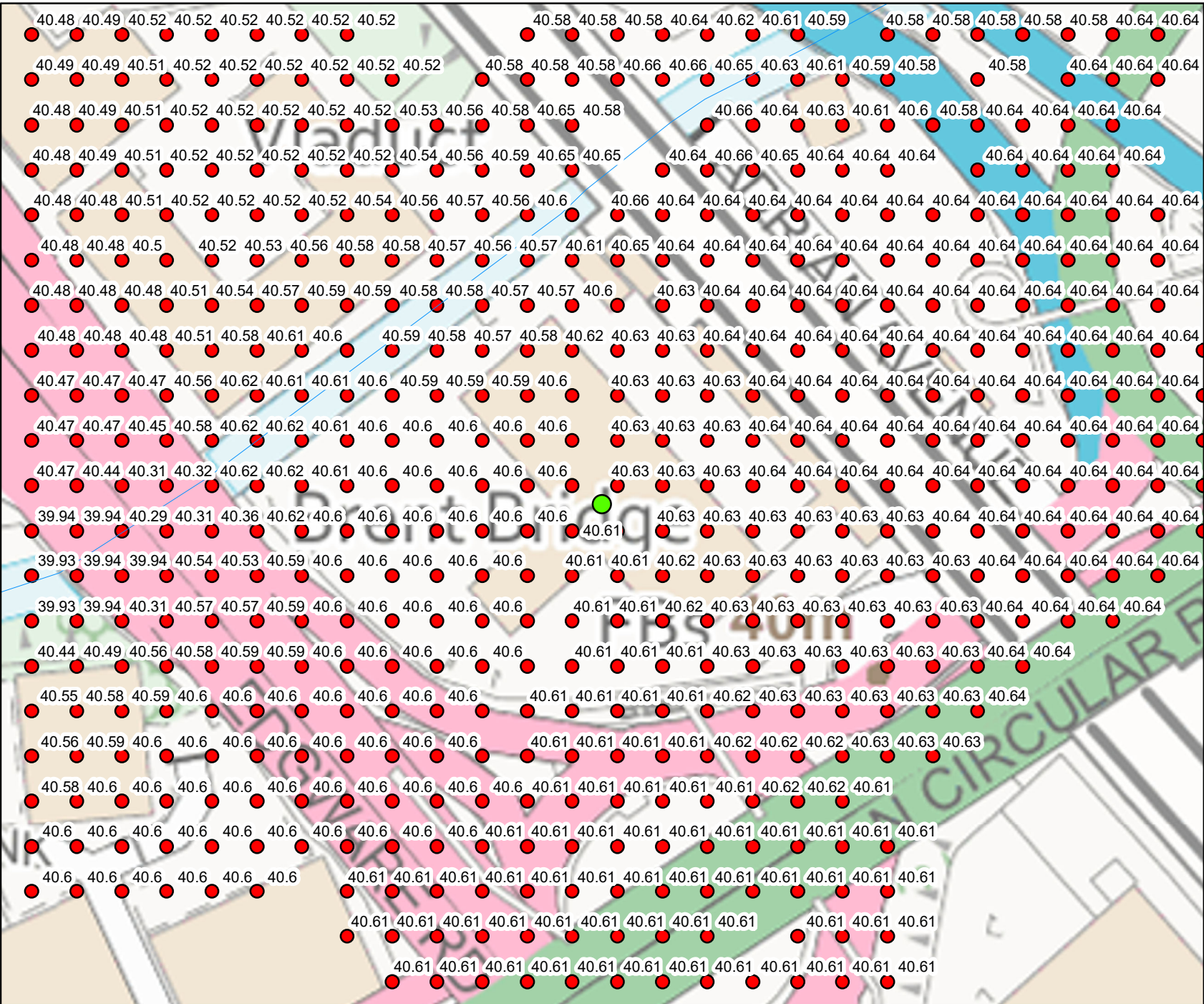
2D Node Results: Heights

- 1 in 100+70% (*CC) Defended

The data in this map has been extracted from the Brent Model Update Study (JBA, 2014). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

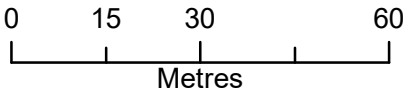
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Legend

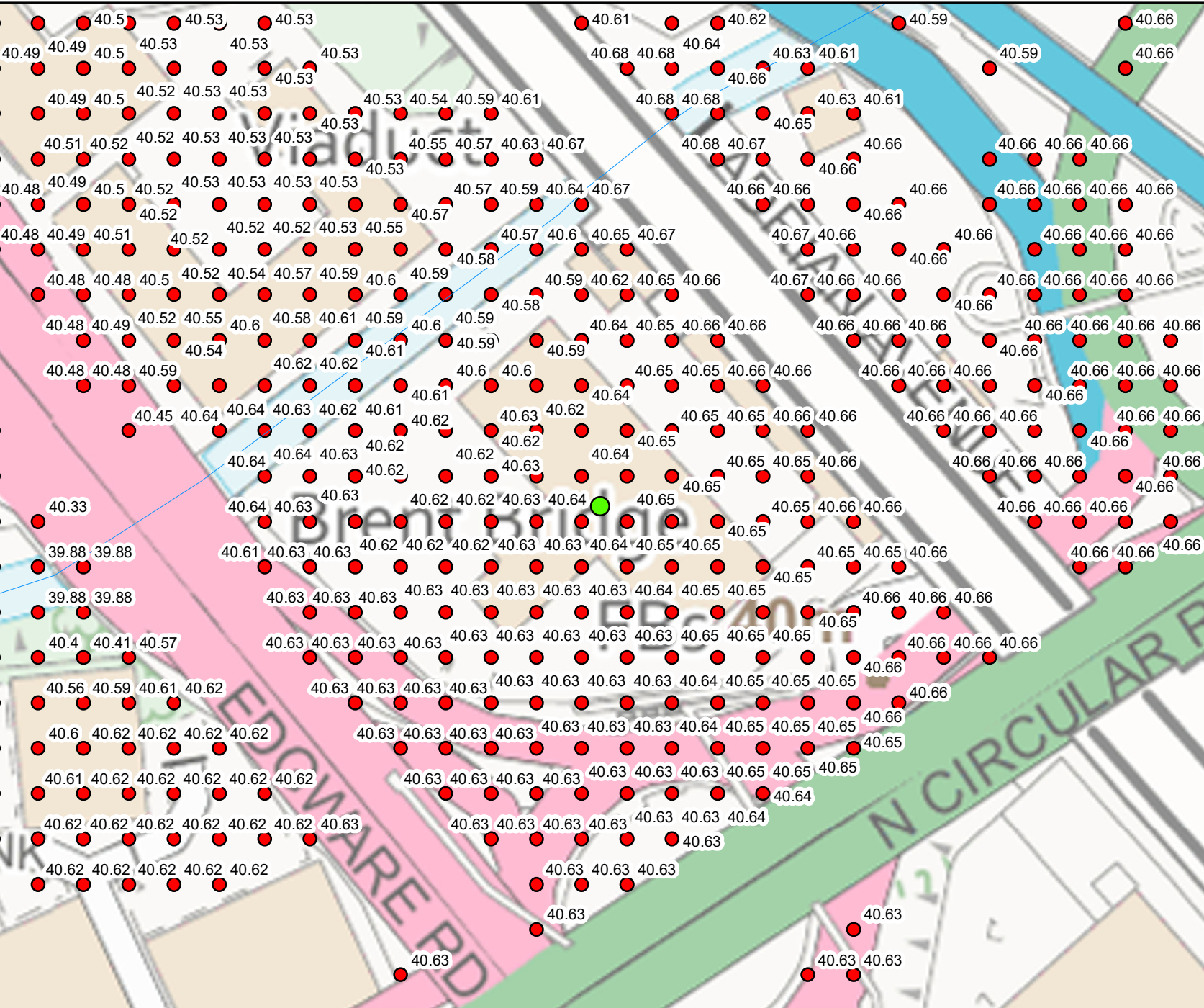
- Statutory Main Rivers
- Site location
- 2D Node Results: Heights**
- 1 in 1000 (0.1%) Defended

The data in this map has been extracted from the Brent Model Update Study (JBA, 2014). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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Appendix D – Flood Compensation Modelling

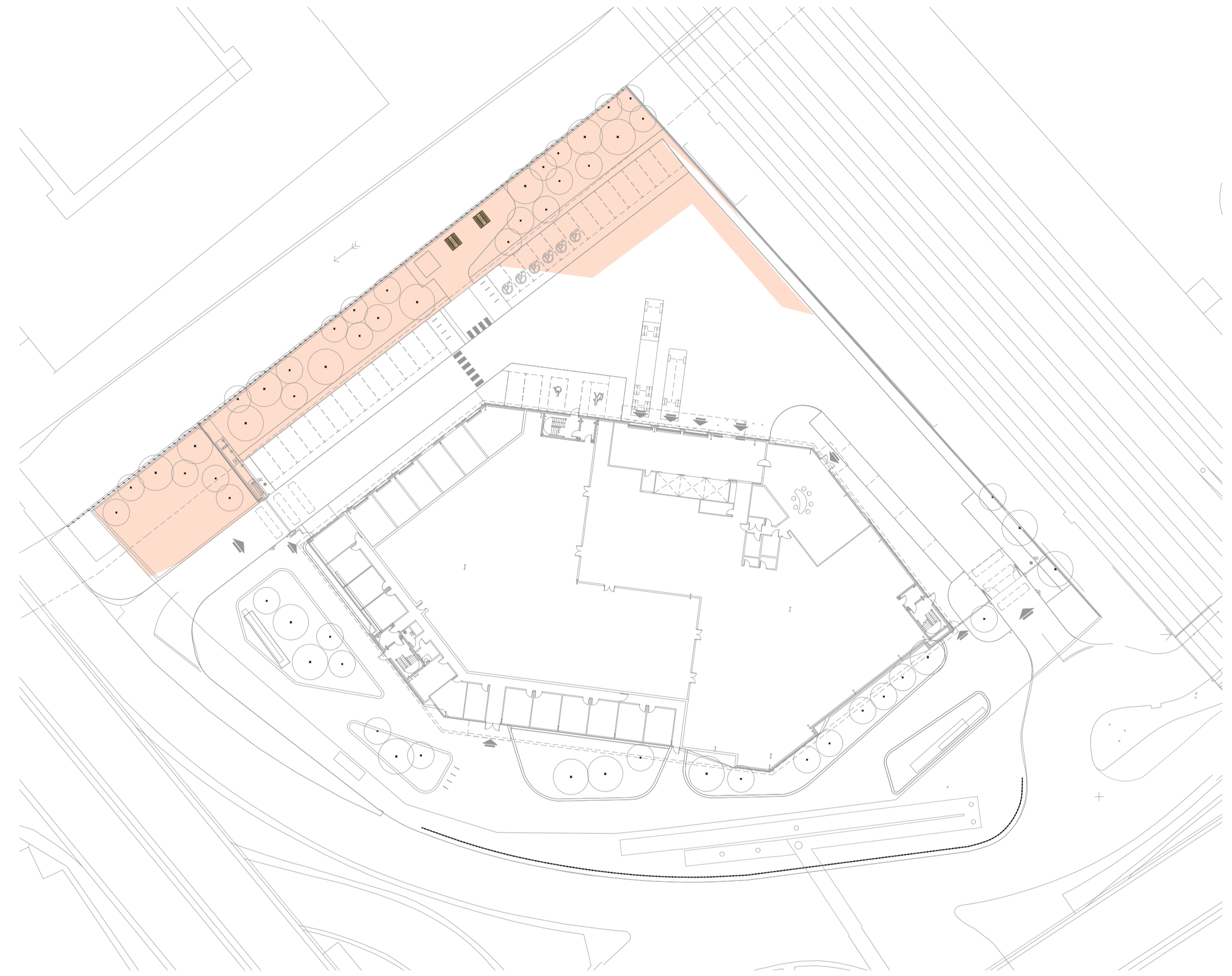
NOTES

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Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	--
Fill 0.2m - 0.4m	--	1.19m ³
Fill 0m - 0.2m	--	109.91m ³
Total Fill:		111.10m ³

EXISTING FLOODPLAIN @ 39.81m AOD
SCALE 1:500



Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	--
Fill 0.2m - 0.4m	--	--
Fill 0m - 0.2m	--	146.55m ³
Total Fill:		146.55m ³

PROPOSED FLOODPLAIN @ 39.81m AOD
SCALE 1:500

Rev	Date	Revision	By	Chk
P02	11.12.23	PROPOSED SITE LAYOUT UPDATED	PW	LG
P01	05.12.23	INCLUDED IN FRA	PW	LG

BIG YELLOW

Client
BIG YELLOW SELF STORAGE COMPANY LTD

Project
BIG YELLOW STAPLES CORNER

Drawing Title
FLOODPLAIN COMPENSATION MODELLING 39.81m AOD LEVEL

Drawn by PW	Checked by LG	Scale @ A1 1:500
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Drawing No. 3727-EVE-BY-XX-SK-C-0001	Revision P02
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London
EC1Y 0UL

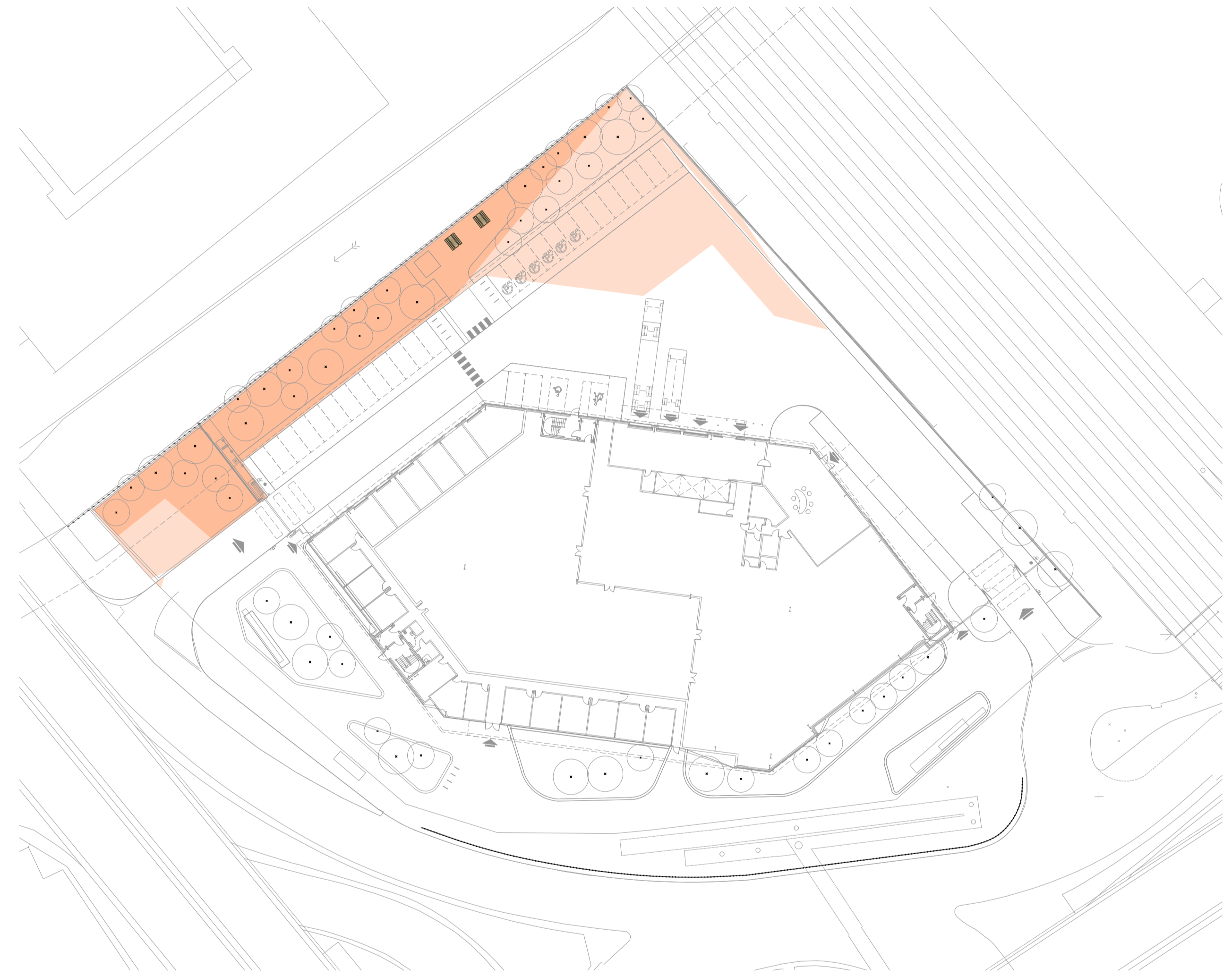
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Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	--
Fill 0.2m - 0.4m	--	4.24m ³
Fill 0m - 0.2m	--	161.82m ³
Total Fill:		166.06m ³

EXISTING FLOODPLAIN @ 39.85m AOD
 SCALE 1:500



Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	--
Fill 0.2m - 0.4m	--	--
Fill 0m - 0.2m	--	197.17m ³
Total Fill:		197.17m ³

PROPOSED FLOODPLAIN @ 39.85m AOD
 SCALE 1:500

Rev	Date	Revision	By	Chk
P02	11.12.23	PROPOSED SITE LAYOUT UPDATED	PW	LG
P01	05.12.23	INCLUDED IN FRA	PW	LG

BIG YELLOW

Client
BIG YELLOW SELF STORAGE COMPANY LTD

Project
BIG YELLOW STAPLES CORNER

Drawing Title
FLOODPLAIN COMPENSATION MODELLING 39.85m AOD LEVEL

Drawn by PW	Checked by LG	Scale @ A1 1:500
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Drawing No. 3727-EVE-BY-XX-SK-C-0002	Revision P01
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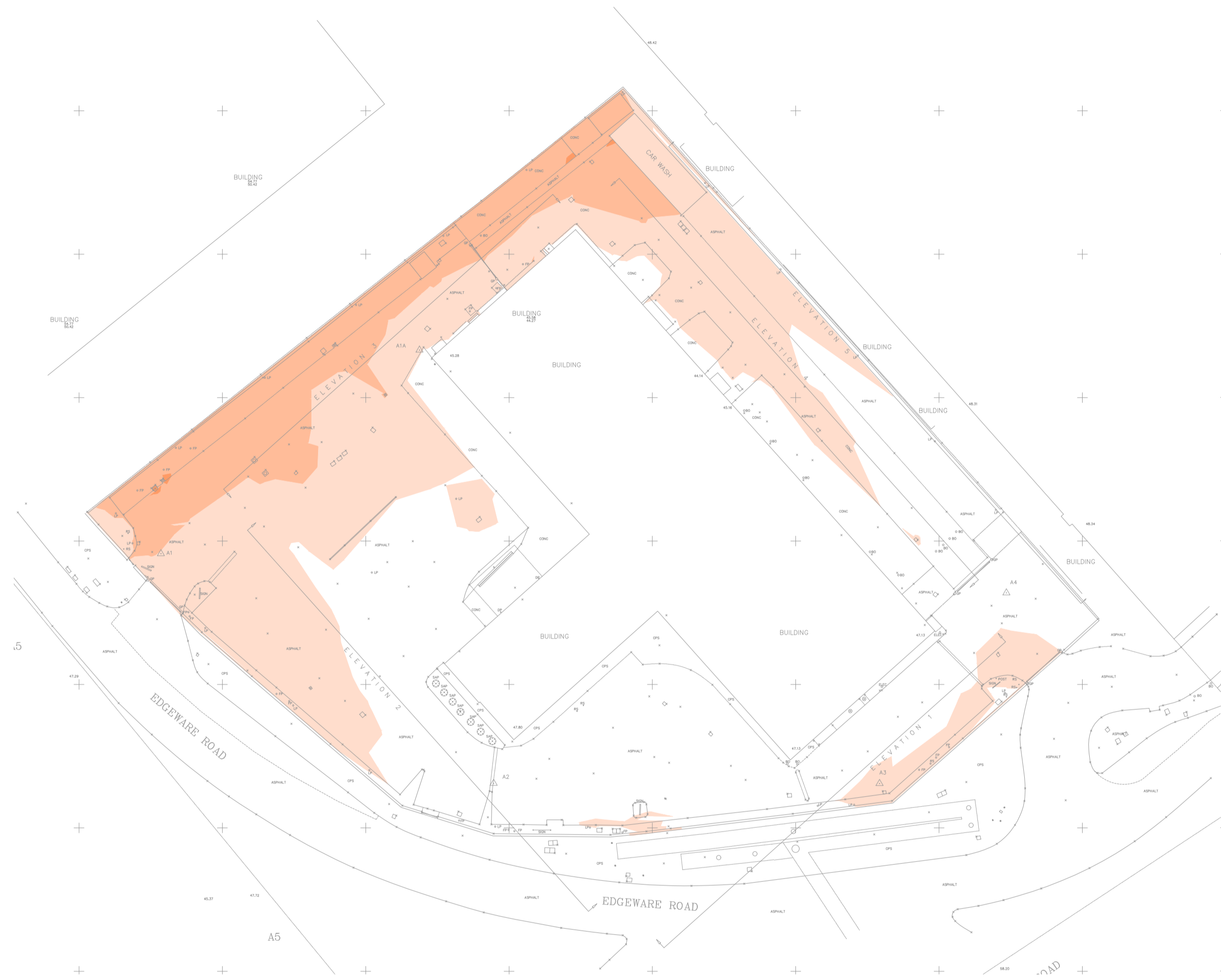
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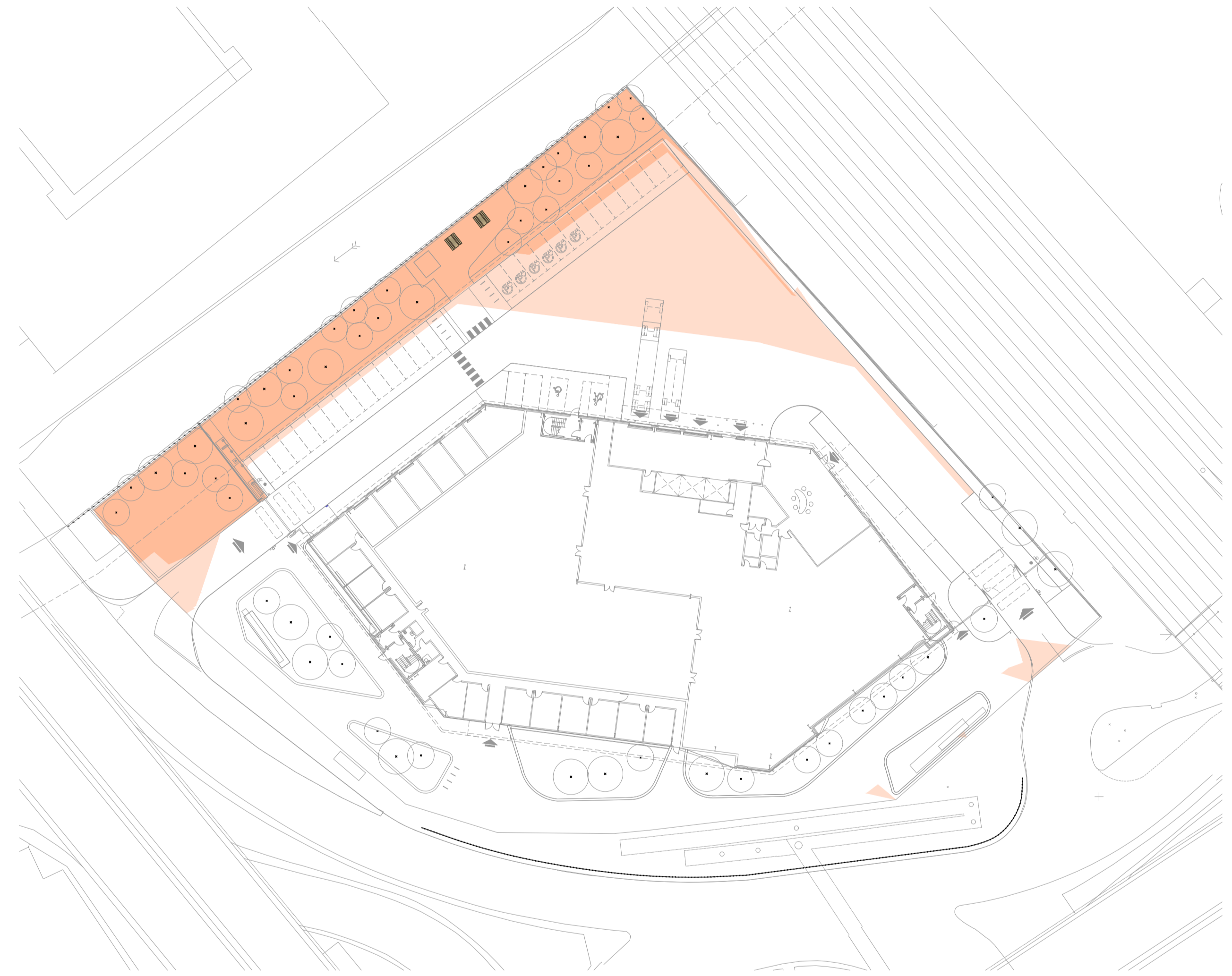
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Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	0.04m ³
Fill 0.2m - 0.4m	--	56.66m ³
Fill 0m - 0.2m	--	342.61m ³
Total Fill:		399.31m ³


EXISTING FLOODPLAIN @ 39.96m AOD
SCALE 1:500



Height Bands	Cut Volume	Fill Volume
Fill 0.8m - 1m	--	--
Fill 0.6m - 0.8m	--	--
Fill 0.4m - 0.6m	--	--
Fill 0.2m - 0.4m	--	92.83m ³
Fill 0m - 0.2m	--	273.09m ³
Total Fill:		365.92m ³

PROPOSED FLOODPLAIN @ 39.96m AOD
SCALE 1:500

Rev	Date	Revision	By	Chk
P02	11.12.23	PROPOSED SITE LAYOUT UPDATED	PW	LG
P01	05.12.23	INCLUDED IN FRA	PW	LG

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Client BIG YELLOW SELF STORAGE COMPANY LTD	
Project BIG YELLOW STAPLES CORNER	
Drawing Title FLOODPLAIN COMPENSATION MODELLING 39.96m AOD LEVEL	
Drawn by PW	Checked by LG
Scale @ A1 1:500	
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