



50 Fountain Street, Manchester

Flood Risk Assessment

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Rev: 01

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1.0 INTRODUCTION

1.1 Purpose of this report

This Site-Specific Flood Risk Assessment (FRA) has been prepared for the proposed development 50 Fountain Street, Manchester. The assessment investigates the potential flood risk impacts of the proposed development in accordance with the National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance.

This FRA is considered proportionate to the degree of flood risk and to the scale, nature and location of the development. This FRA has been prepared in accordance with non-statutory technical standards for sustainable drainage and NPPF climate change allowances.

2.0 THE SITE

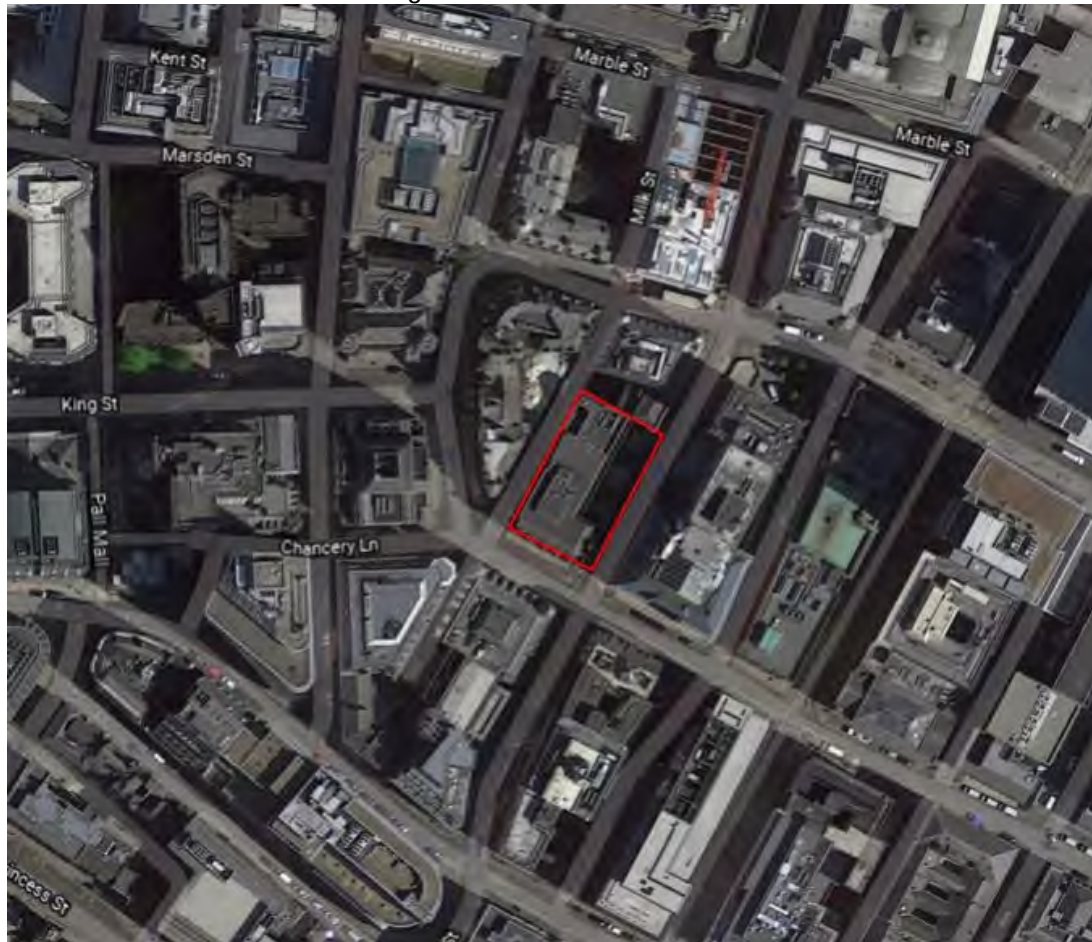
2.1 Site Location

The proposed development site is located at 50 Fountain Street, Manchester.

The site location is described below:

- Post Code M2 2AS
- OS X (Easting) 384069
- OS Y (Northing) 398225
- Nat. Grid SJ 84069 98225

The site location is illustrated in Figure 2.1 below.



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Figure 2.1: Site Location

2.1 Site Description

The site is circa 0.138 hectares and is currently used for office premises built from brick and stone construction. The building is 5 storeys in height and has a basement/semi-basement across the footprint ranging from 1.25m to 3.00m in depths which is used for car parking and houses an electricity substation. There are some trees present towards the south of the building, along Fountain Street.

The site is generally flat in level, as can be seen from the Topographical survey in Appendix A, however access to the building from Fountain Street is higher in level than the surrounding pavement.

The site is set within a largely commercial district with office buildings, banks and restaurants surrounding the site. All site boundaries are open, Concert Lane bounds the site to the north, Fountain Street to the south and Spring Gardens to the west. The eastern boundary is defined by the adjacent office buildings.

There are currently no access restrictions at the site. Access to the building can be obtained from Concert Lane to the north or Fountain Street to the south. No access can be gained from Spring Gardens to the west.

2.2 Existing Site Drainage

The existing site is 100% impermeable with associated existing drainage, as shown by the Drainage Survey in Appendix B. Based on an assessment of the development site and the utility survey drawing the existing foul and surface water from the site discharges to the United Utilities (UU) combined sewer along Concert Street.

2.3 Geology

BGS mapping does not show any made ground deposits on site, however based on the historical mapping and previous development that has taken place on the site, made ground deposits are highly likely to be present. The site is indicated to be underlain by Devensian Till. This stratum typically comprises clay with varying amounts of sand and gravel as minor constituents. The deeper solid geology is indicated to sandstone as part of the Chester Formation. No faults are shown on or within an influencing distance of the site.

2.4 Hydrology

There are no water network record of surface water features within 250m of the site. The nearest watercourse to the site is the Rochdale Canal, which lies at a distance of 480m south-east of the site at its closest point.

With regard to the hydrogeology, the superficial stratum is classified as a Secondary Undifferentiated Aquifer and the bedrock is classified as a Principal Aquifer.

Information obtained from the Environment Agency (EA) Risk of Flooding from Rivers and the Sea (RoFRaS) database indicates that the site does not lie within Flood Zone 2 or 3

The British Geological Survey indicate there is a potential for groundwater flooding at the subject site, with a moderate risk rating. Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

2.5 Proposed Development

Retention and refurbishment of the Grade II Listed 49 Spring Gardens façade following demolition of the existing 50 Fountain Street building and erection of adjoining 8 storey commercial building (Use Class E) with basement areas, roof terraces and plant enclosure, landscaping, and associated works.

Retention and refurbishment of the Grade II Listed 49 Spring Gardens façade following demolition and replacement of the existing 50 Fountain Street building for office use with associated works.

The proposed development plans can be seen in Appendix C.

3.0 SUITABILITY OF DEVELOPMENT PROPOSALS

3.1 National Planning Policy

The National Planning Policy Framework (NPPF) and the accompanying Planning Practice Guidance (PPG) aim to ensure that flood risk is taken into consideration at all stages of the planning process and advocates the use of a risk-based 'Sequential Test' to preferentially locate development in areas with a low risk of flooding. Where development is necessary in high risk areas, the NPPF aims to ensure that the development is safe without increasing flood risk through the application of the Exception Test.

The PPG, defines the levels of flood risk within England as follows:

- Flood Zone 1 - Low Probability - Land having less than a 1 in 1,000 annual probability of river or sea flooding.
- Flood Zone 2 - Medium Probability - Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
- Flood Zone 3a - High Probability - Land having a 1 in 100 or greater annual probability of river flooding; or having a 1 in 200 or greater annual probability of sea flooding.
- Flood Zone 3b - Functional Floodplain - Land where water has to flow or be stored in times of flood.

The PPG states that a site-specific FRA is required for all new development proposals located in Flood Zones 2 and 3, and for any proposal of 1 hectare or greater regardless of its flood zone classification. The flood zones as described above are shown on the Environment Agency's Flood Map for Planning, available online.

Table 2 of the PPG classifies development types based on their vulnerability to flooding, ranging from 'Essential Infrastructure' which has to be operational in times of flood, through 'Highly Vulnerable' (e.g. emergency service stations), 'More Vulnerable' (e.g. residential dwellings and establishments), 'Less Vulnerable' (e.g. offices/retail), to 'Water Compatible' development (e.g. open space, docks, marinas and wharves).

Table 3 of the PPG indicates which 'vulnerability classes' are acceptable in each of the Flood Zones, and when the Exception Test should be applied. This is reproduced as Table 3.1 below.

3.2 Flood Risk Vulnerability

The Flood Risk Vulnerability Classification has been determined in accordance with Planning Practice Guidance, Flood Risk and Coastal Change. For multi-occupancy sites, the Flood Risk Vulnerability should be based upon the most vulnerable part of the site. The Flood Risk Vulnerability Classification is '*More Vulnerable*', which includes '*Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels*'.

3.3 Flood Zone Compatibility

The Flood Zone Compatibility has been reviewed in accordance with Planning Practice Guidance, Flood Risk and Coastal Change, paragraph 067.

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*	✗	✗	✗	✓*

Table 3.1: Flood Risk Vulnerability and Flood Zone Compatibility Key

Key:

✓ Development is appropriate

✗ Development should not be permitted

According to Environment Agency flood maps, the site is located entirely in Flood Zone 1. The vulnerability classification is 'More vulnerable'. The proposal is therefore considered appropriate in accordance with Planning Practice Guidance.

3.4 Application of Sequential and Exception Test

The above Table 3.1 indicates which 'vulnerability classes' are acceptable in each of the Flood Zones, and when the Exception Test should be applied.

The site is shown on the Environment Agency's Flood Map for Planning to be located within Flood Zone 1. (Refer to Section 4.1 for map).

The Sequential Test, as set out in the NPPF, aims to steer developments to areas with the lowest risk of flooding (i.e. to steer developments to Flood Zone 1 areas where possible). Since the proposed development area is located wholly within Flood Zone 1, based on the guidance presented in Table 3.1 above, the Sequential Test is deemed to have been passed.

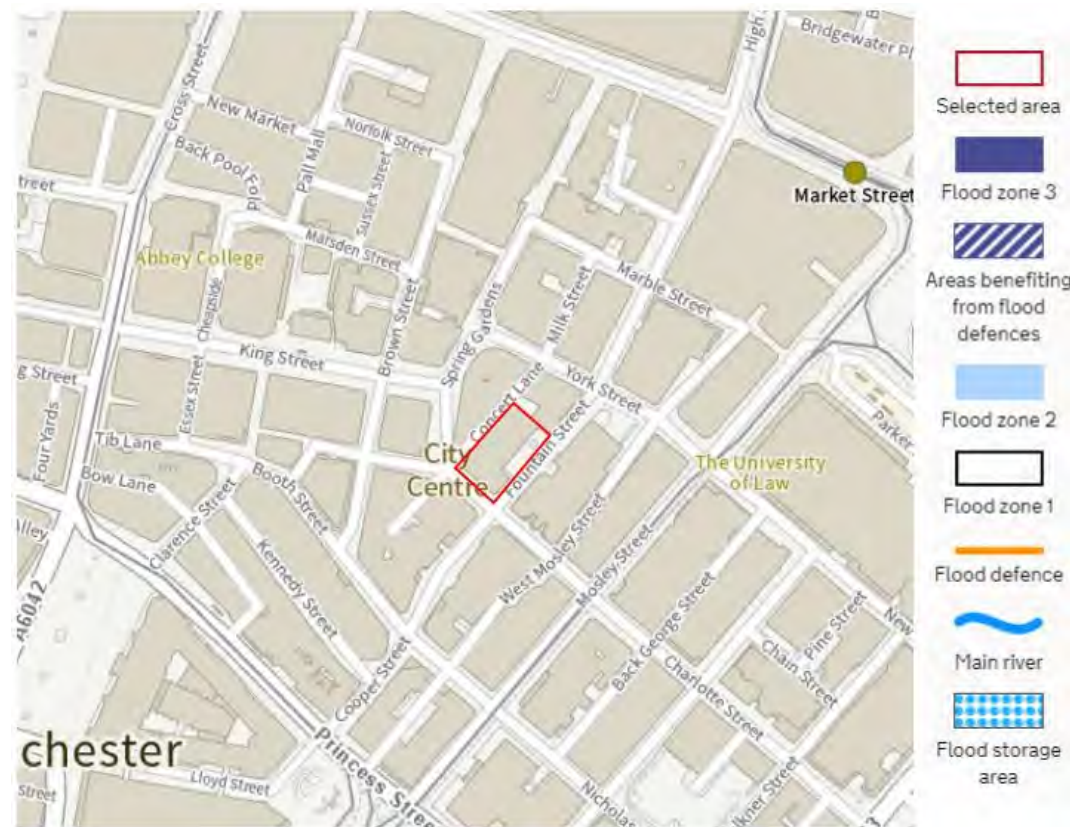
The Exception Test, as detailed in paragraph 159 of the NPPF, is applied after the Sequential Test has been undertaken and, in the circumstances, when 'More Vulnerable' development and 'Essential Infrastructure' cannot be located within Flood Zones 1 or 2, or 'Highly Vulnerable' development cannot be located within Flood Zone 1. The proposed commercial land use at Fountain Street is classified as 'More Vulnerable' development in accordance with Table 2 of the NPPF. Table 3.1, shows that a 'More Vulnerable' development is appropriate within Flood Zone 1 and it is not necessary to apply the Exception Test.

4.0 SOURCES OF FLOODING

4.1 Flood Map for Planning (Rivers and Seas)

Fluvial flooding occurs when high flows exceed the capacity of the river channel and spill out onto the floodplain, usually after a period of prolonged or heavy rainfall.

The Environment Agency (EA) Flood Map for planning (rivers and sea) has been reviewed (Figure 4.1). The site falls entirely with Flood Zone 1; Flood Zone 1 comprises of land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year. (<0.1%)



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Figure 4.1: Risk of flooding from Rivers and Seas

4.2 Flooding from Land (Pluvial Flooding)

The EA Map showing risk of flooding from surface water is presented in Figure 4.2. This type of flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm.

As illustrated in figure 4.2, the site is typically at very low (<0.1%) risk of surface water flooding; however, with a low risk existing further down Fountain Street.

This map is not definitive and is based on the best information available to the EA, such as ground levels and drainage.

The site is currently fully developed except from a small inset of landscaped area off Fountain Street. Based on the map this area is not at risk from Pluvial flooding and there is no overland flood routing across the site due to the extent of the existing building.



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Figure 4.2: Risk of Flooding from Surface Water

4.3 Flooding from Groundwater

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers).

The Strategic Flood Risk Map for Salford City Council indicates that the site is not at risk of groundwater flooding.

4.4 Flooding from Sewers

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. This type of flooding tends to occur sporadically in both location and time. The majority of sewers are built to the guidelines within Sewers for Adoption. These sewers have a design standard to the 1 in 30-year flood event and therefore it is likely that most sewer systems will surcharge during rainstorm events with a return period greater than 30 years.

United Utilities sewer records, indicate that the site is bound by public combined sewers. As previously noted, 100% of the site currently consists of impermeable hard standing. The current drainage system has been confirmed to discharge to the public combined sewer within Concert Lane.

United Utilities is responsible for the disposal of wastewater within the local area. They have

a statutory obligation to maintain a register of properties/areas that are at risk of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding incidents from public foul sewers, combined sewers and surface water sewers that are maintained by the Water Company. When an incident is reported, a decision chart is used to assess whether the properties/areas are 'at risk' and then the record is added to the appropriate register.

The Level 2 Hybrid SFRA, Manchester City, Salford City and Trafford Councils indicates the site to be within the Conurbation Core Critical Drainage Area (CDA). Therefore, new developments are required to provide a minimum 50% reduction in surface water discharge rates from the site.

The development proposals intend to reduce the rate of discharge from the site and accommodate the balance of flows up to and including the 1 in 100-year critical event plus climate change allowance. This restriction and attenuation of flows will have a positive impact on the surrounding existing drainage and hence work to mitigate the long-term risk of flooding from sewers.

4.5 Flooding from Reservoirs

The Environment Agency Reservoir flood risk map indicates that the site to be outside of the maximum flood extent of a breach to any local reservoir.



Figure 4.5: Risk of Flooding from Reservoirs

4.6 Summary of Flooding Risks

The site is within a Critical Drainage Area (CDA) as defined in the Manchester, Salford and Trafford SFRA. CDA's, as described in the SFRA, are those identified from historical flood events and/or modelled data as having a significant risk from surface water flooding and include drainage catchments for the sewer network. A betterment of brownfield discharge is required of 50% on existing in the form of onsite attenuation through the adoption of SuDS features on site.

Based on the above review the risk of flooding from Fluvial, Pluvial, Groundwaters, Sewers, and Reservoirs are all considered to be low.

5.0 FLOOD RISK MITIGATION

As the site is located within a Flood Zone 1 flood risk from fluvial flooding the following mitigation measures are required to be accommodated within the proposed scheme.

Minimum Ground Floor Level: The entrances to the building at to be at grade with the perimeter external levels falling away from the building footprint.

Restricted Surface Water Discharge: The surface water drainage from the site will be restricted to provide a 50% betterment on the existing brownfield run-off rate. Refer to the renaissance Outline Drainage Strategy report for further details.

SUDs: Sustainable urban drainage systems will be incorporated into the scheme where viable. Refer to the renaissance's Outline Drainage Strategy report for further details.

6.0 DRAINAGE STRATEGY

For detailed Drainage Strategy refer to renaissance Outline Drainage Strategy document. A brief summary is included below.

6.1 Drainage Hierarchy

In accordance with NPPF, the following hierarchy of surface water drainage options has been considered:

- Discharge into the ground (infiltration);
- Discharge to a surface water body;
- Discharge to a surface water sewer, highway drain, or another drainage system;
- Discharge to a combined sewer.

Infiltration direct to the ground has been considered, however as the existing building and proposed new building will cover the whole site it is not possible to infiltrate surface water to the ground without impacting the foundations. The site is also surrounded on three sides by Grade II* and Grade II listed buildings which include semi and full basements. Infiltration is therefore not viable.

Opportunities to discharge to watercourse have been considered, however as the nearest watercourse 480m away it is deemed not viable.

There are no surface water drains within the highway around the site, therefore, discharge to the public surface water sewer has been discounted.

Surface water will therefore discharge to the existing public combined sewer within Concert Lane. The surface water system will accommodate flows on-site up to and including the 1 in 100-year critical duration event, with an allowance for climate change. The surface water will be collected and stored on site by a dedicated gravity system designed in accordance with BS EN 752 before discharging to the sewer network, subject to agreement under S106 of the water industry act. Detailed calculations of onsite storage and discharge rates can be found in the detailed Drainage Strategy documentation.

Surface water discharge rate from the site is to be restricted to a 30% betterment of existing 1 in 2 year Brownfield run-off. Refer to the Outline Drainage Strategy for the Micro-drainage Outputs and initial storage estimate calculations.

Foul water flows will be collected by a dedicated gravity network designed in accordance with BS EN 752 before discharging to the existing combined sewers on Concert Lane, subject to agreement under Section 106 of the water industry Act.

6.2 Climate change

The drainage strategy will include an increase in the storm intensity of 40%, which is consistent with the effects of climate change for this development with a design life of 100 years, as outlined in NPPF.

7.0 CONCLUSION

The development will comprise a 7 storey office.

The site is located within flood zone 1 and the probability of flooding is low.

The site is considered to have a low risk of flooding from surface water.

The site is not considered to be at risk of flooding from reservoirs.

The site is considered appropriate under Planning Practice Guidance.

Surface water will discharge to the combined public sewer that surrounds the site with discharge rates to be agreed with the LLFA and United Utilities. Subject to Section 106 Agreement under the water industry act.

Surface water discharge rate from the site is to be restricted to a 30% betterment of the existing 1 in 2 year brownfield run-off.

Foul flows from the development will be discharged to the existing public sewers along Concert Lane subject to Section 106 Agreement under the water industry act.

8.0 REFERENCES

National Planning Policy Framework, Ministry of Housing Communities & Local Government (February 2019)

Planning practice guidance – Ministry of Housing Communities & Local Government <https://www.gov.uk/government/collections/planning-practice-guidance> (22 Nov 2018)

Ministry of Housing, Communities and Local Government <https://www.gov.uk/guidance/flood-risk-and-coastal-change> (6 March 2014)

Flood risk assessments: climate change allowances – Environment Agency

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> (31 July 2019)

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA (March 2010)

British Geological Survey – Geology of British Viewer
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Long term flood risk information <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

Improving the Flood Performance of New Buildings, Flood Resilient Construction, Department for Communities and Local Government, (May 2007)

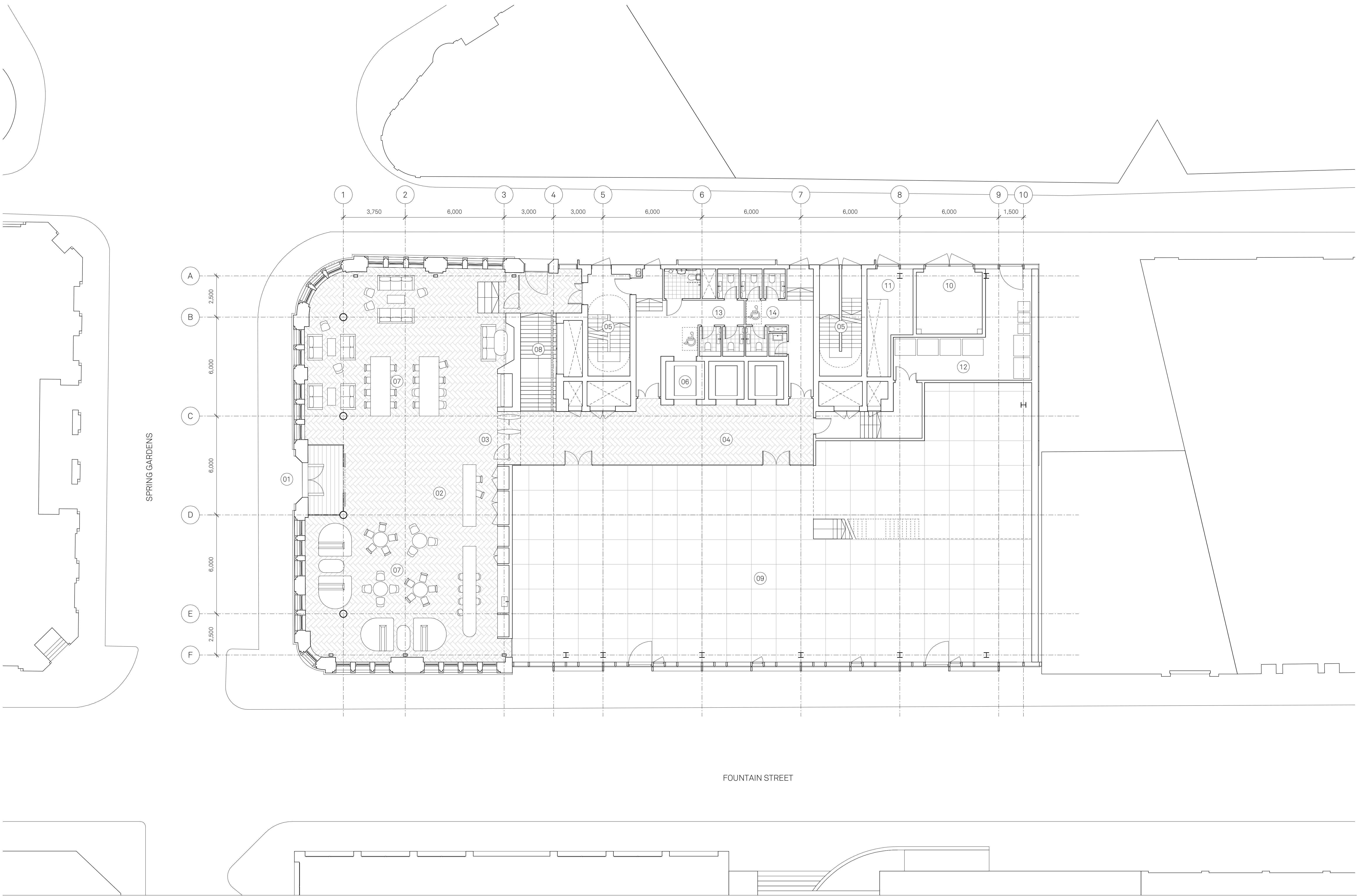
APPENDIX A
Existing Topographical Survey

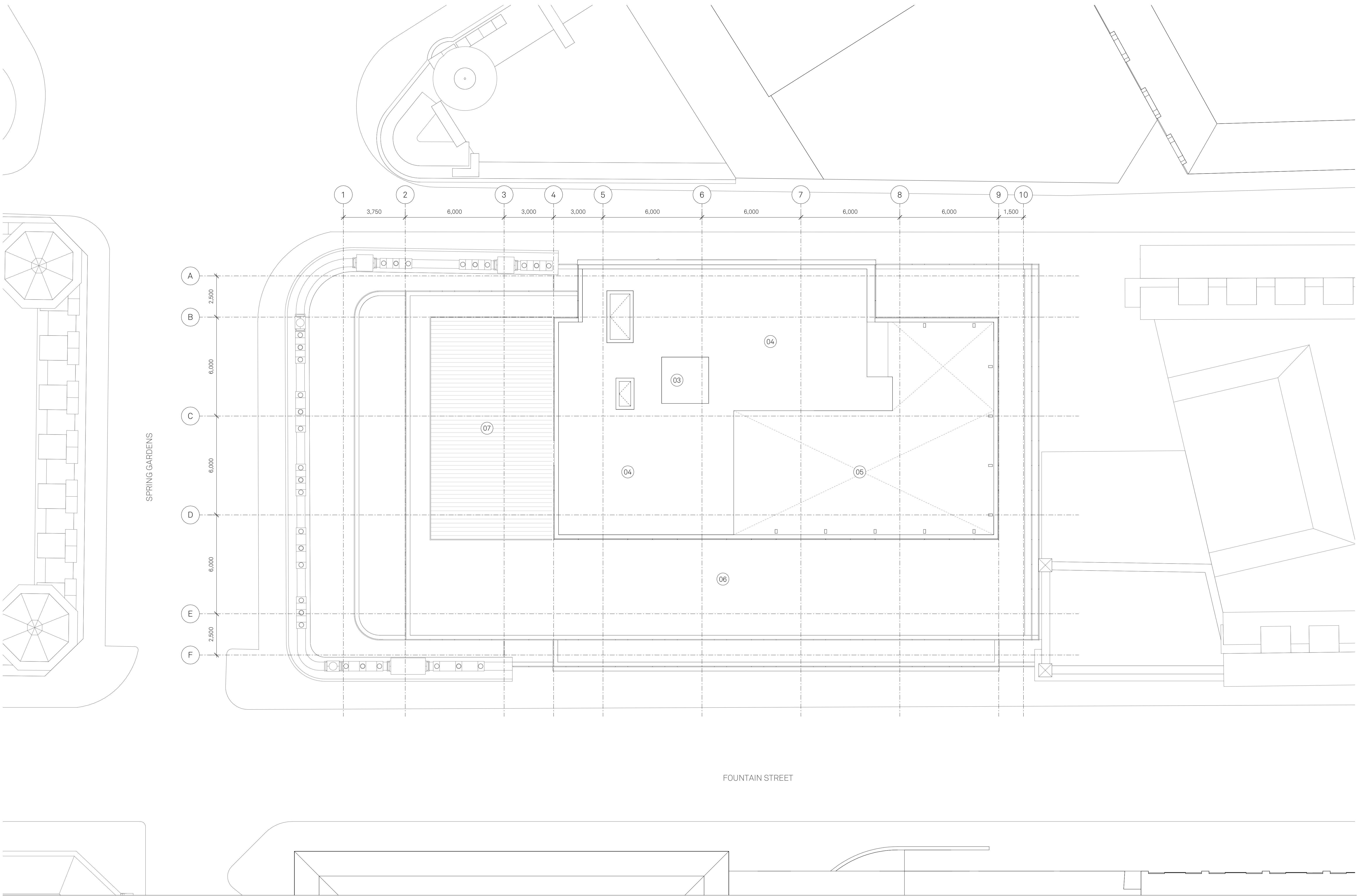
APPENDIX B
Existing Drainage Survey

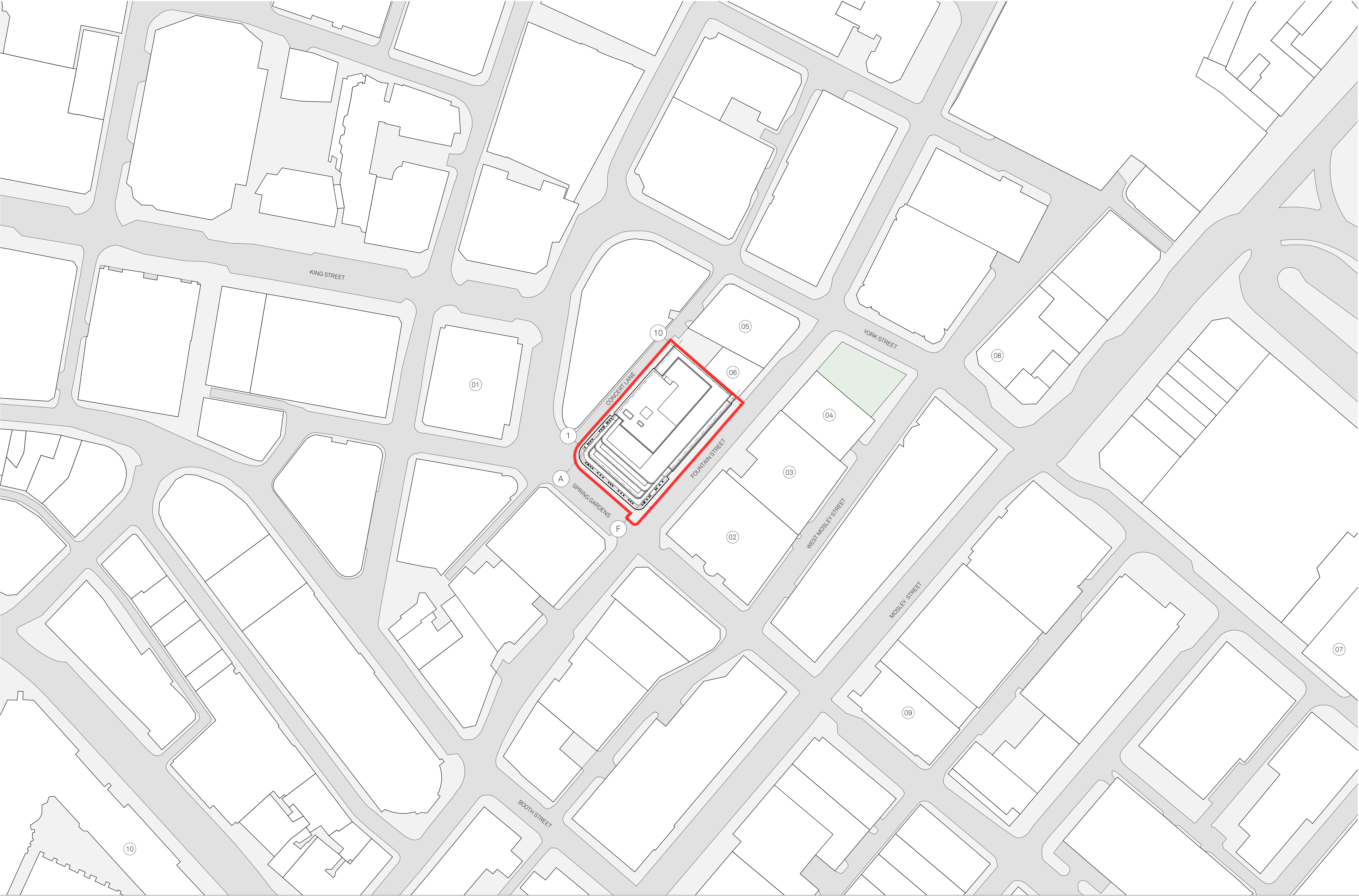


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APPENDIX C
Proposed Development Layouts







APPENDIX D
Sewer Records



RefNo	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
2204		CO		225			VC	8.73185	
9480		CO		225			VC	7.73424	
9507		CO		1500			CO	179.9222	
9901	43.89	CO		38.57	600		CO	67.85225	1 in 36
9404	36.74	CO		28.24	1500		CSB	51.40039	
9008	41.26	CO		34.19	450		VC	28.41208	1 in 42
2914	42.83	CO		900			CO	48.45311	
2007	44.21	CO		40.14	375		VC	53.64689	
3302	44.99	CO		40.4	300		VC	16.48242	1 in 7
8003	40.1	CO		35.71	380		VC	3	
0208	37.6	CO		32.43	300		VC	60.81538	
8501	37.04	CO		26.34	950		BR	6.403124	
0103	43.37	CO		39.02	375		VC	100.3408	1 in 787
8502		CO		0	750		CO	18.43909	
0200	44.08	CO		36.7	300		VC	36.49657	1 in 33
2112	44.5	CO		37.91	1550		CO	20.61553	
9207	41.95	CO		37.49	400		CO	9.219544	1 in 54
9608		CO		600			CO	9.084400	
8410	37.34	CO		33.84	500		PE	22.32272	1 in 17
2507	45.32	CO		35.35	1550		CO	17.46425	
0208	45.61	CO		42.67	300		BR	71.5891	
2302	44.4	CO		33.93	1550		CO	4.472136	
1215	44.16	CO		40.52	300		VC	16.88796	
9404	40.13	CO		33	340		BR	6.082763	1 in 7
2101	44.1	CO		36.63	490		BR	8.219544	
8332	37.17	CO		31.4	1520		CSB	39.20944	1 in 47
8116	37.12	CO		1320			CO	12.53283	
9206	41.88	CO		38.04	375		VC	7.615773	1 in 45
8311	37.12	CO		28.13	1500		PE	20.90259	1 in 348
8335	38.91	CO		28.82	1500		BR	25.03875	
9905	42.03	CO		32.95	1500		CO	87.95953	1 in 54
8342		CO		150			VC	7.322824	
9116		CO		150			VC	1.081039	
1002		CO		150			VC	2.200385	
8333		CO		31.79	900		PSC	2.935400	1 in 18
9812		CO		150			VC	12.02503	
9015	41.13	CO		38.38	300		PVC	8.792014	1 in 88
0002	42.88	CO		40	600		CO	34.65545	1 in 40
8312	38.88	CO		31.5	600		CO	20.25456	1 in 225
9010		CO		150			VC	18.8895	
9203	41.57	CO		35.97	300		VC	40.83669	1 in 27
9001	40.78	CO		38.41	750		BR	37.18894	1 in 186
1109		CO		300			VC	40.75195	

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