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Real Estate

Mayfield Phase 1 – EIA Addendum

EIA Addendum

January 2020

Summary

The table below sets out a summary of the ES chapters and how they are impacted by the changes set out in the body of this EIA Addendum.

EIA Chapter	Changes to information
Introduction Chapters: Introduction, EIA Methodology, Site and Development Description, Consideration of Alternatives	Updates set out within EIA Addendum to reflect the changes in quantum. Amendments have been made to the description of the proposals in the introduction and the development description sections. No change to EIA Methodology, site description and consideration of alternatives sections as set out in the original ES Volume 1 dated October 2019.
Construction Management and Phasing **Technical Appendix – Construction Management Plans**	No change.
Noise and Vibration **Technical Appendix – Noise and Vibration Assessment**	Updated with a qualitative statement to reflect the impact of the additional car movements on the levels of noise and vibration experienced at the nearest sensitive receptors. EIA Addendum (paragraphs 1.27 – 1.32) reflects this assessment and therefore confirms that there is a negligible (non-significant) change to conclusion of the ES Chapter or supporting technical appendices.
Traffic and Transport **Technical Appendices: Transport Statement and Framework Travel Plan**	Updated with a qualitative statement to reflect the impact of the additional car movements on the local highway network and highway safety and comments received from TfGM and Highways. EIA Addendum (paragraphs 1.33 – 1.43) reflects this assessment and confirms that there are no changes to conclusion of the ES Chapter, in terms of cumulative or residual impact, or supporting technical appendices.
Air Quality **Technical Appendix: Air Quality Assessment**	Updated with a qualitative statement to reflect the impact of the additional car movements on the air quality experienced at the nearest sensitive receptors. EIA Addendum (paragraphs 1.44 – 1.52) reflects this assessment and therefore confirms that there are no changes to conclusion of the ES Chapter, in terms of cumulative or residual impact, or supporting technical appendices. A separate technical note has been prepared to confirm this alongside the EIA Addendum.
Ecology **Technical Appendices: Ecological Assessment Report, Bat Survey, River**	No change.

EIA Chapter	Changes to information
Survey, Arboricultural Impact Assessment, Ecology Strategy with Biodiversity Net Gain Calculations	
Ground Conditions **Technical Appendix: Phase 1 Ground Conditions Report**	No change as confirmed in paragraphs 1.60 – 1.68.
Water Resources and Flood Risk **Technical Appendix: Flood Risk Assessment and Drainage Strategy**	Drainage Strategies updated for Baring Street MSCP and Baring Street Office 1 to reflect the latest comments from the flood risk team and propensity for installation of SUDs appended to the ES Addendum (Appendix 11.1A). These updated documents supersede EIA Appendix 11.1 of ES Volume 1 dated October 2019. Qualitative statement (paragraphs 1.69-1.78) confirms that no change to the conclusion of the ES chapter, either in terms of cumulative or residual impacts, as confirmed in the EIA Addendum. A separate technical note has been prepared to confirm this alongside the EIA Addendum.
Wind Microclimate **Technical Appendix: Wind Assessment results**	Wind Microclimate Assessment has been remodelled to account for the changes to the massing of the development. This has confirmed that there are no changes to the identified cumulative or residual wind impact once mitigation has implemented on site, with recommendations for further testing of wind mitigation proposed prior to operation. Revised wind modelling attached to the EIA Addendum, replacing Appendix 12.1 of ES Volume 1 dated October 2019. A separate technical note has been prepared to confirm this alongside the EIA Addendum
Daylight, Sunlight, and Overshadowing **Technical Appendix: Daylight and Sunlight Assessment**	Negligible change associated with increase in building massing and confirmed in the EIA Addendum.
Townscape and Visual Impact **Technical Appendices: Zone of Visual Impact and Viewpoints Plan, Verified Views (Wireline, White Block Massing and Fully Rendered)**	Negligible change to four viewpoints with no change to the conclusions in terms of cumulative or residual impact. Confirmed in the EIA Addendum by Chris Burnett Associates.
Socio-economic Impact	Additional jobs created as a result of the increase in amount of B1 Use Class office floorspace created. No change to the conclusions in terms of either cumulative or residual impact.

EIA Chapter	Changes to information
Technical Appendix: Socio-Economic Data Tables	
Type 1 Cumulative Impact Assessment	There is an increase in inter-project effects on human health as a result of the increase in number of parking spaces provided. This has been deemed to be non-significant.
Summary of Residual Effects	No change as there are no significant anticipated impacts beyond those previously identified, subject to mitigation being implemented as recommended, as a result of the proposed scheme revisions.
Non-Technical Summary (Volume 3)	Amendments to the non-technical summary provided in the EIA Addendum as relevant to explain the revisions to the scheme and associated technical studies in non-technical language.

1 EIA Addendum

Introduction

1.1 This Addendum Environmental Impact Assessment (EIA) Statement accompanies two applications for Full Planning Permission, submitted to Manchester City Council (MCC), in respect of land within the Mayfield Strategic Regeneration Framework (SRF) area. Both applications are in the process of being determined by Manchester City Council.

1.2 The first Application (Ref.: 124972/FO/2019) was submitted and validated on 04 October 2019. It originally comprised the following:

- Phased demolition and site clearance, earthworks including re-profiling and construction of retaining walls for the land bounded by the Mancunian Way to the south, Mayfield Depot to the north, Baring Street to the west and Hoyle Street to the east.
- Mayfield Park: provision of circa 2.4 ha (6 acres) of public park, including hard and soft landscaping to be delivered in phases with new bridges across the River Medlock;
- Baring Street Office 1: 9 storey office development including ground, mezzanine and plant level comprising 9,987 sq. m. (GEA) including active ground floor uses (A1, A2, A3, A4 or B1), public realm and a riverside walkway;
- Baring Street Multi-Storey Car Park (MSCP): 10 storey MSCP including ground for 543 car parking spaces; and
- Highways and Infrastructure Works: creation of a new junction from London Road with required access to the multi-storey car park, works to Baring Street, and Traffic Regulation Orders to Buxton Street, Berry Street and Travis Street, which will be delivered and implemented prior to the MSCP becoming operational.

1.3 The second Application (Ref.: 125248/FO/2019) was submitted and validated on 24 October 2019. It comprises a 13 storey office development including ground and mezzanine floors comprising 29,315 sq. m. (GIA) (circa 31,887 sq. m. (GEA)) with active ground floor uses, highways and associated access and public realm. This is referred to throughout the Environmental Statement and supporting submission documentation as Baring Street Office 2.

1.4 An update to Planning Application Ref.: 124972/FO/2019 is required during determination because amendments are sought to the details of the application submitted with regards to quantum and associated design co-ordination relating to Baring Street Office 1 and Baring Street MSCP.

1.5 The details of Planning Application Ref.: 125248/FO/2019 remain unchanged and this Application is included for reference only, given the original EIA also supported this submission and therefore relates to this Addendum.

1.6 This EIA Addendum describes the proposed amendments to Planning Application Ref.: 124972/FO/2019 and confirms that the conclusions of the original EIA remain broadly unchanged as a result of the proposed amendments.

1.7 It should be read together with the original EIA that supports both applications and the addendum to the Planning Statement submitted, which explains the rationale for the proposed amendments and assesses them against key planning considerations.

Proposed Amendments

1.8 The design changes from the originally proposed scheme of Planning Application Ref.: 125248/FO/2019, as set out in the updated and enclosed planning drawings and Design and Access Statement Addendums, are summarised as follows:

Baring Street MSCP

- **Ground floor level**: the ground floor is lowered by 400mm to floor height of 34.50 metres (AOD) and the ground floor ramp is also removed as a result of this lowering. This has allowed for an efficient and appropriate relocation of accessible parking spaces following the internal ground floor layout being reconfigured.

- **Access**: vehicular entrance moved to Baring Street, with the exit still located on the southern elevation as per the original submission. The width of the, now separate, entrance and exit has increased to suit an identified occupier requirement. With regard to pedestrian access, the entrance from the car park to Mayfield Park has moved, with the core located in the space between the MSCP and office building. The pedestrian access from Baring Street has also moved slightly south.

- **Number of parking spaces**: the amount of parking spaces has been maximised as a result of adopting Automatic Number Plate Recognition ('ANPR') and moving the substation to the northern elevation to gain additional parking spaces. An additional half-deck of parking spaces have also now been included behind the parapet at roof level, combining with other changes to increase the number of spaces to 581 (+38 spaces). The number of disabled spaces remains the same at 21 and EV charging spaces at 60.

- **Massing**: the additional half deck level for car parking (Level 10) has resulted in a subsequent increase in parapet height and the height of the lift overrun. The new parapet height is 66.300m AOD and the planning height previously submitted was 65.981m (AOD). This gives a height increase of 257mm, based on a 1.8m high parapet around the open roof parking level, which would be broadly imperceptible.

- **Core and general arrangement**: the building's floorplate extended south whilst the south facade depth has decreased, resulting in no overall extension to the MSCP. Stairs have been amended within car park layout to connect half levels as part of fire strategy, with the fire stair to the south now rotated. The lift lobby has been extended to deliver better accessibility to the car park floors from the lift.

Baring Street Office 1

- **Basement and ground level changes:** a basement has been incorporated into the scheme to accommodate cycle facilities and additional back of house areas of the building to improve the overall functionality. The ground floor has been altered, with Baring Street activated following additional office space now fronting Baring Street. This has been made possible by relocating the cycle spaces in the basement, rather than fronting Baring Street as previously proposed. The interface with the MSCP to the south has also been developed. Ground floor windows have been introduced to Baring Office 1 which face southward in this area to improve activation between the two development plots and overlook this space.

- **Footprint:** the footprint between the building and the MSCP has been refined and the building has extended south by 920mm.

- **Massing:** the western entrance overhang has been lowered to increase the overall amount of useable floorspace and create a more welcoming entrance. In addition, the structural solution for cantilever has now been developed, resulting in removal of the diagonal bracing expressed in the façade.

- **Quantum**: as a result of the above changes, the proposed development quantum has increased from 9,987 sq m (GEA) as submitted to 11,142 sq m (GEA) now proposed. This represents an increase of 1,155 sq m (GEA / 701 sq m (GIA)) of office floorspace associated with the development. This is primarily driven by the addition of the basement level. The number of cycle spaces has also increased from 75 to 88.

1.9 The park and other areas of public realm applied for in Application 1 (125248/FO/2019) remain unchanged as a result of these amendments save for the revised vehicular entrance to the car park and minor changes to the public realm immediately surrounding the buildings. Similarly, the site description and area as set out in Appendix A all remain consistent with the previously Proposed Development and are therefore unchanged.

Description of Development

1.10 As a result of the above the description of development has been updated as follows:

"Application for Full Planning Permission for two buildings comprising: 9 storey mixed use building (including ground and mezzanine) comprising office space (Use Class B1), with retail uses at ground and mezzanine levels (Use Class A1/A2/A3/A4 and / or B1) and rooftop amenity spaces and terrace levels, internal ancillary storage spaces for waste, cycles, rooftop plant and back of house functions; a 11 storey car park (including ground) comprising 581 car parking spaces (Use Class Sui Generis); and a Park; along with associated public realm, highways works and other associated works"

Use and Amount

1.11 As a result of the design development the Proposed Development will provide the following accommodation:

Use	Original Application	Revised Application
Site Area	5 ha – no change	
Office Building 1	9,483 sq. m. (GIA) / 9,987 sq. m. (GEA)	10,184 sq. m. (GIA) / 11,142 sq. m. (GEA) – additional 701 sq. m. (GIA) or 1,155 sq. m. (GEA).
Office Building 2	29,315 sq. m. (GIA) (circa 31,887 sq. m. (GEA)) – *no change*	
Baring Street Multi-Storey Car Park	543 spaces	581 spaces – additional 38 spaces.
Mayfield Park	2.4 ha of hard and soft landscaping, centred around the River Medlock and delivered in two phases, with relevant enabling and site remediation works associated with the delivery of each phase. – *no change*	
Other	Junction improvements to London Road, improvements to Baring Street and immediate surrounds and Traffic Regulation Orders and Stopping Up of Bond Street and Nether Street. – *no change*	

Phasing

1.12 Following discussion with Manchester City Council the phasing has been updated to include an additional phase – the southern bridge over the River Medlock. The phasing is therefore now as follows:

- Phase A - Demolition and site clearance, earthworks including re-profiling, construction of retaining walls.
- Phase B - London Road junction & temporary access road.
- Phase C - MSCP and immediate public realm.
- Phase D - Baring Street and associated highways and public realm.
- Phase E - Baring Street Office 1, loading bay & immediate public realm (hard landscaping only).

- Phases F, G, H, I – Mayfield Park delivered in 4 phases:
  - Phase G is now the southern bridge over the River Medlock; and
  - Phase F of the Park to be delivered in tandem with Phase C (Baring Street Office 1). Other phases (H and I) to follow.

1.13 Please refer to drawings 0343-SEW-ZZ-ZZ-DR-Z-001000 Rev P00 and 0343-SEW-ZZ-ZZ-DR-Z-001001 Rev P01 that highlight the changes in relation to phasing.

Pre-Application Consultation

1.14 Application 1 is resubmitted following pre-application consultation with officers at Manchester City Council and statutory consultees during the determination process with regard to the principles of the proposed amendments, and the details and form of the forthcoming resubmission.

1.15 The details of the information resubmission have been discussed in advance with statutory consultees in relation to the proposed amendments and their impact on associated technical documents and the Environmental Impact Assessment submitted.

1.16 Where agreed and relevant to do so, the studies undertaken and chapters prepared in relation to the original EIA have been updated via this EIA Addendum. This document summarises any additional likely significant effects, cumulative impact and residual impact as a result of the changes.

1.17 Any updated technical appendices or figures are contained as an Appendix to this EIA Addendum with numbering that is consistent with the original EIA for ease of reference.

Resubmission Documentation

1.18 This EIA Addendum should be read together with the planning application documentation submitted in support of 124972/FO/2019, with explicit reference to the Planning Statement Addendum submitted concurrently and the original EIA (Volume 1 and 2 and NTS) dated October 2019. In summary the documentation changes are as follows:

- A set of revised floorplans and elevation drawings for Baring Street MSCP and Baring Street Office 1 prepared by SEW and Bennetts Associates;
- Baring Street Office 1 Design and Access Statement Addendum prepared by Bennetts associates, to be read alongside the original Baring Street Office 1 Design and Access Statement;
- Baring Street multi-storey car park ('MSCP') Design and Access Statement Addendum prepared by SEW, to be read alongside the original Baring Street MSCP Design and Access Statement; and
- Planning Statement Addendum and Appendices prepared by Deloitte Real Estate, with input from the other consultants as relevant;
- Technical document addendums and updated documents: Waste Management Strategy (Baring Street Office 1), Sustainability Strategy and Masterplan Car Parking Strategy.
- As updated Masterplan Drainage Strategy and Drainage Strategies for Baring Street Office 1, and the Multi-Storey Car Park have been provided in relation to the comments received from MCC's Flood Risk Team to confirm the exploration of SUDs.

1.19 An updated Drawing Schedule is submitted detailing the changes and new revisions. The table below details the changes to the non-EIA application documentation (highlighted red). Please note this excludes any documents that are specific to the Park as there is no change to this element.

Application Documentation	Update required (NB - this list excludes Park specific documents and drawings.)
Existing Plans	No change.
Proposed Plans	Amendments to proposed drawings, reflecting the changes set out in this document and the Design and Access Statement Addendums.
Phasing Plans	Updated following discussion with Manchester City Council.
Application Form and Certificates	Quantum of development amended in Application 1 to confirm the revised car parking numbers and B1 Office floorspace. Additional planning application fees have been paid to the Local Planning Authority to account for the increase in floorspace. We have not formally altered the application form.
Planning Statement	**Planning Statement Addendum** document submitted, with the original Planning Statement appended.
Schedule of external materials Office 1	No change. Materials are the same as those originally proposed.
Schedule of external materials MSCP	No change. Materials are the same as those originally proposed.
Design and Access Statement Office 1	**Addendum to the Design and Access Statement** prepared to account for the changes to the development. The overall design philosophy, use, approach and building access arrangement remain substantially unchanged. An **updated Area Schedule** is also submitted.
Design and Access Statement MSCP	**Addendum to the Design and Access Statement** prepared to account for the changes to the development. The overall design philosophy, approach and use remain unchanged, with an uplift in parking spaces comprising the primary change.
Crime Impact Statements	No change. The design have been reviewed by GMP and they have confirmed that there is no change to the recommendations and conclusions of the Crime Impact Statements submitted.
Baring Street Office 1 Waste Management and Servicing Strategy including Proforma	**Updated document** to reflect revised back of house strategy with revised bin store layouts and waste storage requirements as a result of the uplift in office floorspace. Confirmed that there is sufficient room to accommodate the additional requirement.
TV Reception Surveys	No change. The level of interference of the development will not change as a result of the nominal increase in building height of the MSCP.
Ventilation Strategy Office 1	No change. The high level strategy for ventilation is consistent with that originally submitted i.e. efficient mechanical ventilation and heat recovery systems with mechanical heating and cooling.

Application Documentation	Update required (NB - this list excludes Park specific documents and drawings.)
Ventilation Strategy MSCP	No change. The high level strategy for ventilation is consistent with that originally submitted i.e. naturally ventilated through porous elevations.
Energy Strategy Office 1	No change. Combining high performing fabric design and efficient building services provides a consistent regulated carbon emission result as per the original Energy Strategy.
Environmental Standards Statement	Updated document submitted with references to the quantum of development updated to reflect the revised proposals, but no change to the overall principles set out in that document.
Sustainability Statement	Minor update to reflect the number of initial EV charging points and cycle parking spaces included. An **addendum statement** has been prepared and submitted to confirm this.
Statement of Consultation	No change.
Community Engagement Vision	No change.
MSCP and Office Management and Maintenance Strategy	No change.
Archaeological Desk Based Assessment	No change.
UXO Desktop Study	No change.
Local Labour Agreement	No change.
Temporary Use Strategy (included within the Masterplan Design and Access Statement)	No change.
Masterplan Car Parking Strategy	**Updated** to reflect revised car parking numbers.
Masterplan Cycling Strategy	No change.
Masterplan Energy Strategy	No change.
Masterplan Waste and Servicing Strategy	No change.
Masterplan Ecology Strategy	No change.
Masterplan Drainage Strategy	No change, but should be read in conjunction with the updated Flood Risk Assessment and Drainage Strategy submitted as part of this Environmental Statement Addendum.

1.20 This EIA Addendum considers and assesses the proposed amendments in the context of the EIA chapters, impacts and conclusions presented within the original planning submission (Ref.: 124972/FO/2019).

1.21 The proposed amendments have been reviewed by the EIA Consultants (BuroHappold, eksogen, Chris Burnett Associates) to assess their potential environmental effects as compared to the conclusions presented within the approved EIA. The section below sets out the consequences of changes in relation to the original EIA submitted under Chapter headings and methodology consistent with the original EIA dated October 2019.

Characteristics of the Potential Effect of the Proposed Amendments

Introductory Chapters

1.22 The chapters that comprise the non-technical chapters of the original EIA are 1) Introduction; 2) EIA Methodology; 3) Site and Development Description; and 4) Consideration of Alternatives.

1.23 Updates set out within this EIA Addendum reflect the changes in quantum as described in paragraph 1.8. Amendments have been made to the description of the proposals in the introduction and the development description sections as set out above in this EIA Addendum (paragraphs 1.5-1.7).

1.24 There are no changes to the EIA methodology, site description and consideration of alternatives sections as set out in the original EIA Volume 1 dated October 2019.

Construction Management and Phasing

1.25 In relation to the construction methodology set out in EIA Volume 1 dated October 2019, there is no change to either Chapter 5 or supporting Technical Appendices 5.1 or 5.2, as the broad construction methodology remains the same.

1.26 This information and construction methodology will be refined through the condition discharge process, adding details with regard to site-specific mitigation measures required to control the impact of the Proposed Development, as set out in Chapter 5 and cross-referenced in Chapters 6-15 as relevant.

Noise and Vibration

1.27 The Noise and Vibration (Chapter 6) section of the original EIA dated October 2019 is updated by this EIA Addendum to reflect the impact of the additional car movements on the levels of noise and vibration experienced at the nearest sensitive receptors.

1.28 In summary, 38 no. additional vehicle parking spaces are proposed as part of the development, which may result in a small number of additional vehicle trips. The implications of this are set out below with regard to Chapter 6.

<u>Likely Significant Effects</u>

1.29 The additional trips have been assessed qualitatively are considered highly unlikely to produce significant increases in noise level. The following equation has been used to calculate a realistic change in noise level, associated with additional vehicle movements. The inputs for this equation assume a trip per space.

$$increase\ in\ noise\ level = 10 \times \log\left(\frac{Updated\ spaces}{Original\ spaces}\right)$$

Based on the above:

$$0.3\ dB = 10 \times \log\left(\frac{581}{543}\right)$$

1.30 Based on the equation, a +0.3 dB increase in noise level has been predicted due to the additional vehicle movements. A ± 3.0 dB change in noise level is considered to be the minimum that is perceptible.

1.31 With a predicted increase in noise level of + 0.3 dB due to the above, the magnitude of impact and resultant significance of effect upon the development and on nearby noise sensitive receptors is considered to be negligible.

Mitigation and Residual Impacts

1.32 On this basis, there are no changes to the mitigation measures, cumulative or residual impacts as set out in the EIA dated October 2019.

Traffic and Transport

1.33 The Traffic and Transport section (Chapter 7) of the original EIA dated October 2019 has been reviewed and updated by this Addendum to reflect the impact of the additional car movements on the local highway network, highway safety, and comments received from TfGM and Highways during the determination period.

1.34 As set out in the October 2019 EIA, the operational traffic associated with Application 1 alone is identical to Application 1 and Application 2 combined because work-related trips generated by Baring Street Office 2 in the Application 2 scenario would directly replace general external commuter trips in the car park.

Likely Significant Effects

Demolition and Construction effects

1.35 The construction phases, construction traffic flows and effects described in the October 2019 EIA Addendum remain valid.

Operational effects

1.36 The scheme amendments result in a small change in operational traffic but no change in HGV traffic. These changes impact the road links closest to the site, namely:

- A6 London Road (south of Travis St); and
- A635 Mancunian Way e/b slip (east of A6).

1.37 Table 1.1 shows the changes in traffic flows on these road links in 2023 (when Phase 1 is complete) together with those assessed in the October 2019 EIA.

Table 1.1 Change in 2023 Traffic Flows since October 2019 ES

Paramics Link Reference	Receptor	Vehicle Traffic 2023			
		AADT		AAWT	
		Total Vehicles	HGVs	Total Vehicles	HGVs
October 2019 ES					
9*	A6 London Road (south of Travis St)	22,029	72	20,590	73
108	A635 Mancunian Way e/b slip (east of A6)	1,922	40	1,926	44
Revised Phase 1 Development					
9*	A6 London Road (south of Travis St)	22,209	72	20,758	73
108	A635 Mancunian Way e/b slip (east of A6)	2,040	40	2,037	44
Change					
9*	A6 London Road (south of Travis St)	180	0	168	0
108	A635 Mancunian Way e/b slip (east of A6)	118	0	111	0

*** Moderate Sensitivity**

Table 1.2 Change in Traffic from 2023 Baseline Traffic Flows

Paramics Link Reference	Receptor	Vehicle Traffic 2023			
		AADT		AAWT	
		Total Vehicles	HGVs	Total Vehicles	HGVs
Change in Traffic- October 2019 ES					
9*	A6 London Road (south of Travis St)	18.74%	13.91%	18.74%	13.49%
108	A635 Mancunian Way e/b slip (east of A6)	100.00%	100.00%	100.00%	100.00%
Change in Traffic Revised Phase 1 Development					
9*	A6 London Road (south of Travis St)	19.71%	13.91%	19.71%	13.49%
108	A635 Mancunian Way e/b slip (east of A6)	100.00%	100.00%	100.00%	100.00%

*** Moderate Sensitivity**

1.38 Table 1.1 shows that the change in AADT/AAWT total vehicle trips on A6 London Road south of Travis Street (Link 9), which is of moderate sensitivity, remains significantly less than 30%.

1.39 The percentage change in HGVs on Link 9 is unchanged since the October 2019 EIA, which is shown to be 13.91%/13.49% (AADT/AAWT). The magnitude of this impact therefore remains unchanged.

1.40 The 100% change in traffic flow shown on the A635 Mancunian Way eastbound slip road (Link 108) is also unchanged from the October 2019 EIA, which is due to this link having zero flow in the baseline situation.

1.41 This is because there is currently no (permitted) vehicular access to this road link from the A6 London Road, which will be enabled in the future baseline situation through implementation of highway improvements at this junction. In real terms, the increase in daily vehicle movements on these links are negligible as total traffic flows are well within the road's theoretical capacity.

1.42 The traffic flows above were calculated on the basis of 579 spaces and subsequently an additional two car parking spaces were added to the MSCP (an increase from 579 spaces to 581) as a result of further design changes. As the additional traffic generated by the revised development proposals would dissipate quickly on the highway network, the change in traffic on the network beyond the links identified above (including these additional two car parking spaces) would fall within the daily variation of traffic and the overall effects remain as described in the October 2019 EIA.

1.43 In summary, the operational effects set out in the October 2019 EIA are unchanged and remain valid, in terms of cumulative or residual impact, or supporting technical appendices.

Air Quality

1.44 This EIA Addendum updates part of the assessment from the October 2019 EIA as a result of the latest scheme amendments set out in paragraphs 1.5-1.7. The development proposals associated with Application 2, related to Baring Street Office 2, remain unchanged from that assessed in the October 2019 ES.

1.45 The assessment approach, methodology, policy context and baseline conditions set out in the October 2019 ES air quality chapter (ES Vol I, Chapter 8) remain valid.

Likely Significant Effects

1.46 The proposed scheme changes will not affect the results of the construction assessment detailed in the October 2019 ES, and therefore all conclusions reached remain valid.

1.47 The scheme amendments result in a small change in operational traffic but no change in HDV flows. These changes impact the road links closest to the site, namely:

- A6 London Road (south of Travis St); and

- A635 Mancunian Way e/b slip (east of A6).

1.48 Table 1.3 shows the changes in traffic flows on these road links in 2023 (when Phase 1 is complete) together with those assessed in the October 2019 ES.

Table 1.3 Change in AADT Traffic Flows since October 2019 ES

Road link	Vehicle Traffic 2023	
	AADT	
	Total Vehicles	HDVs
October 2019 ES		
A6 London Road (south of Travis St)	22,029	72
A635 Mancunian Way e/b slip (east of A6)	1,922	40
Revised Phase 1 Development		
A6 London Road (south of Travis St)	22,209	72
A635 Mancunian Way e/b slip (east of A6)	2,040	40
Change		
A6 London Road (south of Travis St)	180	0
A635 Mancunian Way e/b slip (east of A6)	118	0

1.49 There are 7 receptors in the vicinity of these links that were assessed in the ES, and all but one was predicted to experience a negligible impact as a result of the proposed development. A **slight adverse** impact was predicted at one receptor located at the Macdonald Hotel, close to the junction of London Road and Mancunian Way. This receptor was predicted to experience a 2% change in annual mean NO2 as a result of the scheme, with a total concentration of 81% of the Air Quality Objective value, resulting in a **slight adverse** impact in line with IAQM guidance.

1.50 The additional traffic generated as a result of the revised scheme would be unlikely to change the magnitude of impact at any receptors, and certainly would not lead to any significant impact at any of these receptors. In line with IAQM guidance, a significant impact would only be predicted with a change in annual mean NO2 of over 5%. Taking into account the change in concentrations associated with the original flows, this would be very unlikely to occur with the revised flows.

1.51 Since the traffic flows detailed in Table 1.3 were calculated, two additional car parking spaces were added to the MSCP. These additional spaces would not change any of the conclusions reached above.

1.52 In summary, the operational effects set out in the October 2019 ES are unchanged and remain valid and this EIA Addendum confirms that there are no changes to conclusion of the EIA Chapter, in terms of cumulative or residual impact, or supporting technical appendices.

Ecology

1.53 The proposed changes maintain the building position with regards to proximity to the River Medlock and the future receptor of the Mayfield Park.

1.54 These alterations have been assessed against the ecological features identified on and off site. The potential for significant effects on these features as identified within the Ecology chapter of the EIA has been reassessed.

Likely Significant Effects

1.55 It is considered that the proposed changes to the Baring Street MSCP will not change the assessment of significant effects during the construction or operation either alone or when assessed against potential cumulative effects with regards to other development in respect of terrestrial ecology.

1.56 Whilst the access to the car park has changed and reduces the amount of greenspace delivered by the plot on the western boundary, this area was not taken into consideration as part of the Biodiversity Net Gain calculations. Therefore, the retained proposed green space either side of the new access remains in addition to that proposed and assessed within the EIA. A slight increase in the parapet height of the top of the MSCP structure is not considered to have any further significant effects on ecology.

1.57 It is considered that the proposed changes to the Baring Street Office 1 will not change the assessment of significant effects during and construction or operation within Application 1 either alone or assessed against potential cumulative effects with regards to other development in respect of terrestrial ecology.

Mitigation and Residual Impacts

1.58 The proposed changes maintain the building location with regards to the River Medlock and Mayfield Park and therefore the assessment and mitigation of light spill remains the same. In addition, the lowering of the cantilever is not considered to add a significant additional impact to potential light spill from the building, so no additional measures above those recommended within the submitted ES are required.

1.59 On this basis, there are no different or significant cumulative or residual impacts anticipated and no additional mitigation measures required against those set out in Chapter 9 of the EIA Volume 1 submitted and dated October 2019.

Ground Conditions

1.60 In terms of changes that have relevance to the Ground Conditions section (Chapter 10) of the EIA, the proposed changes include lowering the ground floor by 400 mm to 34.50 m AOD.

1.61 This will provide betterment on the existing situation as the Made Ground containing slightly elevated levels of Polycyclic Aromatic Hydrocarbons (PAH's) is likely to be removed during construction (REC 2019 GI - CPBH02 at 0.20 m BGL, Benzo[a]pyrene, 42 mg/kg and Dibenzo[ah]anthracene, 12 mg/kg).

1.62 The proposed changes to Baring Street Office 1 include the provision of a basement (FFL - 32 m AOD) for cycle facilities, associated amenities and plant. During the basement excavation much of the Made Ground will be removed from site, creating betterment of the existing situation.

Likely Significant Effects

1.63 These alterations identified within the Ground Conditions chapter of the EIA have been assessed against the baseline conditions, potential impacts on ground conditions from earthworks, construction and operations, receptors identified on and off site, potential for significant impacts, cumulative effects with respect to adjacent developments, mitigation measures where significant impacts are identified and residual impacts.

1.64 It is considered that the proposed changes to the Baring Street MSCP nor Baring Street Office 1 will change the assessment of the baseline conditions, receptors, and significant impacts during the demolition, construction or operation of the plot within Application 1.

1.65 When assessed against potential cumulative effects with regards to other development in respect of ground conditions, it is not considered the amendments proposed alter the conclusions set out in the EIA dated October 2019.

Mitigation Measures

1.66 During the groundworks for the MSCP, appropriate mitigation measures should be in place to mitigate any significant impacts to the River Medlock and Chester Formation. Therefore, no additional measures above those recommended within the submitted EIA are required. The addition of half a level (Level 10) at the top of the car park will also not alter any of the above factors or conclusions from those set out in the EIA dated October 2019.

1.67 During the basement excavation at Baring Street Office 1, appropriate mitigation measures should again be in place to mitigate any significant impacts to the River Medlock and Chester Formation. Therefore, no additional measures above those recommended within the submitted EIA are required. Other modifications to the design will not impact any of the above factors.

Residual Impact

1.68 Consistent with the EIA dated October 2019, the residual effects are not likely to be significant during the demolition and construction or operational phases of redevelopment provided that:

- Appropriate hazard identification and risk assessment of potential contamination and ground gas are undertaken as part of the site works to confirm baseline conditions;
- Mitigation measures are reviewed and adopted based on site observations during the works; and,
- Good practice procedures are adhered to in both construction and health and safety during remediation and site development.

Water Resources and Flood Risk

1.69 The implications of the amendments upon the water environment, and changes to the original assessment made within the October 2019 EIA (ES Vol I, Chapter 11), are considered below.

1.70 This EIA Addendum supported by a Flood Risk Assessment (FRA) Addendum and updated Drainage Strategy (that replaces the Drainage Strategy from the September 2019 ES Vol II, Appendix 11.1), which provides commentary on any changes to the original FRA and Drainage Strategy (ES Vol II, Appendix 11.1).

1.71 The proposed changes of relevance to the car park include slightly lowering the western ground floor level and moving the car park access and egress location to a slip road off Baring Street.

1.72 In relation to Baring Street Office 1, the proposed changes of relevance include the addition of a basement to accommodate cycle facilities and back of house, at a FFL of 32m (AOD), which is accessed via the entrance lobby at a level of 36.15m (AOD), moving the building south to accommodate 750mm increase in footprint, and increasing the amount of office (Use Class B1) floor area by 701 sq m (GIA).

Likely Significant Effects

1.73 It is considered that the proposed changes to the Baring Street MSCP will not change the assessment of the baseline conditions, receptors, or significant effects during the construction or operational phase of the development. There are no changes to cumulative effects in this regard.

1.74 The proposed changes to Baring Street Office 1 are likely to increase the risk of flooding to the proposed basement given the lower FFL (AOD). Additional mitigation measures therefore will be required to ensure that the level of protection from flood risk is maintained, and the proposed basement must be waterproof to ensure no water penetration.

1.75 It should also be noted that a green roof is now proposed on this plot, described in the Baring Street Office 1 Drainage Strategy. Although this has not been counted towards the provision of on-site surface water storage (as CIRIA guidance C697 states hydraulic performance of green roofs during extreme events is similar to a standard roof), it will provide betterment. The overall residual effects, relating to potable and foul water demands predicted to be negligible within the October 2019 EIA, remain unchanged.

1.76 With waterproofing mitigation implemented, coupled with the provision of a green roof on the plot, there are no changes to the assessment of significant effects during the construction or operational phase of the development. There are no changes to cumulative effects in this regard.

Mitigation Measures

1.77 As mentioned in the Flood Risk Assessment Addendum (Appendix 11.1A), the proposed basement of Baring Street Office 1 will be required to implement waterproofing measures, so as to ensure that the level of protection from flood risk is maintained. In order to mitigate any risk from flooding, the proposed basement under Baring Street Office 1 will need to be waterproof to a minimum of grade 2 to BS8102:2009.

Residual Impact

1.78 On the basis that mitigation is applied to the proposed basement of Baring Street Office 1, the residual impacts and cumulative impacts are consistent with those set out in Chapter 11 (Water Resources, Drainage and Flood Risk) of the October 2019 EIA and its associated technical appendices (included within this EIA Addendum as Appendix 11.1A).

Wind Microclimate

1.79 This EIA Addendum updates part of the assessment set out in Chapter 12 from the October 2019 EIA as a result of the latest scheme amendments set out in paragraphs 1.5-1.7. The development proposals associated with Application 2, related to Baring Street Office 2, remain unchanged from that assessed in the October 2019 ES.

1.80 The assessment approach, methodology, policy context and baseline conditions set out in the October 2019 ES Wind Microclimate chapter (ES Vol I, Chapter 12) remain valid. A full EIA Addendum Statement with updated wind results are contained in Appendix 12.1.

Likely Significant Effects

1.81 There are three main changes in the modelled test when compared with the October 2019 ES. The first one is the reduction of the height of Plot N by 3m, the second is the increase of the height of the cantilever to the north of Baring Street Office 1, and finally the third one is the integration of the proposed mitigation from October 2019 EIA in to the current test.

1.82 The updated test results show very similar operational effects to those reported in the October 2019 ES. However, a slight reduction to windy areas in yellow (suitable for pedestrian walking) is noticed, mainly produced by the reduction of height of Plot N. In line with the October 2019 ES, no safety concerns have been identified. Conditions for summer and winter for Application 1 wind effects are presented in Appendix 12.1.

1.83 The operational effects remain unchanged from the October 2019 ES. A slight reduction in windy areas is, however, noticed mainly due the height reduction of plot N. In line with the October 2019 ES, no safety concerns have been identified.

Cumulative and Residual Effects

1.84 In this cumulative scenario, the same mitigation that was tested for the Application 1 and Application 2 scenario has been applied. The reduction in height of the Plot N slightly reduces the area where windy conditions occur. However, in terms of magnitude of effect no changes have been identified compared with the October 2019 ES. No safety concerns have been identified, in line with the October 2019 ES.

1.85 Future monitoring of significant residual effects remains unchanged from the October 2019 ES.

Daylight, Sunlight, and Overshadowing

1.86 Daylight, Sunlight and Overshadowing assessment and EIA Chapter is affected only by the overall massing and location of the Proposed Development. Relevant changes in this regard are extending the Baring Street Office 1 to the south by 920mm to accommodate refinement of the footprint between the building and Baring Street MSCP and lowering the western entrance overhang. In relation to the Baring Street MSCP, there is an additional level of car parking with an increase in parapet height of 257mm.

Likely Significant Effects

1.87 It is considered that the proposed changes to Baring Street Office 1 will not change the conclusions of the October 2019 EIA assessment because:

- The minor impact on the lower storeys of Liberty Point is a result of the upper extent of the massing of Baring Street Office 1. As the overall height of Baring Street Office 1 is unchanged, its impact on Liberty Point will remain **minor adverse**.
- The proposed Baring Street Office 1 massing is too far away from proposed on-site residential units to have an impact on their daylight and sunlight access. As the overall height of Baring Street Office 1 is unchanged this remains the case.
- The negligible impact on Mayfield Park will remain negligible as overshadowing of the proposed park is produced by the northeast facing façade, which remains in the same location and the same height.

1.88 It is considered that the proposed changes to Baring Street MSCP will not change the conclusions of the October 2019 EIA because:

- The proposed Baring Street MSCP massing is too far away from proposed on-site residential units to have an impact on their daylight and sunlight access. This remains the case following the increase in parapet height.
- Overshadowing of the south-western edge of the park is predominantly produced by Baring Street Office 1, the adjacent Baring Street Office 2 and surrounding buildings, with minimal additional shading from the proposed Baring Street MSCP massing. This remains the case following the increase in parapet height.

1.89 As set out above, there is no further need for re-testing based on this qualitative assessment, which should be read in conjunction with ES Volume 1, Mayfield (dated October 2019).

Mitigation and Residual Impacts

1.90 On this basis, the mitigation measures, cumulative impacts and residual impacts are consistent with those set out in Chapter 13 (Daylight and Sunlight) of that ES and its associated technical appendices.

Townscape and Visual Impact

1.91 The author of the TVIA has reviewed the proposed design changes and can confirm that there will be no change to the conclusions of the TVIA chapter in the EIA as a result of the proposed amendments to the Phase 1 Mayfield Application.

1.92 There is however, likely to be minor and subtle changes to some of the rendered images contained in Appendix 14.2, notably views 4, 5 and 6, in response to minor changes to the cladding for both Baring Street Office 1 and the Baring Street MSCP.

1.93 On the basis that there will be a negligible change to four viewpoints, there will be no change to the conclusions of Chapter 14 in terms of cumulative or residual impact. An updated CGI has been submitted with the Application to confirm the revised treatment.

Socio-economic Impact

1.94 The scheme has been reviewed by ekosgen to provide an update on how the changes, described in this EIA Addendum, impact the previous socio-economic impact assessment in the Environmental Statement for Mayfield Phase 1.

1.95 The relevant changes to Application 1 include additional employment space and car parking, meaning some additional jobs can be accommodated within the new development, impacting upon the employment and local expenditure from the development during operation. The additional employment and local expenditure result in a modest increase to the previous socio-economic impact assessment.

Likely Significant Effects

Employment

1.96 The revised schedule for Baring Street Office 1 now comprises of an additional 701 sq m (GIA) of employment space, likely to be Use Class B1. Based on the previously applied employment densities, assuming the employment space is fully occupied, the additional office space would generate 60 direct FTE jobs at the Site. This would be beneficial, but would not alter the degree of impact associated with the Proposed Development.

Local Expenditure

1.97 Based on the previous assumptions on annual wages an estimated uplift of £1.2m in wages each year is expected. This would increase expenditure in the local area and benefit local businesses, as well as bringing positive supply chain effects, but would not be significant beyond that previously set out.

Residual and Cumulative Effects

1.98 Based on the above assessment, this increase in impact does not materially affect the final assessment of significance reported in the EIA.

Cumulative Impact

1.99 The EIA and other freestanding technical assessments that were undertaken to support the Proposed Development included cumulative impact assessments which, where necessary, took into consideration the committed developments within the area.

1.100 When taking into account proposed mitigation measures, these studies have not revealed any significant adverse stand-alone or cumulative (Type 1 or Type 2) environmental impacts, subject to mitigation measures being adhered to, and the proposed amendments set out in this Addendum will not impact on this conclusion.

1.101 It is therefore considered that the proposed amendments would not result in any significant cumulative impacts when considered alongside other committed development and / or proposed development close to the site.

Conclusion

1.102 In view of the information set out in this EIA Addendum Statement, it can be concluded that there will be no significant effects on the environment on or close to the application site, beyond those already identified and mitigated for within the EIA dated October 2019, as a result of the proposed amendments.

1.103 As such, there are no changes required to the Non-Technical Summary of the EIA and the Technical Appendices (Volume 2) remain the same unless included in the Appendices to this EIA Addendum.

Appendix 11.1A – Updated Flood Risk Assessment and Drainage Strategy

BUROHAPPOLD
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Mayfield Phase 1 Foul and Surface Drainage Strategy

0042912

19 December 2019

Revision P03

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Revision	Description	Issued by	Date	Checked
P01	Drainage Strategy	JS	02/09/2019	AG
P02	Drainage Strategy Amendments	JS	13/09/2019	AG
P03	Update	JS	19/12/2019	AG

https://burohappold-my.sharepoint.com/personal/tom_peacock_burohappold_com/Documents/Documents/Mayfield/Mayfield Site Wide Drainage Strategy P03.docx

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date	**19/12/2019**
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date	**19/12/2019**

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1 Introduction

BuroHappold Engineering has been appointed by U+I Group PLC on behalf of the Mayfield Development Partnership LP to prepare a drainage strategy for Mayfield Phase 1 Development, including two commercial office blocks, a multi-storey car park and creation of a city centre park, in September and October 2019 and will become a reference document for other development within the Mayfield SRF 2018 area. . The Phase 1 site is 7 Ha and is bounded by the Mayfield Depot building to the north, Hoyle Street to the east, the Mancunian Way ring road (A635) to the south and Baring Street (inclusive) to the west. The Site boundary also extends to the London Road junction and access to Baring Street to facilitate road improvements proposed ("the Site").

This report has been prepared to describe the proposed surface water and foul water drainage strategy for the new development, a high-quality urban neighbourhood with residential buildings and public spaces just south of the Manchester Piccadilly Railway Station.

Figure 1-1 Proposed Mayfield Masterplan

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2 Legislation, Policy and Guidelines

2.1 Planning Context

The management of water resources is governed by a range of legislative guidance set out within international, national and regional policies and plans. The stormwater strategy has been prepared with due regard to the plans and policies set out in this section.

2.1.1 Planning Policies and the Guidance

The Drainage Strategy has been developed in accordance with the following policies and guidelines:

- National Planning Policy Framework – March 2012
- Water Resources Act 1991 – December 1991
- Flooding and Water Management Act 2010 – April 2010
- Guide to Development in Manchester Supplementary Planning Document and Planning Guidance Adopted - April 2007
- Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA User Guide Final – May 2010
- Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Level 2 SFRA Final – March 2011
- Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Canal Hazard Zones, Drawing Number MM_3.2B, Final – March 2011
- Manchester City, Salford City and Trafford Councils (March 2011) Level 2 Hybrid SFRA Critical Drainage Areas, Drawing Number SS_4.5, Final – March 2011
- Manchester City, Salford City and Trafford Councils (March 2011) Level 2 Hybrid SFRA Flood Risk Management, Drawing Number FL_1.1 F, Final – March 2011
- Manchester City Council SuDS Requirements for New Developments
- Manchester Green and Blue Strategy – July 2015
- Manchester Green and Blue Action Plan – July 2015
- Northwest River Basin Management Plan – February 2015
- Environment Agency (EA) Guidelines

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3 Consultation with Manchester City Council and the Environment Agency

3.1 Manchester City Council (MCC)

Following conversations and meetings with MCC the below parameters were agreed:

- Proposed discharge rate is to be restricted to 50% of the existing brownfield runoff rate with 2l/s/ha to be subtracted from this peak 50% discharge rate.
- Climate change allowance is to be 30%, however, attenuation volumes should also be checked against a 40% allowance.
- No flooding of buildings occurs in 1 in 100 year rainfall event plus climate change allowance. Plot designers will need to accommodate all the necessary surface water attenuation within the plot demise. The attenuation will need to be designed to accommodate the 1 in 100 year storm events plus climate change allowance based on a 50% brownfield rate with a further reduction of 2l/s/ha for long-term storage.
- Surface flooding of open spaces is acceptable for short periods in events over 1 in 30 year return period rainfall events
- Overland flow routes for extreme events are diverted away from buildings
- As the existing site is brownfield the 1 in 100 year, 6 hour rainfall runoff volume shall be constrained to a maximum of the existing brownfield runoff volume for the same event. Our aspiration is to better this where we can
- For surface car parks (>50 spaces) and areas of unusual pollution risk pollution control measures will be provided (likely to be a combination of petrol interceptors and SuDS features where applicable)

3.2 Environment Agency (EA)

After consultation with the EA it was agreed that discharge of surface water into the Medlock River would be acceptable.

3.3 Scoping Opinion Response

A scoping opinion was submitted to MCC in July 2019 the comments returned highlighted two key issues for the drainage strategy to address:

The area is situated within the Conurbation Core Critical Drainage Area and in accordance with the Manchester City Council SFRA at least a 50% reduction in surface water runoff should be provided through SUDS as part of any brownfield development with the aim of reducing to the Greenfield runoff rates.

Surface water should be managed to ensure there is no increased surface water from the proposed development and runoff from extreme events should be retained within the site such that the adjacent third party land is not affected.

And;

The suitability of sustainable drainage systems should be assessed in accordance with paragraphs 051, 079 and 080 of the revised NPPF Planning Practice Guidance for Flood Risk and Coastal Change Sustainable drainage systems should be designed in line with national Non-Statutory Technical Standards for SuDS and local policies EN08, EN14 and EN17 of the Core Strategy.

Hydraulic calculations and drawings to support the design need to be provided along with proposed standards of operation and maintenance in accordance with paragraph 081 of NPPF Planning Practice Guidance.

Both of these points are addressed as part of the proposed surface water strategy.

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4 Existing Site Existing Site

The Mayfield Phase 1 Development Site is a 7ha and is located in Manchester City Centre to the immediate south/southeast of Piccadilly Railway Station, centred at NGR 385006 397717. The River Medlock meanders through the central area of the Site, flowing from east to west within a deep rectangular brick/stone walled channel. It is culverted beneath Hoyle Street.

The Site is currently occupied by existing and historical urban development comprising the former (now abandoned) Mayfield Railway Station and associated railway lines, numerous works/factories, a scrap yard, a depot, Hoyle Street Industrial Estate, derelict land and car parking. The immediate surrounding area comprises urban development including residential (student accommodation/private rental), offices, commercial and industrial facilities.

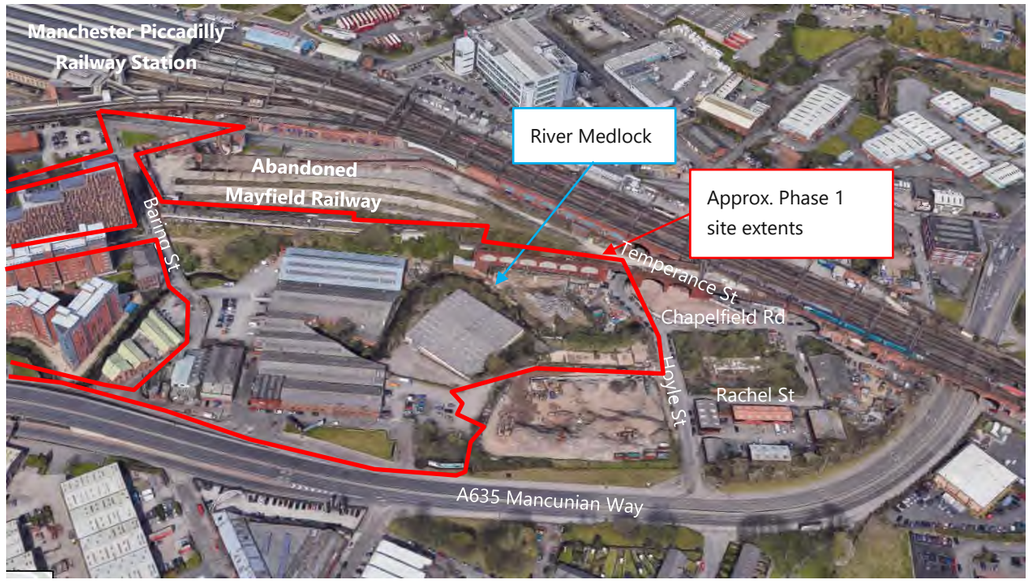

Figure 4-1 Existing Site with the Phase 1 Site Boundary

The condition of the river varies. The river wall is generally in a poor derelict state of repair with parts collapsed into the river. It is assumed that some stormwater is seeping through cracks into the River Medlock. In many locations, siltation has built up on one or both sides of the river bank. The silt deposits have enabled the dense growth of vegetation along almost the entire corridor. Japanese Knotweed is currently present along the riparian corridor within the site.

The site is heavily overgrown in areas and is largely covered in impermeable hardstanding and buildings in various states of condition with hardscaping in areas being cracked and deteriorated.

4.1 Existing Flood Zones

Extract from River Strategy Report and water chapter of Strategic Regeneration Framework dated 12/10/2017:

"The Environment Agency's flood risk mapping shows parts of the existing site to be highly susceptible to flooding with the River Medlock canalised between the high walls and under industrial buildings. Flooding of the site is concentrated around the Medlock in the central area (Flood Zone 3 High risk) with some Flood Zone 2 (Medium risk) on the margins. However, the majority of the site is situated within Flood Zone 1 (Low risk) with a flood risk less than 0.1% (on average one occurrence in 1000 years). Flood risk from ground water, surface water and artificial sources is currently considered low to very low at the site.

The regeneration of Mayfield will allow the river corridor and floodplain to be carefully reprofiled using the results of detailed hydraulic modelling, that will ensure the park can reduce the risk of flooding and mitigate for the effects of climate change. The well-considered design will ensure that there will be no detrimental effects upstream or downstream, with finished floor levels for property set well above design flood levels as recommended by the Environment Agency (EA). This will ensure the development is safe, with appropriate pedestrian and vehicular access, even during the 0.1% AEP event for maintenance or improvements works."

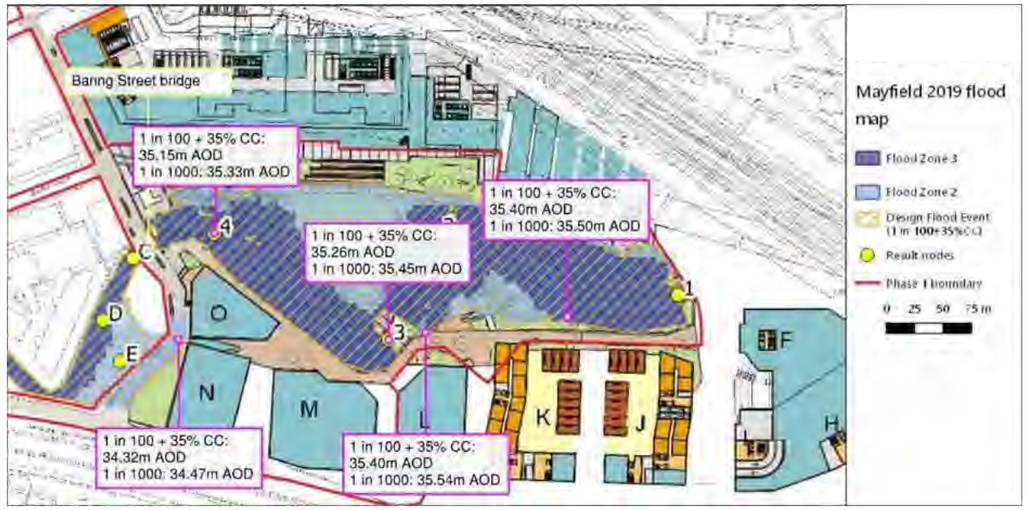

Figure 4-2 Mayfield 2019 Flood Map extract from the Flood Risk Assessment

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5 Existing Surface Water Drainage

5.1 Existing Drainage and Outfalls

It is unclear from public sewer records how the current site is drained however the lack of available information would suggest that the vast majority of the site is served by private drainage networks. It is likely that the buildings are served by individual connections to the United Utilities combined sewers that surround the site.

The site generally slopes towards the River Medlock and it is assumed that it drains into the river. Only one outfall is shown on the topographic survey conducted by Malcolm Hughes. Visual inspection of the river bank on a site visit (conducted 01/10/2017) highlighted one existing drainage outfall to the River Medlock (Figure 5-1). It is assumed that this is a stormwater only outfall however this has not been confirmed at this stage. It is assumed that there are more outfalls along both banks however due to the overgrown and inaccessible nature of the river banks these are not currently observable. Responsibility for managing these systems is assumed split due to the wide array of site situations.

Figure 5-1 Existing Outfall Observed During Site Visit

The existing drainage is assumed to have been designed and installed in accordance with national standards. It is assumed that the existing below ground stormwater drainage system discharges at an uncontrolled rate and no on-site storage exists or is anticipated.

There is a short length of 150mm diameter United Utilities combined sewer just to the south of the southwest end of the abandoned Mayfield train station. The sewer does not appear to drain to an obvious discharge point on the sewer records so this sewer alignment and depth needs to be confirmed via a site-wide utility survey, however, it is assumed to connect to the combined sewer along Amory Street. Other combined sewers within the site and the site's proximity are discussed in section 6 regarding the existing foul water drainage.

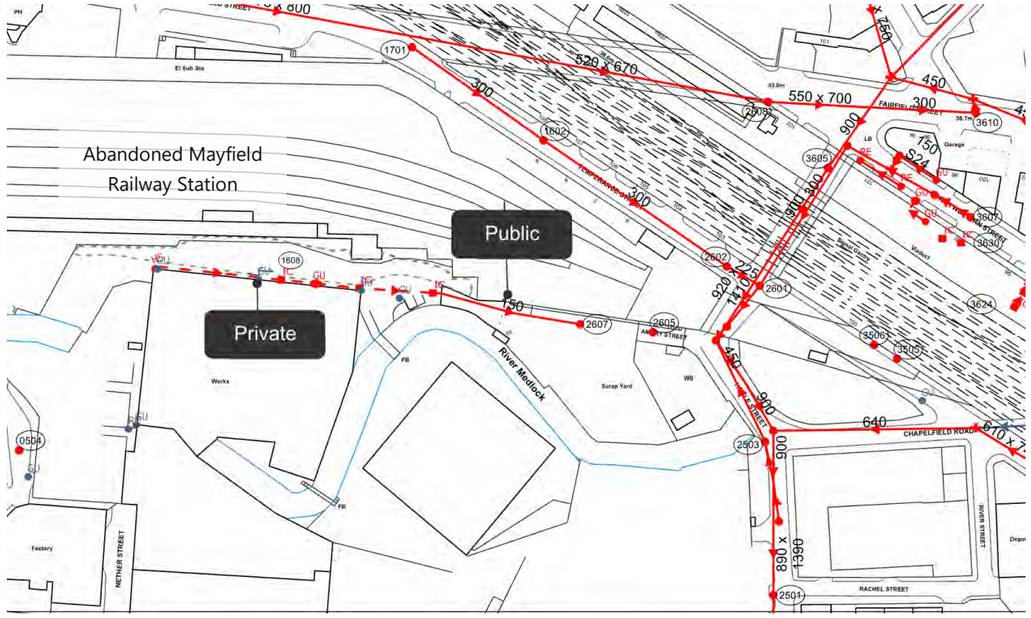

Figure 5-2 Location of the 150mm Combined Sewer on United Utilities Record Drawing (Image courtesy of the United Utilities © United Utilities Water PLC 2017)

Existing topographic surveys show gullies within Hoyle Street, Baring Street, Temperance Street and Chapelfield Road however the condition and exact layout of these stormwater drains are unknown at this stage. It is proposed to retain these drains throughout the resurfacing of these roads and reuse them in the final masterplan.

5.2 Exiting Discharge Rates and Volumes

Table 5—1 Pre-Development Peak Greenfield and Existing Brownfield Discharge Rates

Annual Probability	Greenfield Peak Discharge (l/s)	Existing Brownfield Peak Discharge (l/s)
2	34.8 l/s	61.6 l/s
30	63.5 l/s	139.9 l/s
100	77.75 l/s	188.4 l/s

It should be noted that the values in Table 5—1 have been calculated using the area of the proposed park and Baring Street within the application boundary as this area relates to the area that will be captured and discharged by the storm water system within this application. This area is 3.68 ha.

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6 Existing Foul Water Drainage

Mayfield is served by a network of public combined sewers (conveying both foul and surface water together) situated beneath the principal roads both within the masterplan (Hoyle Street, Baring Street and Chaplefield Road) and immediately beyond its perimeter (Mancunian Way, Fairfield Street and Temperance Street). United Utilities (UU) records show one number site sewer as having been adopted, situated in Amory Street, site of the proposed park.

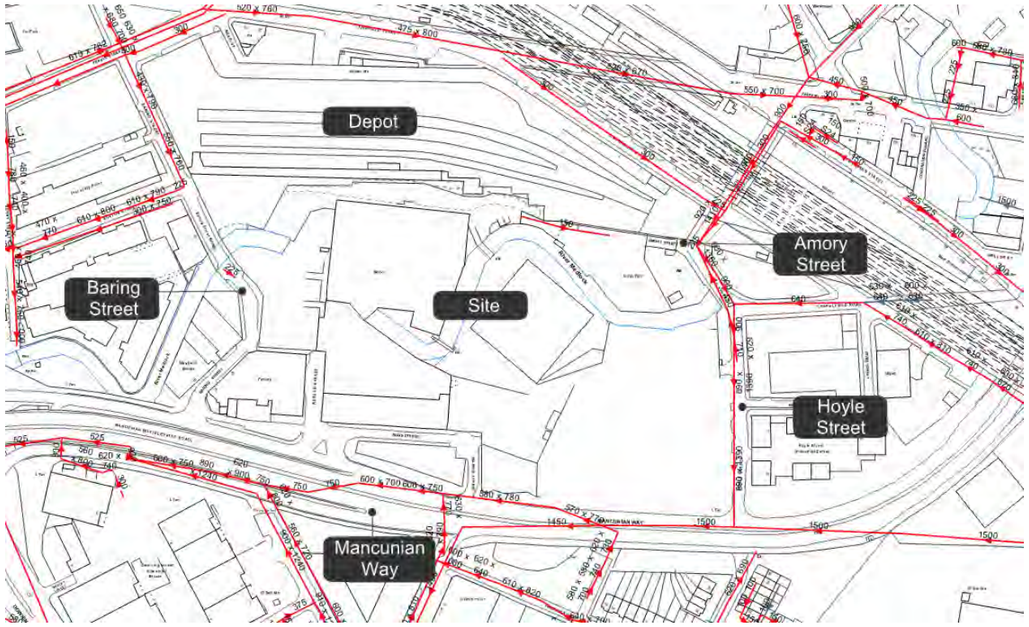

Figure 6-1 United Utilities Sewer Asset Record. (Image courtesy of the United Utilities © United Utilities Water PLC 2017)

UU network pipes sizes vary from 150mm diameter to 1500mm in Mancunian Way. Pipe materials are a mix of vitrified clay and brick and sewer shape varies from circular to egg. Sewer depths appear significant, up to 10m in places, suggesting that they have excavated in rock or possibly constructed within a tunnel heading. UU sewer levels and exact manhole locations are unknown in the majority of cases. A line and level survey at probable points of connection will be required at the next stage.

Information pertaining to the private site foul drainage is limited, and no as-built data is available. UU asset records record a length north of the river serving the Fedex building, does not appear to drain to an obvious discharge point on the sewer records, however, it is assumed to connect to the public sewer in Amory Street. A known private combined sewer is connected to this run.

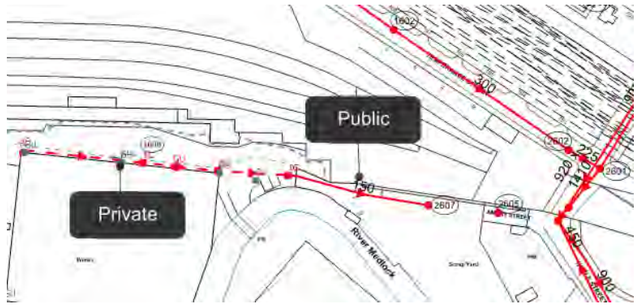

Figure 6-2 Known private site sewerage (Image courtesy of the United Utilities © United Utilities Water PLC 2017)

Localised private sewerage is also known to have been installed as part of the Mayfield Masterplan development, accessed from Baring Street. The new public connection is not shown on the UU record drawings.

The sewers that run underneath Chapelfield Road and Hoyle Street are both assumed to be Victorian era, egg-shaped brick combined sewers of unknown condition and are owned by UU. The sewer that runs beneath Chapelfield Road is buried approximately 2-3m deep based on incomplete UU sewer records and is recorded as a 640mm "diameter". There are two sewers that run down Hoyle Street in opposite directions. There is a 450mm diameter combined sewer draining northwards at approximately 5m depth that runs for roughly a third of the length of the section of Hoyle Street that is within the site boundary. A much larger and deeper 900mm "diameter" combined sewer flows southwards beneath this sewer at a depth of between 8-14m. It is assumed based on limited ground information that this deep sewer is within rock. The other two sewers may be partly within rock but are likely to be buried within the made ground on site. Based on guidance provided by UU no-build easements have been calculated for the existing sewers

UU records show a short length of sewer south of the river within Baring Street. Investigation is recommended to ascertain the extent and suitability of this sewer to receive flows in this area.

This review of existing below ground foul drainage information concludes that a drainage survey is required to confirm the on-site private sewerage network and key points of probable connection to the public UU network beneath the adjacent roads.

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7 Proposed Surface Water Drainage

7.1 Proposed Strategy

The proposed drainage strategy shall be designed:

- To protect against flooding
- To collect and convey surface water away from developed areas in a safe and controlled manner
- To protect surface receiving waters, in both quality and hydraulic terms
- To be sustainable and maintainable; and
- To ensure structural integrity over the duration of the development design life

The new below ground drainage network shall replace the existing and convey water to outfall into the River Medlock. It is proposed that all new sewers will drain by gravity, wherever possible however pumping stations may be required to keep the attenuation storage above modelled flood levels. Due to the existing ground conditions, infiltration and other source controls are generally unlikely to be achievable.

The majority of the green space proposed in the landscape masterplan is within the park and whilst it lies within the flood plain, where appropriate, areas will form part of the Sustainable Urban Drainage solutions (SuDs) (see below) network for the overall development. The strategy proposes that all surface water that falls within the park will flow over-ground and either infiltrate to the underlying strata or flow into the river via the green landscaped areas. Therefore, the Park will incorporate SuDs prior to discharge to provide a water quality benefit. These could include filter strips and swales to reduce suspended solids within the surface water runoff.

All surface water from the surrounding building plots will utilise a range of SuDs systems including green, blue and brown roofs, rainwater harvesting, raingardens and below ground storage. The plots will also utilise surrounding landscaped areas if levels and the operational use of the landscape areas will facilitate the incorporation of SuDs features. These measures will designed to meet the required surface water discharge rates for the development.

7.2 Drainage Design Hierarchy for Sustainable Drainage

The design of the SuDs will need to take account of the flood plain and the contaminated ground conditions that may preclude the use of methods that rely on infiltration. In developing the storm water strategy for the masterplan, the following design hierarchy has been adopted.

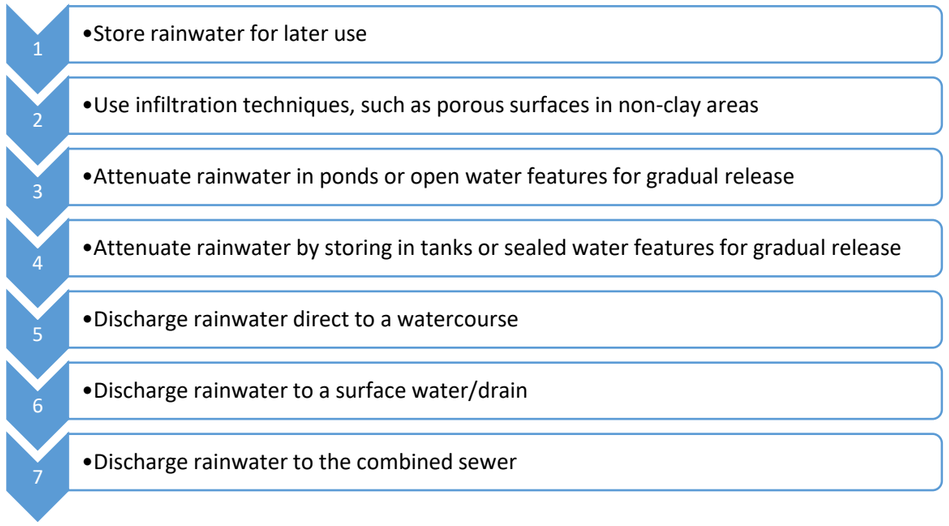

Figure 7-1 SuDS Design Hierarchy

7.2.1 Rainwater Harvesting

Rainwater harvesting could be proposed as part of the on plot water strategy but has not been decided at this stage. This could be developed further by the plot designers at the detailed design stages subject to technical feasibility and cost viability.

7.2.2 Infiltration Techniques

Permeable paving is unlikely to be compatible with proposals for the resurfacing of Hoyle Street, Baring Street and Temperance Street and is unsuitable for use in areas where tight HGV manoeuvring would occur due to wheel loads and tyre scrub. The paving along the footpaths that are within the flood zones are proposed to be permeable.

Areas of the park will use infiltration techniques for storms up to 1 in 30 years plus climate change via swales/infiltration trenches. See section 7.2.3 below.

7.2.3 Rainwater attenuation in open water features for gradual release

There is insufficient space for large open water features such as lakes outside of the flood zone, however, in some areas within the flood zone, swales/infiltration trenches will be introduced to contain 1 in 30 year storm event runoff from neighbouring softscape and footpaths. The remaining runoff from a 1 in 100 year storm event will overflow into the River Medlock. There is no need to generate enough hydraulic head to push the water into the River Medlock during a flood event as these areas will have flooded. Examples of a swale and an infiltration trench are shown below.

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Figure 7-2 Infiltration Trench Example (Left); Swale Example (Right)

7.2.4 Rainwater discharge direct to a watercourse

It has been agreed with the EA to discharge surface water runoff into the River Medlock that runs through the centre of the site. Areas of hardstanding outside of the fluvial flood zone will discharge into the river.

7.2.5 Rainwater attenuation above ground

Buildings will utilise a range of SuDs systems including green, blue and brown roofs, rainwater harvesting and raingardens. These will be designed and determined by the plot designers.

7.2.6 Rainwater attenuation below ground

Rainwater attenuation below ground is not required for areas in the public realm. Plot designers will be required to attenuate their surface water runoff at 50% of the 1 in 100 year storm brownfield runoff rate minus 2l/s/ha as agreed with MCC.

The discharge of the plot designers' attenuation will be discharged into the proposed surface water network that transfers surface water to the River Medlock.

7.2.7 Rainwater discharge to a surface water sewer or drain

There are no public surface water sewers. Currently it is assumed that the majority of the site is connected to a private surface water network that drains into the River Medlock. The intention is to discharge all surface water into the River Medlock as agreed with the EA. This will replicate the existing conditions for the majority of the site.

7.2.8 Rainwater discharge to a combined sewer

Part of the site currently drains into public combined sewers situated around the site. However, to improve the situation with regards to sustainable urban drainage, it is propose to discharge surface water into the River Medlock as agreed with the EA.

7.3 Design Parameters

We propose that all new buried drainage provides the following levels of service:

- No surcharge within the pipe network up to and including a 1:2 year storm event;
- No flooding of the drainage system up to and including a 1:30 year storm event;
- Management of flood water up to the 1:100 year storm event.
- Climate change allowance included in the infrastructure design shall be 30%; and
- Proposed discharge rate for plot attenuation shall be restricted to 50% of the existing peak brownfield runoff rate with 2l/s/ha subtracted from this 50% peak discharge rate (1 in 100 year) as per discussions with MCC and the EA.

7.4 Catchment Areas

Indicative surface water sewer runs were created within the masterplan. Catchment areas were then created based on the sewer runs and the landscaping layout. Catchment areas are shown in Table 7—1. The effective areas for each catchment have been calculated using the runoff coefficients of 0.95 for hardscaping and buildings and 0.3 for softscape landscaped areas. The locations of the catchment areas can be seen in Figure 7-3.

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Table 7—1 Catchment Areas

Catchment Type	Catchment Ref.	Catchment Area (m^2)	Catchment Area (ha)	Hardscape (%)	Softscape (%)	Effective Hardscape Area (ha)	Effective Softscape Area (ha)	Total Effective Area (ha)
Landscape	C1	2439	0.24	60%	40%	0.14	0.03	0.17
Landscape	C2	4200	0.42	65%	35%	0.26	0.04	0.30
Landscape	C3	3108	0.31	10%	90%	0.03	0.08	0.11
Landscape	C4	3619	0.36	68%	32%	0.23	0.03	0.27
Landscape	C5	430	0.04	55%	45%	0.02	0.01	0.03
Landscape	C6	929	0.09	95%	5%	0.08	0.00	0.09
Landscape	C7	598	0.06	70%	30%	0.04	0.01	0.05
Landscape	C8	966	0.10	90%	10%	0.08	0.00	0.09
Landscape	C9	323	0.03	100%	0%	0.03	0.00	0.03
Landscape	C10	1054	0.11	15%	85%	0.02	0.03	0.04
Landscape	C11	670	0.07	97%	3%	0.06	0.00	0.06
Landscape	C12	44	0.00	100%	0%	0.00	0.00	0.00
Building	B1a	1126	0.11	100%	0%	0.11	0.00	0.11
Building	B1b	1784	0.18	100%	0%	0.17	0.00	0.17
Building	B2	2609	0.26	100%	0%	0.25	0.00	0.25

Figure 7-3 Catchment Areas Plan

Catchment area C13 shown in the plan is to be drained by the surface water system that runs along Baring Street and is design by Civic Engineers and therefore has not been included in the surface water sewer design. Catchment area C14 is to be drained via the same method as it currently drains. It's drain paths are to be unaffected.

There is potential for rainwater runoff in catchment area C1 to fall into the planting areas between the hardscaping during low rainfall intensities, however, during higher rainfall return periods, this area will need to be provided with a flow path to the Medlock to avoid localised flooding.

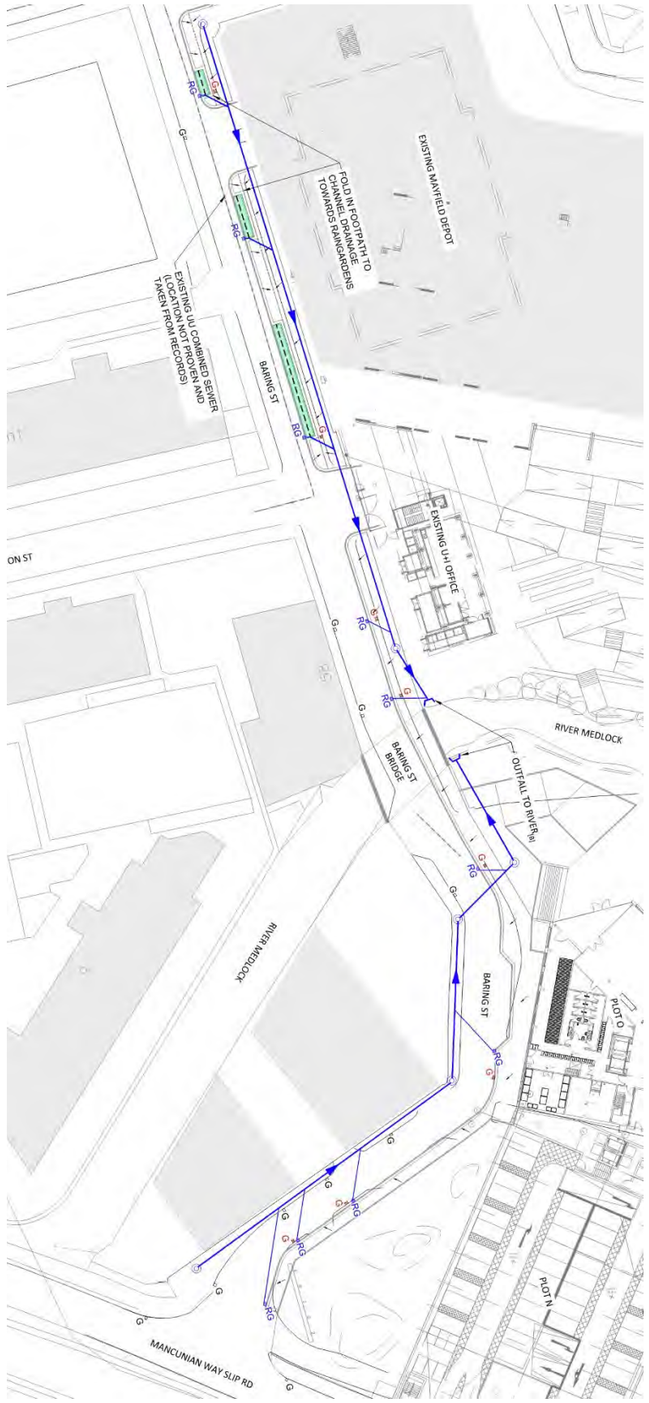

Figure 7-4 Civic Proposed Surface Water Sewer Run

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The existing runoff rates within these catchments have been calculated using the topographical survey. The difference between the existing and proposed effective areas within each catchment can be seen in the table below.

Table 7—2 Existing Catchment Areas

Catchment Ref.	Hardscape (ha)	Softscape (ha)	Effective Hardscape Area (ha)	Effective Softscape Area (ha)	Total Effective Area (ha)
C1	0.05	0.19	0.05	0.06	0.11
C2	0.28	0.14	0.26	0.04	0.31
C3	0.31	0.00	0.29	0.00	0.29
C4	0.34	0.02	0.33	0.01	0.33
C5	0.03	0.01	0.03	0.00	0.03
C6	0.09	0.00	0.09	0.00	0.09
C7	0.06	0.00	0.05	0.00	0.06
C8	0.06	0.03	0.06	0.01	0.07
C9	0.02	0.01	0.02	0.00	0.03
C10	0.11	0.00	0.10	0.00	0.10
C11	0.06	0.01	0.05	0.00	0.06
C12	0.00	0.00	0.00	0.00	0.00
B1a	0.11	0.00	0.11	0.00	0.11
B1b	0.18	0.00	0.17	0.00	0.17
B2	0.22	0.05	0.20	0.01	0.22

7.5 Building Runoff Rates and Discharge Points

The MCC has stipulated that the surface water discharge from the plots will need to be restricted to 50% of the peak brownfield discharge rate (1 in 100 year storm event) minus 2l/s/ha. Brownfield runoff rates for the proposed buildings have been calculated based on the catchment areas of the buildings using the Modified Rational Method. The plot teams have provided flow rates with further reductions for discharging the buildings' surface water into the proposed surface water sewer. These discharge rates have been used in the design of the surface water sewer.

Table 7—3 Brownfield Runoff Rates

Building Catchment Ref.	Effective Area (ha)	1 in 100 year storm event 50% Brownfield Runoff Rate minus 2l/s/ha (l/s)	Discharge Rates from Plot Teams (l/s)
B1a	0.11	10.10	7.50
B1b	0.17	16.00	10.70
B2	0.25	23.40	15.80

The surface water system will also need to take into account future runoff from the proposed buildings around the site. Points of connection to the proposed external surface water system for the on plot attenuation tanks at the required maximum discharge rates are shown in the figure below. See Appendix F for drainage strategies from the plot teams.

Figure 7-5 Surface Water Plot Connection Points into proposed surface water sewer

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7.6 Proposed Outfalls

Due to the high river flood levels during high return-period river flooding events the stormwater outfalls into the River Medlock will become surcharged and thus submerged. This can mean that water is unable to discharge unless there is sufficient hydraulic head in the network to force the water out of the outfall. For most buildings/plot this is unlikely to be a problem as the invert levels of the proposed storage features will be above the high river flood levels and therefore provide enough hydraulic head to discharge into the River Medlock.

However, where invert levels of any attenuation within the proposed buildings are below the 1in 5 year flood levels, it is proposed that these are drained via a pumping or lifting station to provide sufficient hydraulic head.

Where possible, the invert levels of the outfalls have been proposed to be above the 1 in 25 year flood event. However, due to the levels and gradients around the site in some locations it is not possible to achieve this. Instead the average river level has been used as the minimum outfall invert level. There are three outfalls where this occurs, two of which are within the river bank areas of the Phase 1 site. However, it is deemed unlikely that a high intensity fluvial event will coincide with a high intensity rainfall event. If a convergence occurs, there is sufficient hydraulic head within the surface water network to prevent flooding to the buildings/plots if the outfalls are submerged.

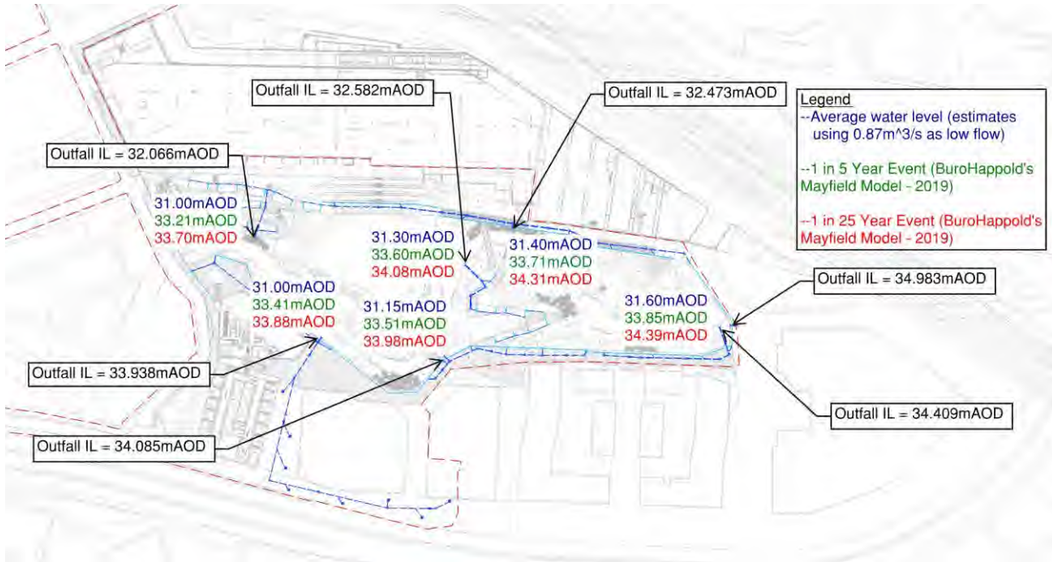

Figure 7-6 1 in 25 Year fluvial flood levels and Average Water Levels near proposed outfalls

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7.7 Proposed Layout

After hydraulic analysis using the catchment areas and brownfield runoff rates of the buildings the layout shown below is proposed. For more detail including pipe sizes and manhole sizes see Appendix D.

Swales/Infiltration trenches have been proposed in some areas of the flood zone to contain 1 in 30 year storm event runoff from neighbouring softscape and hardstanding. The remaining runoff from a 1 in 100 year storm event will overflow into the River Medlock. Footpaths within the river bank areas are proposed to be permeable and include a SuDS system geotextile between its foundations and subgrade that will filter any potential contaminates.

Any flooding from a 1 in 100 year storm that occur within the surface water network will be contained on site and flow towards the River Medlock as the site slopes towards the river.

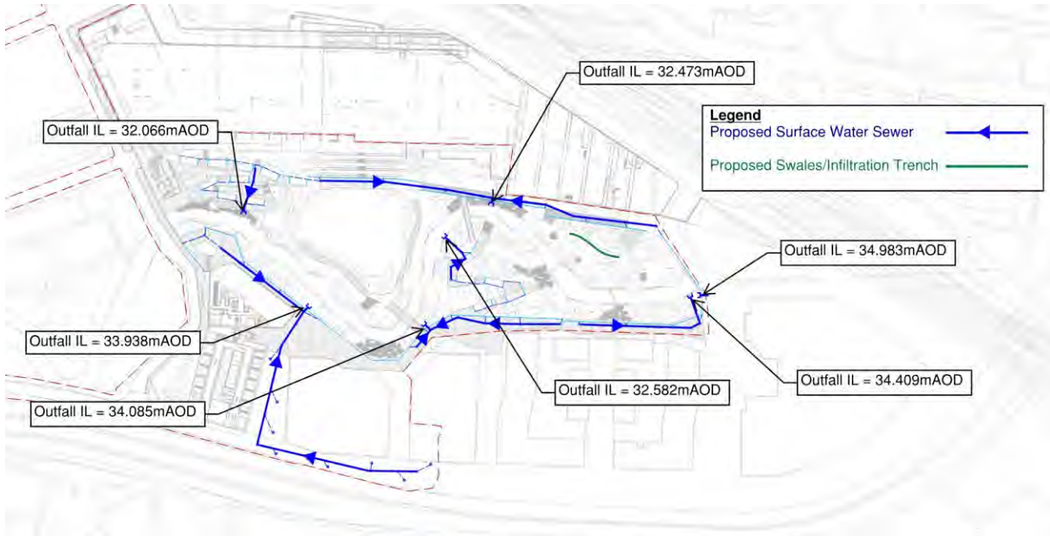

Figure 7-7 Proposed Surface Water Drainage Layout Plan

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8 Proposed Foul Water Drainage

A proposed foul network has been provided to allow plot teams to connect. The proposed network will then connect into the existing UU combined sewer network to the south of the site. Plot connections to the proposed foul water sewer are shown below.

A description of the individual plot drainage strategies and details for plot foul water networks can be found in Appendix F.

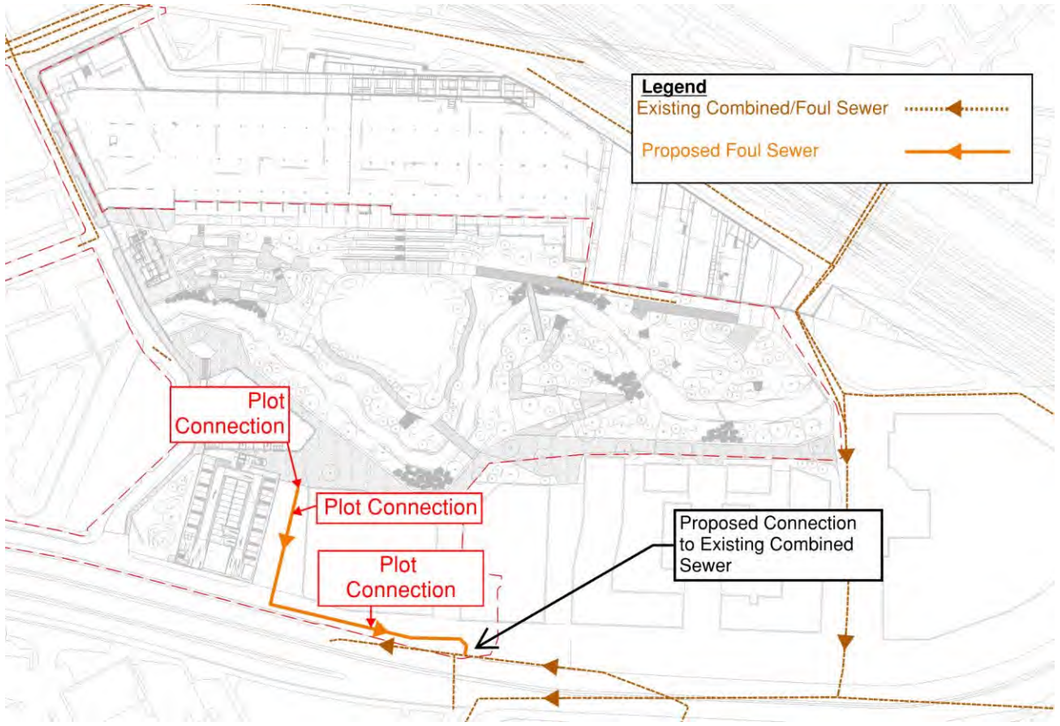

Figure 8-1 Proposed Foul Network

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9 Next Steps

This Foul and Surface Water Drainage Strategy has been prepared to support the planning application for the Mayfield Phase 1 Development.

The strategy has provided calculations of the volume of storage that could be necessary to support the proposed development, using the illustrative masterplan to demonstrate how the proposed approach could be accommodated within the parameters established by the planning application.

Overall, it has demonstrated that as the Proposed Development progresses, the approach to foul and surface water could deliver a sustainable method for managing surface water, which would satisfy both national and local planning policy requirements.

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Appendix A Existing Foul/Combined Sewer Network

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Appendix B Proposed Foul Network

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Appendix C Proposed Catchment Areas

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Appendix D Proposed Storm Water Layouts

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Appendix E Microdrainage Results

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Appendix F Drainage Strategy Statements from Plot Teams of Building Plots O, N and M

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1. Introduction

Civic Engineers has been appointed by Mayfield Partnership to provide a Drainage Statement and Strategy for the proposed development of Baring St MSCP, Mayfield.

The purpose of this statement is to:

- Provide information on the existing site's topography and drainage,
- Establish the pre-development peak 1 in 1-year surface water run-off rate,
- Calculate the required attenuation volume; and
- Summaries the proposed drainage strategy (including the feasibility of SUDS features)

This statement is based on currently available information. Proposals contained or forming part of this statement represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project.

2. Existing Site Details

Baring St MSCP occupies 0.176ha and is located in the south west corner of the Mayfield Development Site. It is bounded by Baring Street to the west; the proposed Baring St Office 1 plot to the north; and the Mancunian Way to the south. The plot is centred around an approximate National Grid Reference of SJ850975.

The proposed area has a history of industrial use during the 18th and 19th century as well as providing areas of terraced workers' housing and a primary community focal point in the form of the Mayfield Bath House. Within the latter half of the 20th century, there was a general reduction in the scale of industrial development of the site and the removal of previous workers' accommodation and the bathhouse. Low-level industrial units remained and following the construction of the Mancunian Way to the south in 1986, the site has been consistent with the current day layout

2.1 Existing Topography

A topographical survey was undertaken by Malcolm Hughes Surveyors in September 2017 and shows the majority of the plot is occupied by industrial units. Topographical levels were obtained around the edges of these existing buildings and indicate the plot generally grades from the south east, with an approximate level of 36.75m AOD, to the north, with an approximate level of 35.20m AOD.

Sections of the southern and eastern boundary are occupied by Bond St and Nether St, respectively, and a small section of grass and trees (46m^2) is present, adjacent the northern plot boundary.

For the purpose of drainage calculations, the plot is considered to be 100% impermeable

2.2 Existing Drainage

No above ground watercourses have been identified within the proposed plot boundary. The River Medlock is generally a culverted watercourse, however an exposed section is present approximately 50m north of the proposed plot.

Public Sewer records have been obtained from United Utilities which indicate there are no adopted sewers within the proposed plot boundary.

The following public sewer infrastructure has been identified within the vicinity of the plot:

- A varying large diameter combined water sewer runs within the Mancunian Way approximately 35m south of the proposed plot
- A 225mm diameter combined water sewers runs within Baring St. The sewer is believed to run the length of Baring St, however the United Utilities Asset Map only displays a short section.

The following private sewer infrastructure is believed to be in the vicinity of and within the proposed plot:

- From site observations it is anticipated that a private surface water sewer runs below the existing surface car park within the adjacent plot, Baring St Office 1, and discharges into the River Medlock,
- A private combined water sewer is anticipated within Nether St

A CCTV Survey has not been undertaken for the proposed plot.

3. Proposed Development

Baring St MSCP is included within the Phase 1 proposal of the Mayfield Development and comprises ground plus 10 storey MSCP for circa 545 car parking spaces.

The Phase 1 Site is located entirely within the Mayfield Strategic Regeneration Framework (SRF) area, which lies to the south of Fairfield Street in Manchester city centre, in close proximity to Piccadilly mainline railway station.

4. Surface Water Calculations

4.1 Catchment/Impermeable Areas

Site Drainage Area	=	1756m^2 / 0.176 ha
Pre-Development Impermeable Area	=	1756m^2 / 0.176 ha (100% impermeable)
Post-Development Impermeable Area	=	1756m^2 / 0.176 ha (100% impermeable)

4.2 Surface Water Calculation Variables

Data to calculate the pre-development 1 in 1-year surface water run-off rates and attenuation volumes are based on figures from the Flood Studies Report (FSR) data and Wallingford Procedure, which have been sourced from HR Wallingford.

The variables used to calculate the surface water run-off rates and required attenuation volumes are as follows:

M5 – 60 (mm)	=	17.000		
Ratio R	=	0.4		
Cv (Summer)	=	0.750		
Cv (Winter)	=	0.840		
Time of Entry	=	4 minutes		
Climate Change	=	0	-	Pre-Development
	=	30%	-	Post Development

4.3 Pre-Development Peak 1 in 1 Year Surface Water Run-Off

Based on the above variables, and calculations undertaken using a two-pipe simulated network within Micro Drainage computer software, the pre-development surface water run-off rates are as follows:

Pre-Development 1 in 1-Year Rate	=	22.2 l/s	(15-minute critical storm)

4.4 Post Development Restricted Surface Water Run-Off Rate

The Buro Happold Surface Water Design Note requires each plot to discharge at a rate at 50% of the existing runoff rate, minus 2 L/s/ha (per plot boundary) to account for long term storage.

The surface water from the proposed development is to be restricted by a flow control, in this case a vortex flow control devise will be used, to give:

Post Development SW Run-Off Rate	=	10.7 L/s	(50% of 22.2l/s – 2 l/s/ha)

4.5 Surface Water Attenuation Volumes

The surface water attenuation volumes have been calculated using the above variables within the Source Control module of Micro Drainage.

1 in 100 Year Event + CC (30%)	=	36 m^3	(10.7 l/s)

5. Surface Water Drainage Strategy

The site wide drainage strategy, prepared by Buro Happold, proposes that the surface water runoff from each plot be collected within a main sewer run and then outfall to the River Medlock at a restricted rate.

Based on the current proposed layout, runoff will be collected by rainwater pipes, gullies and channels and conveyed via a traditional below ground system of pipes and manholes before being treated by a Class I Bypass Separator (NSBP003 Kingspan or approved equivalent). Runoff will then flow to a underground attenuation tank, before discharging to the proposed Buro Happold Surface Water sewer at a restricted rate of 10.7 L/s.

Surface water runoff from hard paved areas at risk of contamination should receive water quality treatment. Low traffic access roads and car parking is considered low hazard in terms of contamination, therefore a bypass separator has been recommended.

The proposed drainage strategy is enclosed within Appendix A.

5.1 Potential Sustainable Drainage Systems (SUDS) Features Feasibility

Where possible SuDS are to be incorporated into the post development design to provide attenuation and ensure that runoff from the site does not exceed predevelopment runoff rates.

Varied SuDS methods have been summarised in the table below to assess and establish which are most feasible for the proposed post development site

SuDS Method	Feasibility, Given Site and Project
Green & Blue Roofs	Green roofs are systems which cover a building's roof with vegetation. They are laid over a drainage layer, with other layers providing protection, waterproofing and insultation. As the current layout proposes 100% of the plot be occupied by carparking facilities there is no area available for a Green or Blue roof.
Basins and Ponds – Above Ground storage	Basins and ponds increase biodiversity and amenity of the area; provide attenuation; and improve water quality. This method does however occupy large areas of developable land and requires suitable offsets from buildings. Due to the proposed structure occupying the entire plot and the urban location, basins and ponds are not a feasible option.
Rain Gardens & Tree Pits	The current layout proposes 100% of the plot be occupied by carparking facilities and as such there is no area available for a Rain Gardens or Tree Pits
Filter Strips and Swales	Filter strips and swales are generally used adjacent highways to reduce and treat runoff. The current layout proposed does not involve highways and as such there is no available area for filter strips or swales.
Rainwater Harvesting	Storage and use of rainwater for non-potable uses within a building (eg. Toilet flushing). Is should be noted that storage in these types of systems is not usually considered to count towards the provision of on-site storage for surface water balancing

	because, given the sporadic nature of the use of harvester water, it cannot be guaranteed that the tanks are available to provide sufficient attenuation during storm events. Rainwater harvesting is not a viable option as the current layout is a carparking facility and has no use for non-potable water.
Infiltration Devices	Borehole testing conducted on site identified the presence of made ground and the BGS drift maps indicate the site is underlain by a Secondary Aquifer within the Superficial drift and a Primary Aquifer within the bedrock. The historic use of the site as a tannery, factories and bathhouse also present a high risk to groundwater contamination. For these reasons it is recommended that infiltration not be incorporated into the drainage strategy.
Permeable surfaces	Permeable surfaces allow rainwater to infiltrate through the surface into an underlying storage layer. There are no external landscape areas associated with the carpark and whilst the top storey of the carpark will be open to the elements, the structural slab will form the surface of the carpark. As such there is no opportunity for permeable surfacing within the plot.
Vortex Control and Tanked Attenuation systems	A vortex flow control device is to be used to restrict the surface water flow from the site to proposed runoff rates. Tanked attenuation systems provide high storage capacity and can be incorporated within road pavements and under structural slabs and landscaping.

Appendix A – Drainage Strategy (1076-02-CE-YY-XX-DR-C-0001)

HEALTH & SAFETY: The works shall be carried out by specialist competent and experienced contractors. All operatives shall have received full and appropriate training with appropriate qualifications for the operations they are required to undertake. All work shall be carried out in accordance with the relevant Health & Safety Regulations.

DRAINAGE NOTES

All discrepancies shall be reported to the engineer for action prior to any new construction

All drainage works shall be carried out in accordance with the requirement of the local authority and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and addendums as appropriate.

All drainage shall comply with the typical drainage construction details and the requirements of BS EN 752.

Access covers and frames shall comply with the loadings specified and to BS EN 124 and kitemarked or if recessed covers are specified then in accordance with FACTA association equivalent. Allow for recess manhole covers to accept landscape architect finishes to all landscaped areas (total 9No. covers)

The proposed building outlines shown on this drawing are for information only. Refer to Architects plans for precise location setting out information and details. For setting out dimensions of SS's, SVP's, RWP's, Floor Gully & other drainage 'pop up' locations, refer to Architects or Mechanical & Electrical Engineers drawings.

All underslab drainage shall be laid at gradients of 1:80 min. for foul pipework and 1:100 min. for surface water unless noted otherwise. All pipework to be: Foul 100mm and Surface Water 150mm unless otherwise stated.

All underslab drainage shall be clear of foundations unless shown otherwise with long radius bends kept to a minimum and used where unavoidable.
All surface water drop down positions shall have a bend set at invert level no greater than 1.3m below finish floor level.

At least one soil pipe at the head of each foul run shall be vented to the atmosphere. All rainwater downpipes shall be accessible above ground for rodding purposes.

All existing drainage levels to which the the proposed drainage is to connect is to be clarified on site. Proposed drainage shown on this drawing subject to change once existing drainage levels are known.

Surface water connections to existing drainage are subject to local planners and statutory organisation approvals.
Existing details shown on this drawing including kerblines, existing drains, chambers, sewers, pipework, stub connections where new connections, diversions or abandonment are shown, invert levels and pipe sizes shall be checked and confirmed to the engineer prior to the commencement of any works. Any discrepancies shall be reported to the engineer for action prior to any new construction.
All drainage works shall be carried out in accordance with the requirements of the local authority and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and addendums as appropriate.

Cover levels shown on this drawing are approximate and shall be adjusted to suit finished pavement levels on site by Contractor. Covers shall be orientated to suit pavement finishes where appropriate.

All private drainage pipework for foul and surface water systems have been designed on the basis of UPVC to BS EN 1401-1, unless noted otherwise.

All drainage pipework shall be laid soffit to soffit unless noted otherwise.

Where new drainage is situated within 5 metres of new or existing trees the pipework shall be encased in concrete to reduce the risk of root ingress.

Concrete encasement of the pipework shall be required where the vertical clearance between two pipes crossing is less than 300mm.

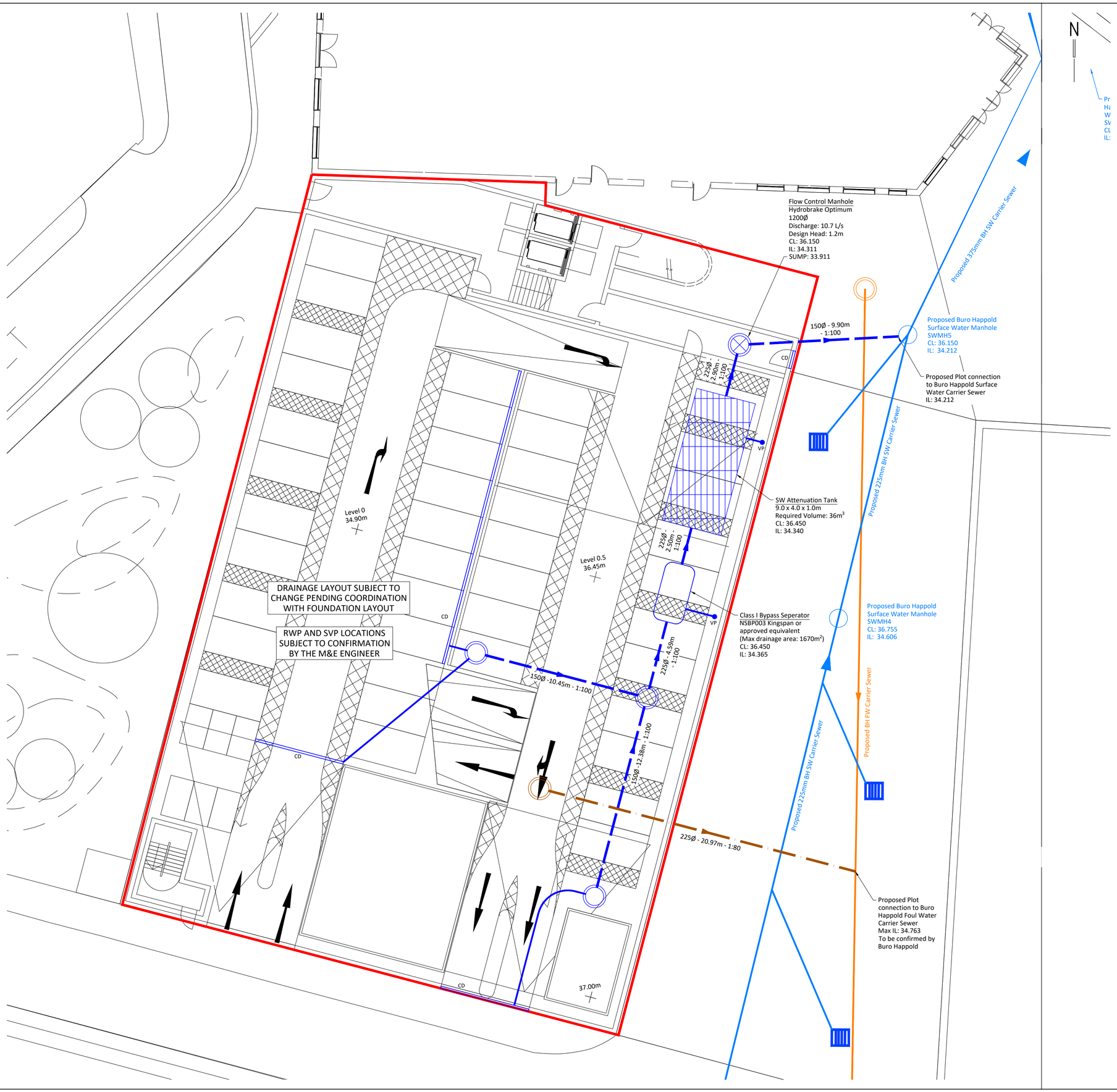
All existing drainage shall be assumed to be 'live' and shall be maintained at all times during the works. Existing drainage shall be reconnected to the new drainage system unless proven to be redundant for abandonment. All existing drainage to be abandoned shall be sealed by appropriate means.

All drainage connecting to the public sewer network shall not commence until receipt of the approval from the drainage authority and shall comply with requirements using vitrified clay pipework to BS EN 295 with plain sleeved or socketed flexible joints subject to their approval.
Where drainage works are carried out in the public highway the relevant necessary approvals and road opening notices shall be obtained from the highway authority and utility companies.

Prior to construction the flow control manufacturer's drawing and hydraulic table shall be provided to the engineer for approval

Prior to construction the attenuation tank manufacturer's drawings shall be provided to the engineer for approval

Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion. Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.



Standard Notes

1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification.
2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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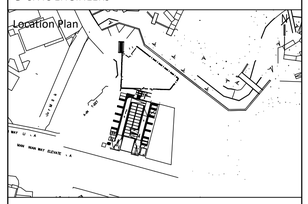
Location Plan



Notes
1. This Drawing has been based on the following;
   - Masterplan layout (0345-SEW-ZZ-00-DR-L-007102) provided by Studio Egret West on 21/08/19
   - Plot Boundaries (0343-SEW-ZZ-ZZ-DR-Z-000050) provided by Studio Egret West on 04/03/19
   - Site Wide Surface Water Drainage Strategy (0042912-BHE-XX -XX-DR-C-3121) provided by Buro Happold on 19/09/19
   - Site Wide FW Drainage Strategy (0292-SEW-ZZ-03 -SK1009) provided by Buro Happold on 21/03/19
   - Topographic Survey (170929 Utilities and Topo) provided by Faithful & Gould on 18/08/18

Key

- PLOT BOUNDARY
- PROPOSED BURO HAPPOLD FOUL WATER CARRIER SEWER
- PROPOSED BURO HAPPOLD SURFACE WATER CARRIER SEWER
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED BURO HAPPOLD SURFACE WATER CARRIER MANHOLE
- PROPOSED BURO HAPPOLD FOUL WATER CARRIER MANHOLE
- PROPOSED FOUL WATER MANHOLE
- PROPOSED SURFACE WATER MANHOLE WITH FLOW RESTRICTION
- PROPOSED SURFACE WATER MANHOLE
- CD — PROPOSED LINEAR CHANNEL DRAIN
- PROPOSED ATTENUATION TANK
- VP — PROPOSED VENT PIPE

Date	Rev	Description	Drawn	Chkd
24.09.19	P02	ISSUED FOR INFORMATION	EMM	-
05.09.19	P01	ISSUED FOR INFORMATION	EMM	PM

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Project
MAYFIELD DEVELOPMENT
BARING STREET MSCP

Title
DRAINAGE STRATEGY
GENERAL ARRANGEMENT

Status
INFORMATION

Scale @ A1	Date Created	Drawn	Checked
1:125	05/09/19	EMM	PM

Project Number	Originator	Discipline	Drawing Number	Revision
1076-02	CE	C	0001	P02

Appendix B – Micro Drainage Readouts

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	17.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 17.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Summer	1	+0%					8.119
1.001	2	15 Summer	1	+0%					8.018

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.031	0.000	0.98		15.5	OK	
1.001	2	-0.032	0.000	0.98		15.5	OK	

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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 33 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	34.876	0.826	0.0	7.5	7.5	17.3	O K
30 min Summer	35.065	1.015	0.0	7.5	7.5	21.2	O K
60 min Summer	35.093	1.043	0.0	7.5	7.5	21.8	O K
120 min Summer	34.994	0.944	0.0	7.5	7.5	19.7	O K
180 min Summer	34.842	0.792	0.0	7.5	7.5	16.6	O K
240 min Summer	34.677	0.627	0.0	7.5	7.5	13.1	O K
360 min Summer	34.433	0.383	0.0	7.5	7.5	8.0	O K
480 min Summer	34.284	0.234	0.0	7.3	7.3	4.9	O K
600 min Summer	34.200	0.150	0.0	6.9	6.9	3.1	O K
720 min Summer	34.153	0.103	0.0	6.4	6.4	2.2	O K
960 min Summer	34.120	0.070	0.0	5.3	5.3	1.5	O K
1440 min Summer	34.093	0.043	0.0	3.9	3.9	0.9	O K
2160 min Summer	34.076	0.026	0.0	2.9	2.9	0.5	O K
2880 min Summer	34.066	0.016	0.0	2.3	2.3	0.3	O K
4320 min Summer	34.055	0.005	0.0	1.6	1.6	0.1	O K
5760 min Summer	34.050	0.000	0.0	1.3	1.3	0.0	O K
7200 min Summer	34.050	0.000	0.0	1.1	1.1	0.0	O K
8640 min Summer	34.050	0.000	0.0	0.9	0.9	0.0	O K
10080 min Summer	34.050	0.000	0.0	0.8	0.8	0.0	O K
15 min Winter	35.009	0.959	0.0	7.5	7.5	20.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	107.328	0.0	24.7	22
30 min Summer	70.622	0.0	32.5	32
60 min Summer	44.405	0.0	40.9	50
120 min Summer	27.084	0.0	50.0	86
180 min Summer	20.061	0.0	55.5	120
240 min Summer	16.138	0.0	59.5	148
360 min Summer	11.797	0.0	65.3	206
480 min Summer	9.396	0.0	69.3	262
600 min Summer	7.872	0.0	72.6	318
720 min Summer	6.816	0.0	75.4	376
960 min Summer	5.426	0.0	80.1	492
1440 min Summer	3.929	0.0	87.0	734
2160 min Summer	2.841	0.0	94.3	1092
2880 min Summer	2.255	0.0	99.8	1468
4320 min Summer	1.626	0.0	108.0	2184
5760 min Summer	1.288	0.0	114.1	0
7200 min Summer	1.075	0.0	118.9	0
8640 min Summer	0.926	0.0	123.0	0
10080 min Summer	0.817	0.0	126.6	0
15 min Winter	107.328	0.0	27.7	22

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	35.227	1.177	0.0	7.5	7.5	24.6	O K
60 min Winter	35.396	1.346	0.0	7.5	7.5	25.2	O K
120 min Winter	35.100	1.050	0.0	7.5	7.5	21.9	O K
180 min Winter	34.867	0.817	0.0	7.5	7.5	17.1	O K
240 min Winter	34.601	0.551	0.0	7.5	7.5	11.5	O K
360 min Winter	34.291	0.241	0.0	7.3	7.3	5.0	O K
480 min Winter	34.163	0.113	0.0	6.5	6.5	2.4	O K
600 min Winter	34.127	0.077	0.0	5.7	5.7	1.6	O K
720 min Winter	34.111	0.061	0.0	4.9	4.9	1.3	O K
960 min Winter	34.093	0.043	0.0	3.9	3.9	0.9	O K
1440 min Winter	34.076	0.026	0.0	2.9	2.9	0.5	O K
2160 min Winter	34.063	0.013	0.0	2.1	2.1	0.3	O K
2880 min Winter	34.055	0.005	0.0	1.6	1.6	0.1	O K
4320 min Winter	34.050	0.000	0.0	1.2	1.2	0.0	O K
5760 min Winter	34.050	0.000	0.0	0.9	0.9	0.0	O K
7200 min Winter	34.050	0.000	0.0	0.8	0.8	0.0	O K
8640 min Winter	34.050	0.000	0.0	0.7	0.7	0.0	O K
10080 min Winter	34.050	0.000	0.0	0.6	0.6	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	70.622	0.0	36.5	33
60 min Winter	44.405	0.0	45.9	54
120 min Winter	27.084	0.0	56.0	92
180 min Winter	20.061	0.0	62.2	130
240 min Winter	16.138	0.0	66.7	156
360 min Winter	11.797	0.0	73.1	210
480 min Winter	9.396	0.0	77.7	260
600 min Winter	7.872	0.0	81.3	314
720 min Winter	6.816	0.0	84.5	372
960 min Winter	5.426	0.0	89.7	490
1440 min Winter	3.929	0.0	97.4	728
2160 min Winter	2.841	0.0	105.7	1096
2880 min Winter	2.255	0.0	111.8	1432
4320 min Winter	1.626	0.0	120.9	0
5760 min Winter	1.288	0.0	127.8	0
7200 min Winter	1.075	0.0	133.2	0
8640 min Winter	0.926	0.0	137.8	0
10080 min Winter	0.817	0.0	141.8	0

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Model Details

Storage is Online Cover Level (m) 36.150

Cellular Storage Structure

Invert Level (m) 34.050 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	22.0	0.0	1.201	0.0	0.0
1.200	22.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0122-7500-1400-7500
Design Head (m)	1.400
Design Flow (l/s)	7.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	122
Invert Level (m)	34.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	7.5
Flush-Flo™	0.413	7.5
Kick-Flo®	0.868	6.0
Mean Flow over Head Range	-	6.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	7.0	3.000	10.7	7.000	16.1
0.200	6.9	1.400	7.5	3.500	11.5	7.500	16.6
0.300	7.4	1.600	8.0	4.000	12.3	8.000	17.1
0.400	7.5	1.800	8.4	4.500	13.0	8.500	17.6
0.500	7.4	2.000	8.9	5.000	13.7	9.000	18.1
0.600	7.3	2.200	9.3	5.500	14.3	9.500	18.6
0.800	6.6	2.400	9.7	6.000	14.9		
1.000	6.4	2.600	10.0	6.500	15.5		

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1. Introduction

Civic Engineers has been appointed by Mayfield Partnership to provide a Drainage Statement and Strategy for the proposed development of Baring St Office 1, Mayfield.

The purpose of this statement is to:

- Provide information on the existing site's topography and drainage,
- Establish the pre-development peak 1 in 1-year surface water run-off rate,
- Calculate the required attenuation volume; and
- Summarise the proposed drainage strategy (including the feasibility of SUDS features)

This statement is based on currently available information. Proposals contained or forming part of this statement represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project.

2. Existing Site Details

Baring St Office 1 occupies 0.123ha and is located in the south west corner of the Mayfield Development Site, with Baring Street adjacent the west boundary and the proposed Baring St MSCP adjacent the south boundary. The plot is centred around an approximate National Grid Reference of SJ850975.

The proposed area has a history of industrial use during the 18th and 19th century as well as providing areas of terraced workers' housing and a primary community focal point in the form of the Mayfield Bath House. Within the latter half of the 20th century, there was a general reduction in the scale of industrial development of the site and the removal of previous workers' accommodation and the bathhouse. In 1977 a portion of the previous India Rubber building was demolished, leaving an area of open land in the majority of plot.

2.1 Existing Topography

A topographical survey was undertaken by Malcolm Hughes Surveyors in September 2017 and indicates the plot generally grades from the south east, with an approximate level of 35.79m AOD, to the north, with an approximate level of 35.15m AOD. The majority of the plot is currently used as a carpark with a tarmac surface finish, which has localised falls towards a central road gully.

The eastern side of the plot is occupied by a building and there is a small section of grass and trees (31m^2) adjacent the south east plot boundary.

For the purpose of drainage calculations, the plot is considered to be 100% impermeable

2.2 Existing Drainage

No above ground watercourses have been identified within the proposed plot boundary. The River Medlock is generally a culverted watercourse, however an exposed section is present approximately 15m north of Baring St Office 1.

Public Sewer records have been obtained from United Utilities which indicate there are no adopted sewers within the proposed plot boundary.

The following public sewer infrastructure has been identified within the vicinity of the plot:

- A varying large diameter combined water sewer runs within the Mancunian Way approximately 90m south of the proposed plot
- A 225mm diameter combined water sewers runs within Baring St. The sewer is believed to run the length of Baring St, however the United Utilities Asset Map only displays a short section.

The following private sewer infrastructure is believed to be in the vicinity of and within the proposed plot:

- From site observations it is anticipated that a private surface water sewer runs below the existing surface car park and discharges into the River Medlock, north of Baring St Office 1
- A private combined water sewer is anticipated within Nether St

A CCTV Survey has not been undertaken for the proposed plot.

3. Proposed Development

Baring St Office 1 is included within the Phase 1 proposal of the Mayfield Development and comprises an 8 storey office development including ground, mezzanine and plant level comprising 9, 987 sq.m. (GEA) including active ground floor uses (A1, A3, A4 or B1), public realm and riverside walkway.

The Phase 1 Site is located entirely within the Mayfield Strategic Regeneration Framework (SRF) area, which lies to the south of Fairfield Street in Manchester city centre, in close proximity to Piccadilly mainline railway station.

4. Surface Water Calculations

4.1 Catchment/Impermeable Areas

Site Drainage Area	=	1227m^2 / 0.123 ha
Pre-Development Impermeable Area	=	1227m^2 / 0.123 ha (100% Impermeable)
Post-Development Impermeable Area	=	1223m^2 / 0.123 ha (100% impermeable)

4.2 Surface Water Calculation Variables

Data to calculate the pre-development 1 in 1-year surface water run-off rates and attenuation volumes are based on figures from the Flood Studies Report (FSR) data and Wallingford Procedure, which have been sourced from HR Wallingford.

The variables used to calculate the surface water run-off rates and required attenuation volumes are as follows:

M5 – 60 (mm)	=	17.000		
Ratio R	=	0.4		
Cv (Summer)	=	0.750		
Cv (Winter)	=	0.840		
Time of Entry	=	4 minutes		
Climate Change	=	0	-	Pre-Development
	=	30%	-	Post Development

4.3 Pre-Development Peak 1 in 1 Year Surface Water Run-Off

Based on the above variables, and calculations undertaken using a two-pipe simulated network within Micro Drainage computer software, the pre-development surface water run-off rate is as follows:

Pre-Development 1 in 1-Year Rate	=	15.5 l/s	(15-minute critical storm)

4.4 Post Development Restricted Surface Water Run-Off Rate

The Buro Happold Surface Water Design Note requires each plot to discharge at a rate at 50% of the existing runoff rate, minus 2 L/s/ha (per plot boundary) to account for long term storage.

The surface water from the proposed development is to be restricted by a flow control, in this case a vortex flow control devise will be used, to give:

Post Development SW Run-Off Rate	=	7.5 L/s	(50% of 15.5l/s – 2 l/s/ha)

4.5 Surface Water Attenuation Volumes

The surface water attenuation volume has been calculated using the above variables within the Source Control module of Micro Drainage.

1 in 100 Year Event + CC (30%)	=	26.4m^3	(7.5 l/s)

5. Surface Water Drainage Strategy

The site wide drainage strategy, prepared by Buro Happold, proposes that the surface water runoff from each plot be collected within a main sewer run and then outfall to the River Medlock at a restricted rate.

Based on the current proposed layout, runoff collected by the green roof will be conveyed through the building to a traditional below ground system of pipes and manholes which will then convey flows to a underground attenuation tank, before discharging to the proposed Buro Happold Surface Water sewer at a restricted rate of 7.5 L/s.

The proposed drainage strategy is enclosed within Appendix A.

5.1 Potential Sustainable Drainage Systems (SUDS) Features Feasibility

Where possible SuDS are to be incorporated into the post development design to provide attenuation and ensure that runoff from the site does not exceed predevelopment runoff rates.

Varied SuDS methods have been summarised in the table below to assess and establish which are most feasible for the proposed post development site.

SuDS Method	Feasibility, Given Site and Project
Green & Blue Roofs	Green roofs are systems which cover a building's roof with vegetation. They are laid over a drainage layer, with other layers providing protection, waterproofing and insultation. A green roof is currently proposed for the building, however it should be noted that the use of brown/green roofs should be for betterment purposes and not to be counted towards the provision of on-site storage for surface water. This is due to their hydraulic performance during extreme events being similar to a standard roof (CIRIA C697)
Basins and Ponds – Above Ground storage	Basins and ponds increase biodiversity and amenity of the area; provide attenuation; and improve water quality. This method does however occupy large areas of developable land and requires suitable offsets from buildings. Due to the proposed structure occupying the entire site and the urban location, basins and ponds are not a feasible option.
Rain Gardens & Tree Pits	The current layout proposes 100% of the plot be occupied by the residential building and as such there is no area available for a Rain Gardens or Tree Pits
Filter Strips and Swales	Filter strips and swales are generally used adjacent highways to reduce and treat runoff. The current layout proposed for Baring St Office 1 does not involve highways and as such there is no available area for filter strips or swales
Rainwater Harvesting	Storage and use of rainwater for non-potable uses within a building (eg. Toilet flushing). Is should be noted that storage in these types of systems is not usually considered to count towards the provision of on-site storage for surface water balancing because, given the sporadic nature of the use of harvester water, it cannot be guaranteed that the tanks are available to provide sufficient attenuation during storm events.

	Rainwater harvesting is not a viable option due to the rainfall yield on the roof area being significantly less than the water demand for the residential units.
Infiltration Devices	Borehole testing conducted on site identified the presence of made ground and the BGS drift maps indicate the site is underlain by a Secondary Aquifer within the Superficial drift and a Primary Aquifer within the bedrock. The historic use of the site as a tannery, factories and bathhouse also present a high risk to groundwater contamination. For these reasons it is recommended that infiltration not be incorporated into the drainage strategy.
Permeable surfaces	Permeable surfaces allow rainwater to infiltrate through the surface into an underlying storage layer. As the proposed building occupies 100% of the plot there are no surface areas available for this method.
Vortex Control and Tanked Attenuation systems	A vortex flow control device is to be used to restrict the surface water flow from the site to proposed runoff rates. Tanked attenuation systems provide high storage capacity and can be incorporated within road pavements and under structural slabs and landscaping.

6. Foul Water Drainage Strategy

The site wide drainage strategy, prepared by Buro Happold, proposes that the foul water discharge from each plot be collected within a main sewer run and then outfall to the existing public combined water sewer within the Mancunian Way.

Based on the current proposed layout, foul drainage from each residence is be collected via a piped system, before discharging to the proposed Buro Happold Foul Water sewer at an unrestricted rate.

The proposed drainage strategy is enclosed within Appendix A.

Appendix A – Drainage Strategy (1076-01-CE-YY-XX-DR-C-0001)

HEALTH & SAFETY: The works shall be carried out by specialist competent and experienced contractors. All operatives shall have received full and appropriate training with appropriate qualifications for the operations they are required to undertake. All work shall be carried out in accordance with the relevant Health & Safety Regulations.

DRAINAGE NOTES

All discrepancies shall be reported to the engineer for action prior to any new construction

All drainage works shall be carried out in accordance with the requirement of the local authority and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and addendums as appropriate.

All drainage shall comply with the typical drainage construction details and the requirements of BS EN 752.

Access covers and frames shall comply with the loadings specified and to BS EN 124 and kitemarked or if recessed covers are specified then in accordance with FACTA association equivalent. Allow for recess manhole covers to accept landscape architect finishes to all landscaped areas (total 9No. covers)

The proposed building outlines shown on this drawing are for information only. Refer to Architects plans for precise location setting out information and details. For setting out dimensions of SS's, SVP's, RWP's, Floor Gully & other drainage 'pop up' locations, refer to Architects or Mechanical & Electrical Engineers drawings.

All underslab drainage shall be laid at gradients of 1:80 min. for foul pipework and 1:100 min. for surface water unless noted otherwise. All pipework to be: Foul 100mm and Surface Water 150mm unless otherwise stated.

All underslab drainage shall be clear of foundations unless shown otherwise with long radius bends kept to a minimum and used where unavoidable.
All surface water drop down positions shall have a bend set at invert level no greater than 1.3m below finish floor level.

At least one soil pipe at the head of each foul run shall be vented to the atmosphere. All rainwater downpipes shall be accessible above ground for rodding purposes.

All existing drainage levels to which the the proposed drainage is to connect is to be clarified on site. Proposed drainage shown on this drawing subject to change once existing drainage levels are known.

Surface water connections to existing drainage are subject to local planners and statutory organisation approvals.
Existing details shown on this drawing including kerblines, existing drains, chambers, sewers, pipework, stub connections where new connections, diversions or abandonment are shown, invert levels and pipe sizes shall be checked and confirmed to the engineer prior to the commencement of any works. Any discrepancies shall be reported to the engineer for action prior to any new construction.
All drainage works shall be carried out in accordance with the requirements of the local authority and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and addendums as appropriate.

Cover levels shown on this drawing are approximate and shall be adjusted to suit finished pavement levels on site by Contractor. Covers shall be orientated to suit pavement finishes where appropriate.

All private drainage pipework for foul and surface water systems have been designed on the basis of UPVC to BS EN 1401-1, unless noted otherwise.

All drainage pipework shall be laid soffit to soffit unless noted otherwise.

Where new drainage is situated within 5 metres of new or existing trees the pipework shall be encased in concrete to reduce the risk of root ingress.

Concrete encasement of the pipework shall be required where the vertical clearance between two pipes crossing is less than 300mm.

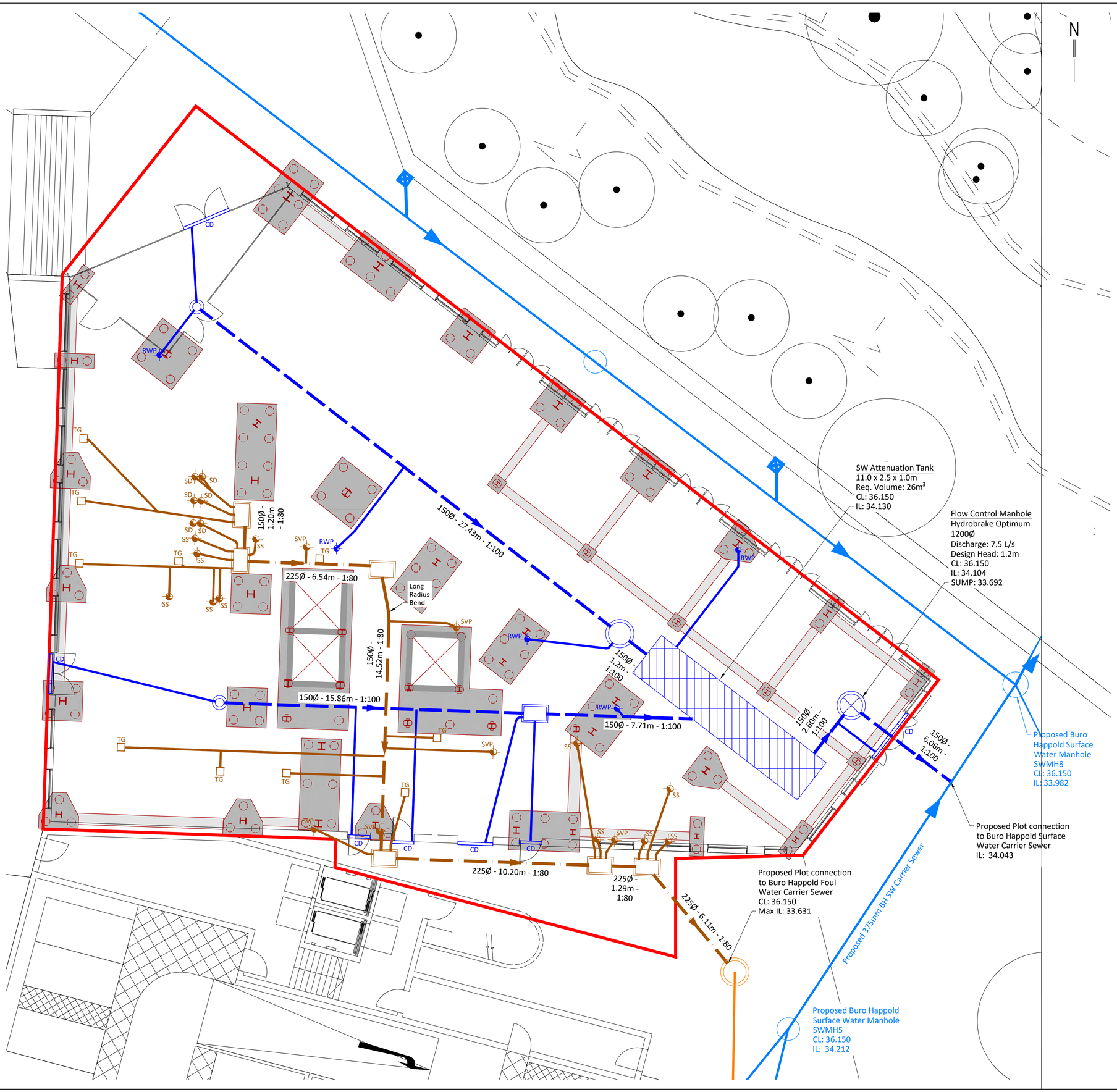
All existing drainage shall be assumed to be 'live' and shall be maintained at all times during the works. Existing drainage shall be reconnected to the new drainage system unless proven to be redundant for abandonment. All existing drainage to be abandoned shall be sealed by appropriate means.

All drainage connecting to the public sewer network shall not commence until receipt of the approval from the drainage authority and shall comply with requirements using vitrified clay pipework to BS EN 295 with plain sleeved or socketed flexible joints subject to their approval.
Where drainage works are carried out in the public highway the relevant necessary approvals and road opening notices shall be obtained from the highway authority and utility companies.

Prior to construction the flow control manufacturer's drawing and hydraulic table shall be provided to the engineer for approval

Prior to construction the attenuation tank manufacturer's drawings shall be provided to the engineer for approval

Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion. Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.



Standard Notes

1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification.
2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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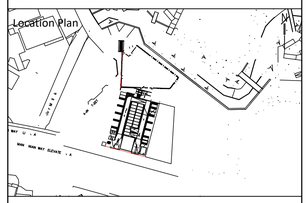
Location Plan



Notes
1. This Drawing has been based on the following;
   - Masterplan layout (0345-SEW-ZZ-00-DR-L-007102) provided by Studio Egret West on 21/08/19
   - Plot Boundaries (0343-SEW-ZZ-ZZ-DR-Z-000050) provided by Studio Egret West on 04/03/19
   - Site Wide SW Strategy (0042912-BHE-XX-XX-DR-C -3120) provided by Buro Happold on 19/09/19
   - Site Wide FW Strategy (0292-SEW-ZZ-03 -SK1009) provided by Buro Happold on 21/03/19
   - Plot O Dropdown Positions (0405907-HLEA-XX-GF -DR-P-520-0002) by Hoarelea on 19/09/19
   - Topographic Survey (170929 Utilities and Topo) provided by Faithful & Gould on 18/08/18

Key

- PLOT BOUNDARY
- PROPOSED BURO HAPPOLD FOUL WATER CARRIER SEWER
- PROPOSED BURO HAPPOLD SURFACE WATER CARRIER SEWER
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED BURO HAPPOLD SURFACE WATER CARRIER MANHOLE
- PROPOSED BURO HAPPOLD FOUL WATER CARRIER MANHOLE
- PROPOSED FOUL WATER INSPECTION CHAMBER (RECTANGULAR)
- PROPOSED SURFACE WATER MANHOLE WITH FLOW RESTRICTION
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER INSPECTION CHAMBER (TYPE 2)
- SS SVP SD — FOUL DROP DOWN CONNECTION LOCATION PROVIDED BY M&E ENGINEER
- TG — PROPOSED FOUL WATER TRAPPED GULLY
- CD — PROPOSED LINEAR CHANNEL DRAIN
- PROPOSED ATTENUATION TANK
- VP — PROPOSED VENT PIPE
- RWP — RAINWATER PIPE DROP DOWN CONNECTION. LOCATION PROVIDED BY M&E ENGINEER
- PROPOSED BUILDING FOUNDATIONS

Date	Rev	Description	Drawn	Chkd
24.09.19	P02	ISSUED FOR INFORMATION	EMM	-
05.09.19	P01	ISSUED FOR INFORMATION	EMM	PM

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Project
MAYFIELD DEVELOPMENT
BARING STREET OFFICE 1

Title
DRAINAGE STRATEGY
GENERAL ARRANGEMENT

Status
INFORMATION

Scale @ A1	Date Created	Drawn	Checked
1:100	05/09/19	EMM	PM

Project Number	Originator	Discipline	Drawing Number	Revision
1076-01	CE	C	0001	P02

Appendix B – Micro Drainage Readouts

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	17.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 0 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 17.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Summer	1	+0%					8.119
1.001	2	15 Summer	1	+0%					8.018

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.031	0.000	0.98		15.5	OK	
1.001	2	-0.032	0.000	0.98		15.5	OK	

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Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 33 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	34.876	0.826	0.0	7.5	7.5	17.3	O K
30 min Summer	35.065	1.015	0.0	7.5	7.5	21.2	O K
60 min Summer	35.093	1.043	0.0	7.5	7.5	21.8	O K
120 min Summer	34.994	0.944	0.0	7.5	7.5	19.7	O K
180 min Summer	34.842	0.792	0.0	7.5	7.5	16.6	O K
240 min Summer	34.677	0.627	0.0	7.5	7.5	13.1	O K
360 min Summer	34.433	0.383	0.0	7.5	7.5	8.0	O K
480 min Summer	34.284	0.234	0.0	7.3	7.3	4.9	O K
600 min Summer	34.200	0.150	0.0	6.9	6.9	3.1	O K
720 min Summer	34.153	0.103	0.0	6.4	6.4	2.2	O K
960 min Summer	34.120	0.070	0.0	5.3	5.3	1.5	O K
1440 min Summer	34.093	0.043	0.0	3.9	3.9	0.9	O K
2160 min Summer	34.076	0.026	0.0	2.9	2.9	0.5	O K
2880 min Summer	34.066	0.016	0.0	2.3	2.3	0.3	O K
4320 min Summer	34.055	0.005	0.0	1.6	1.6	0.1	O K
5760 min Summer	34.050	0.000	0.0	1.3	1.3	0.0	O K
7200 min Summer	34.050	0.000	0.0	1.1	1.1	0.0	O K
8640 min Summer	34.050	0.000	0.0	0.9	0.9	0.0	O K
10080 min Summer	34.050	0.000	0.0	0.8	0.8	0.0	O K
15 min Winter	35.009	0.959	0.0	7.5	7.5	20.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	107.328	0.0	24.7	22
30 min Summer	70.622	0.0	32.5	32
60 min Summer	44.405	0.0	40.9	50
120 min Summer	27.084	0.0	50.0	86
180 min Summer	20.061	0.0	55.5	120
240 min Summer	16.138	0.0	59.5	148
360 min Summer	11.797	0.0	65.3	206
480 min Summer	9.396	0.0	69.3	262
600 min Summer	7.872	0.0	72.6	318
720 min Summer	6.816	0.0	75.4	376
960 min Summer	5.426	0.0	80.1	492
1440 min Summer	3.929	0.0	87.0	734
2160 min Summer	2.841	0.0	94.3	1092
2880 min Summer	2.255	0.0	99.8	1468
4320 min Summer	1.626	0.0	108.0	2184
5760 min Summer	1.288	0.0	114.1	0
7200 min Summer	1.075	0.0	118.9	0
8640 min Summer	0.926	0.0	123.0	0
10080 min Summer	0.817	0.0	126.6	0
15 min Winter	107.328	0.0	27.7	22

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	35.227	1.177	0.0	7.5	7.5	24.6	O K
60 min Winter	35.396	1.346	0.0	7.5	7.5	25.2	O K
120 min Winter	35.100	1.050	0.0	7.5	7.5	21.9	O K
180 min Winter	34.867	0.817	0.0	7.5	7.5	17.1	O K
240 min Winter	34.601	0.551	0.0	7.5	7.5	11.5	O K
360 min Winter	34.291	0.241	0.0	7.3	7.3	5.0	O K
480 min Winter	34.163	0.113	0.0	6.5	6.5	2.4	O K
600 min Winter	34.127	0.077	0.0	5.7	5.7	1.6	O K
720 min Winter	34.111	0.061	0.0	4.9	4.9	1.3	O K
960 min Winter	34.093	0.043	0.0	3.9	3.9	0.9	O K
1440 min Winter	34.076	0.026	0.0	2.9	2.9	0.5	O K
2160 min Winter	34.063	0.013	0.0	2.1	2.1	0.3	O K
2880 min Winter	34.055	0.005	0.0	1.6	1.6	0.1	O K
4320 min Winter	34.050	0.000	0.0	1.2	1.2	0.0	O K
5760 min Winter	34.050	0.000	0.0	0.9	0.9	0.0	O K
7200 min Winter	34.050	0.000	0.0	0.8	0.8	0.0	O K
8640 min Winter	34.050	0.000	0.0	0.7	0.7	0.0	O K
10080 min Winter	34.050	0.000	0.0	0.6	0.6	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	70.622	0.0	36.5	33
60 min Winter	44.405	0.0	45.9	54
120 min Winter	27.084	0.0	56.0	92
180 min Winter	20.061	0.0	62.2	130
240 min Winter	16.138	0.0	66.7	156
360 min Winter	11.797	0.0	73.1	210
480 min Winter	9.396	0.0	77.7	260
600 min Winter	7.872	0.0	81.3	314
720 min Winter	6.816	0.0	84.5	372
960 min Winter	5.426	0.0	89.7	490
1440 min Winter	3.929	0.0	97.4	728
2160 min Winter	2.841	0.0	105.7	1096
2880 min Winter	2.255	0.0	111.8	1432
4320 min Winter	1.626	0.0	120.9	0
5760 min Winter	1.288	0.0	127.8	0
7200 min Winter	1.075	0.0	133.2	0
8640 min Winter	0.926	0.0	137.8	0
10080 min Winter	0.817	0.0	141.8	0

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Model Details

Storage is Online Cover Level (m) 36.150

Cellular Storage Structure

Invert Level (m) 34.050 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	22.0	0.0	1.201	0.0	0.0
1.200	22.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0122-7500-1400-7500
Design Head (m)	1.400
Design Flow (l/s)	7.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	122
Invert Level (m)	34.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	7.5
Flush-Flo™	0.413	7.5
Kick-Flo®	0.868	6.0
Mean Flow over Head Range	-	6.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	7.0	3.000	10.7	7.000	16.1
0.200	6.9	1.400	7.5	3.500	11.5	7.500	16.6
0.300	7.4	1.600	8.0	4.000	12.3	8.000	17.1
0.400	7.5	1.800	8.4	4.500	13.0	8.500	17.6
0.500	7.4	2.000	8.9	5.000	13.7	9.000	18.1
0.600	7.3	2.200	9.3	5.500	14.3	9.500	18.6
0.800	6.6	2.400	9.7	6.000	14.9		
1.000	6.4	2.600	10.0	6.500	15.5		

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Mayfield Baring Street No.2
Design Note

Drainage Strategy Supplementary Note

The proposed B1 Office development site referenced as Baring Street No.2 (Plot M) sits within the Mayfield Strategic Regeneration Framework (SRF) Phase 1 Boundary. The site comprises the building footprint only and excludes all adjoining external areas.

This Drainage Strategy Supplementary Note represents a plot implementation within the Buro Happold Mayfield Drainage Strategy Design Note dated 11.03.2019 ref:0042912. It does not compromise the requirements of the Drainage Strategy Design Note or fully implement the intended drainage strategy for the Mayfield SRF.

Investigation of the existing site drainage was undertaken during demolition and site clearance and whilst not being able to positively prove the connectivity of the whole existing drainage system, it gives an indication that the existing buildings, yards roads were positively drained to either sewer or to the nearby watercourse (River Medlock).

National and local planning guidance sets out the National Planning Policy Framework (NPPF), Planning Policy Guidance (PPG) and the Non-Statutory Technical Standards for Sustainable Drainage aim to protect and control the risk of flooding downstream of development sites by recommending the management of surface water as close to source.

From the CIRIA SuDS Manual C753 guidance in the form of hierarchy of drainage is indicated below;

Runoff Destinations

See the Planning Practice Guidance

This states:

"Generally the aim should be discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable:

1. Into the ground (infiltration)
2. To a surface water body;
3. To a surface water sewer, highway drain or another drainage system;
4. To a combined sewer."

1. As the drainage strategy for this site is on a plot only basis, it is not practical to provide infiltraion to ground beneath the building footprint. Also, the indicative ground conditions of made ground overlaying fluvial deposits together with the sites previous use for industrial purposes; would increase the risk of mobilising potential ground contamination which is unacceptable.

2. The Mayfield SRF is providing new separate foul and surface water infracture drainage for the development area, with surface water discharging to the nearby River Medlock and the foul water to nearby United Utilties public sewerage network.

This is considered to be the most practical solution for draining the foul and surface water runoff generated from this site.

SuDS consideration

During the course of developing the surface water strategy for Baring Street Office 2 the following systems have been considered.

Blue/Green roofs – Plant provision at roof level minimises the opportunity for Green roof provision, however consideration has been given to the use of Blue roofs to assist in surface water attenuation. Further consideration will be given to Blue roof provision, to supplement below ground attenuation, in the following design stages accounting for, plant provision, building maintenance and commercial aspects.

Surface attenuation features, ponds, rain gardens – Building access, maintenance and emergency access dictates that the immediate building perimeter consist of hard standing material, negating the provision of surface water features. Wider provision may be feasible within the wider park provision considered by Buro Happold, but this is considered to remote to support the provision of building drainage attenuation.

Permeable paving – This strategy considers drainage of hard landscaped areas by filtration of the surface water through the hard paving. As this note considerers only drainage of the building plot, permeable paving has not been considered. However it is noted that due to the past industrial use of the site and risk of leaching of contamination in the made ground, infiltration is not considered a viable solution.

Drainage Strategy & Design Criteria

The drainage strategy for this site is to;

1. Discharge the foul water unrestricted by gravity to the adjoining new foul water infrastructure being provided, which will discharge to the public sewerage system.
2. Discharge the surface water at a minimum 50% reduced discharge rate from the existing by gravity to the adjoining new surface water infrastructure being provided, which discharges to the the nearby River Medlock.The design criteria being;
   - No Surcharge for a 1 in 1 year return period storm
   - No Flooding for a 1 in 30 year return period storm
   - Flood check and management for a 1 in 100 year return period storm + 40% rainfall allowance for climate chainge.

Foul Water

Foul water to drain unrestricted to nearest appropriate foul water infrastructure drain provided, prior to discharging to public sewerage system.

Based on the current Architects floor plans and utilising the Unit Discharge Unit Method from BS EN12056-2 System III Table 2 with a Typical Frequency of K – 0.5 'Intermittent Use' from Table 3 an estimated design discharge rate of 11.3 litres per second can be expected, requiring a 150dia connection at a minimum gradient of 1 in 125.

Localised sump pumping is required to the plant room basement area, restricted to a maximum of 10 litres per second to the above ground drainage at off-peak times to reduce the risk of overloading the drainage system.

Grease treatment is not considered a requirement due to the 'Office use' of the building. However, should grease treatment be required to any food or bar areas, this will be provided locally at source above ground.

Surface Water

The surface water drainage takes into account the requirements of the Buro Happold Mayfield Drainage Strategy Design Note dated 11.03.2019 ref:0042912. However, due to the age and condition of the existing site drainage, insufficient information was obtained and as such, it is not practical to model the existing site drainage.

In order to set a peak discharge rate for the site, it is proposed to use a flat rainfall rate of 50mm/hr to set the peak Q100 runoff rate from the existing site. Due to age of the site and drainage, it is a reasonable assumption for the original design of the sewers. This approach has been accepted by United Utilities Plc and Manchester City Council as Lead Local Flood Authority on similar urban re-development sites in Manchester. This approximately equates to a 15min duration 30yr RP storm.

- From a review of the current drawings, the site's drained plan area is estimated to be 2,610m² (0.261ha) made up of;
  - 2,185m² Hardstanding (Roof/Yards and Roads)
  - 425m² soft landscaping
- Taking the runoff from the hardstanding areas at 100% and 20% equivalent area from the soft landscaping a catchment area of 2,770m² (0.227ha) is derived
- Thus, the peak flow rate (existing) = 2.78 x 0.227 x 50 = 31.6 l/s (for a 15min 30yr RP event)
- To comply with the Drainage Strategy Design Note and National/Local Planning Guidance, a 50% reduction is applied which reduces peak discharge rate of Q = 31.6 x 0.5 = 15.8 l/s
- This is equivalent to the existing run off from a 25mm/hr flat rainfall rate which equates to less than a 15min 1yr RP Storm
- Micro Drainage Quick storage estimate, subject to design and based on the above for the 100yr+40% climate change allowance is in the order of 80m³, without allowance for the effects of a surcharged outlet
- Utilising MicroDrainage Network and simulating the surface water design for a development area of 2,610m² (0.261ha) as indicated on RoC drawing 3986-DR-201 for the 1yr, 30yr and 100yr +40% free discharge and again the 30yr and 100yr +40% against a 1m surcharged outfall, the required attenuation volume has been adjusted to 120.2m³ net storage resulting in no surface flooding to the building and the peak discharge rate of 15.8 l/s is not exceeded.
- As noted on RoC drawing 3986-DR-201 the attenuation is to be provided by means of a geocellular tank 50.05m long x 4.55m wide x 0.55m deep fully tanked with a fully welded waterproof membrane beneath the building footprint. The discharge rate is to

be controlled in a downstream manhole chamber by a vortex flow control rated at 15.8 l/s at a design head of 1.2m

Applying a limit of 15.8 l/s to the Q100+40%CC event will inherently give a greater than 50% reduction in run-off because the limiting flow rate is similar to the existing run off rate for a 1yr RP storm of 15-30mim duration. As such it is not consider that there is a need to provide the further reduction in run-off rate of 2 l/s/ha stipulated in the Buro Happold Drainage Strategy Design Note or to carry out a flood check on the long term storage volume.

The above surface water drainage strategy meets the requirements outlined in the Buro Happold Mayfield Drainage Strategy Design Note dated 11.03.2019 ref:0042912, subject to confirmation from Buro Happold and further development from this RIBA Stage 2 design.

Appendix 12.1 – Wind EIA Addendum

1 WIND MICROCLIMATE

1.1 INTRODUCTION

1.1.1 This chapter of the ES assesses the potential change to environmental effects of the Proposed Development with respect to wind microclimate. It provides an updated assessment of baseline conditions currently existing at the site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been adopted.

1.1.2 A quantitative assessment has been undertaken to predict and analyse the wind environment at the detailed planning application site and to support the production of appropriate mitigation. This methodology has been agreed with Manchester City Council (MCC) for this project through the EIA scoping process. The full application is for a fully developed design for Phase 1, Application 1 and a fully developed design for maximum parameters, Denominated Phase 1, Application 2, as described in Chapter 3 of this ES.

1.1.3 For the mitigated case, the Site has been modelled with a committed landscaping strategy which has responded to the wind environment, assuming a conservative scenario. Wind effects are likely to be mitigated further when the full landscape strategy of the Park is in place. The partial modelled landscape accomplishes mitigation requirements. The chapter concludes with a summary of residual effects, taking into account the results of the modelling and influence of proposed mitigation in the form of landscaping treatment.

1.1.4 The assessment approach, methodology, policy context and baseline conditions set out in the October 2019 ES Wind Chapter remains valid.

1.2 REVIEW OF BASELINE CONDITIONS (CHANGES SINCE 2019 ES)

1.2.1 No changes have been applied to the Baseline conditions. Plots extracted from the results of the previous tests (October 2019 ES) have been updated to include a larger area of the surroundings in proximity to the site. Conditions for summer and winter are presented in Figures 1-1 and 1-2 below.

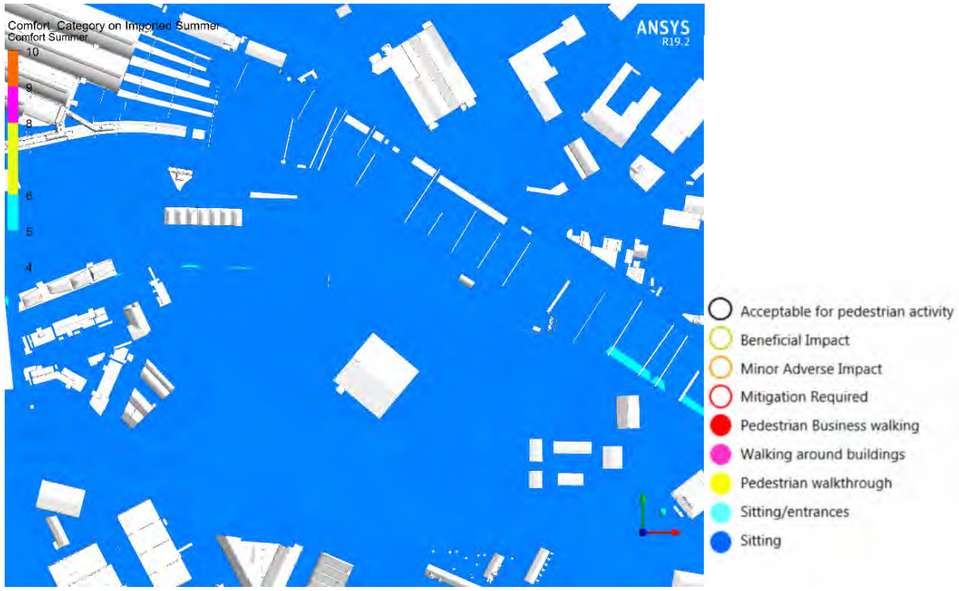

Figure 1-1 Existing site with existing surroundings - summer composite comfort map (12 wind directions)

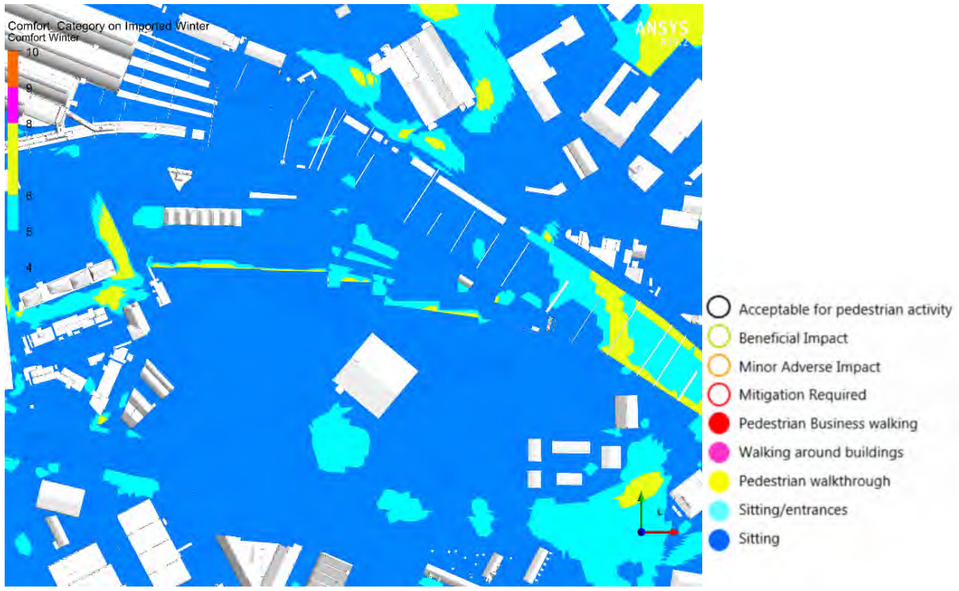

Figure 1-2 Existing site with existing surroundings - winter composite comfort map (12 wind directions)

1.2.2 The baseline conditions for the assessment remain unchanged from those set out in the October 2019 ES.

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1.3 UPDATED POTENTIAL EFFECTS AND MITIGATION MEASURES

Demolition and construction effects

Demolition and construction effects for Application 1 (Baring Street Multi Storey Car Park, Baring Street Office 1 and Mayfield Park)

1.3.1 The demolition and construction effects remain unchanged from the October 2019 ES.

Demolition and construction effects for Application 1 and Application 2 (Baring Street Multi Storey Car Park, Baring Street Office 1, Baring Street Office 2 and Mayfield Park)

1.3.2 The demolition and construction effects remain unchanged from the October 2019 ES.

Supplementary mitigation measures

1.3.3 No further supplementary mitigation is required

Operational effects

Operational effects for Application 1 (Baring Street Multi Storey Car Park, Baring Street Office 1 and Mayfield Park)

1.3.4 There are three main changes in the modelled test when compared with the October 2019 ES. The first one is the reduction of the height of Plot N by 3m, the second is the increase of the height of the cantilever to the north of Plot O, and finally the third one is the integration of the proposed mitigation from October 2019 ES in to the current test.

1.3.5 The agreed and tested mitigation for Application 1 is listed in Table 1-1 and shown in Figure 1-3 below.

Table 1-1 Mitigation agreed and tested

Mitigation tested in Application 1 in existing surroundings scenario.
One 2m by 2m low-level planter, including shrubbery up to 0.5m at the northern corner of Plot O.
A 50% porous 1.1m tall balustrade at the podium contention wall from the Park.
A series of eight, 7m tall trees to the North of the Plots O and M, inside the Park, according to the Landscape design.

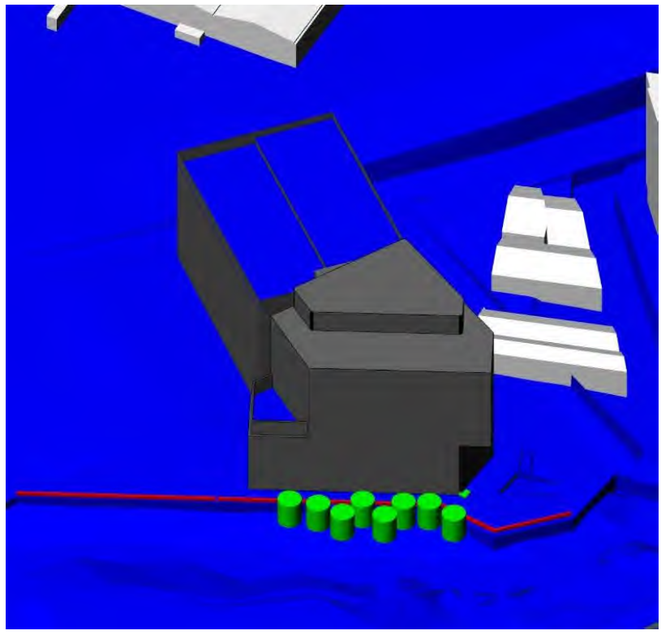

Figure 1-3 Modelled Geometry Phase 1 Application 1 in existing surroundings mitigation

1.3.6 The updated test results show very similar operational effects to those reported in the October 2019 ES. However, a slight reduction to windy areas in yellow (suitable for pedestrian walking) is noticed, mainly produced by the reduction of height of Plot N. In line with the October 2019 ES, no safety concerns have been identified. Conditions for summer and winter for Application 1 wind effects are presented in Figures 1-4 and 1-5 below.

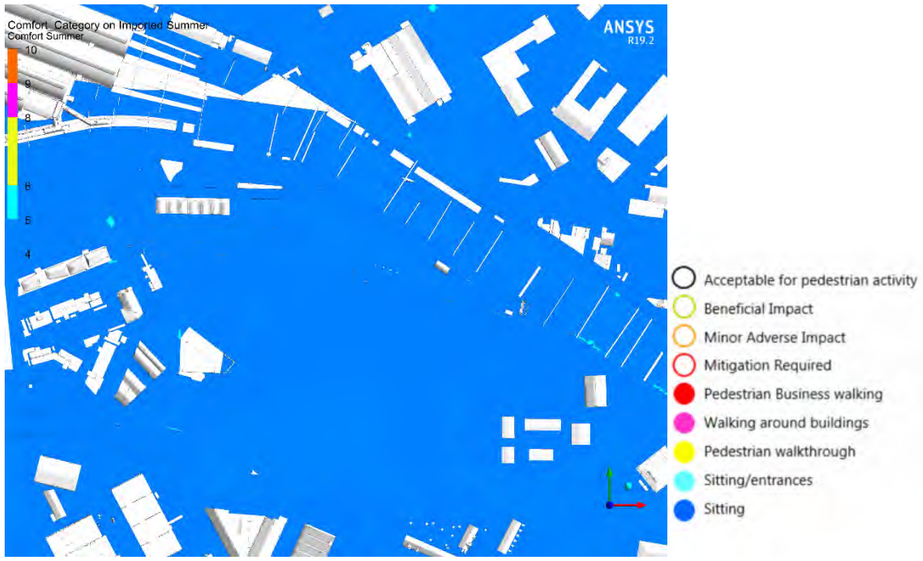

Figure 1-4 Phase 1 Application 1 in existing surroundings - summer composite comfort map (12 wind directions)

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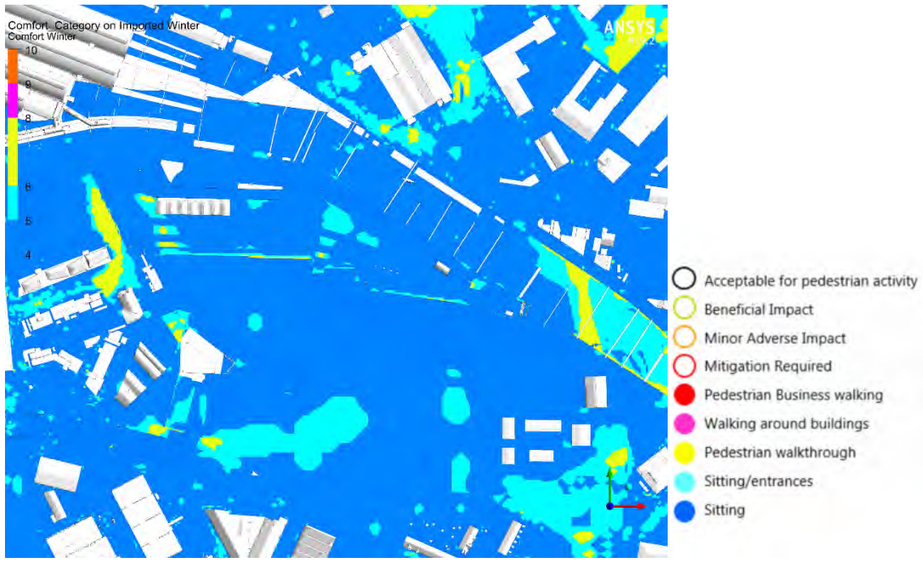

Figure 1-5 Phase 1 Application 1 in existing surroundings - winter composite comfort map (12 wind directions)

Operational effects for Application 1 and Application 2 (Baring Street Multi Storey Car Park, Baring Street Office 1, Baring Street Office 2 and Mayfield Park)

1.3.7 In this scenario there are two main changes in the proposed development from the October 2019 ES; The first one is the reduction of the height of Plot N by 3m, the second is the increase of the height of the cantilever to the north of Plot O. The mitigation strategy remains unchanged from that proposed in the October 2019 ES. The agreed and tested mitigation is listed in Table 1-2 and shown in Figure 1-6 below.

Table 1-2 Mitigation agreed and tested

Mitigation tested in Application 1 and Application 2 in existing surroundings scenarios.
One 2m by 2m low-level planter, including shrubbery up to 0.5m at the northern corner of Plot O.
A 50% porous 1.1m tall balustrade at the podium contention wall from the Park.
A series of fifteen, 7m tall trees to the North of the Plots O and M, inside the Park, according to the Landscape design.
Three, 7m tall trees to the northwest corner of Plot M, including a lower level planter with shrubbery up to 1m tall.
Four, 7m tall trees to the southeast corner of Plot M, including a lower level planter with shrubbery up to 1m tall.
Four, 7m tall trees to the east of Plot N, including a lower level planter with shrubbery up to 1m tall.

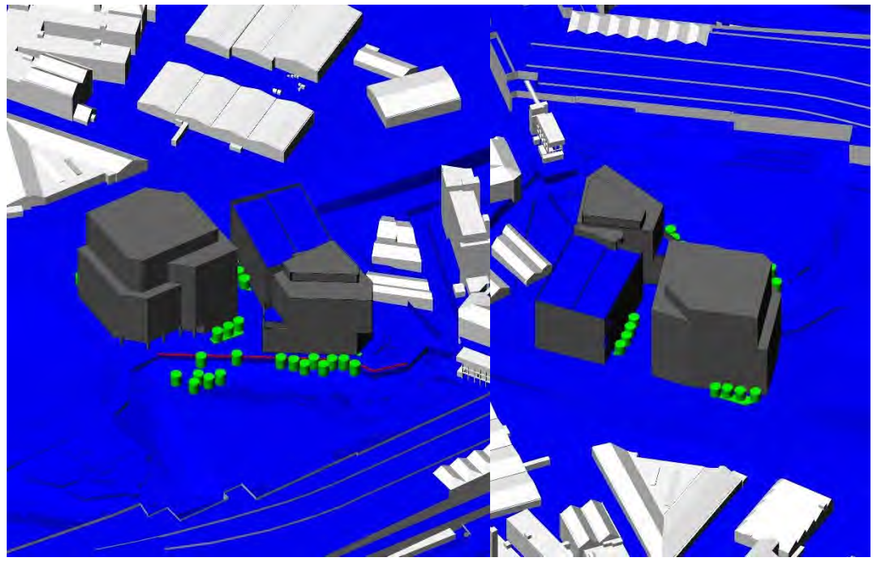

Figure 1-6 Modelled Geometry Phase 1 Application 1 and Application 2 in existing surroundings mitigation

1.3.8 The operational effects remain unchanged from the October 2019 ES. A slight reduction in windy areas is, however, noticed mainly due the height reduction of plot N. In line with the October 2019 ES, no safety concerns have been identified. Conditions for summer and winter for Application 1 and Application 2 wind effects are presented in Figures 1-7 and 1-8 below.

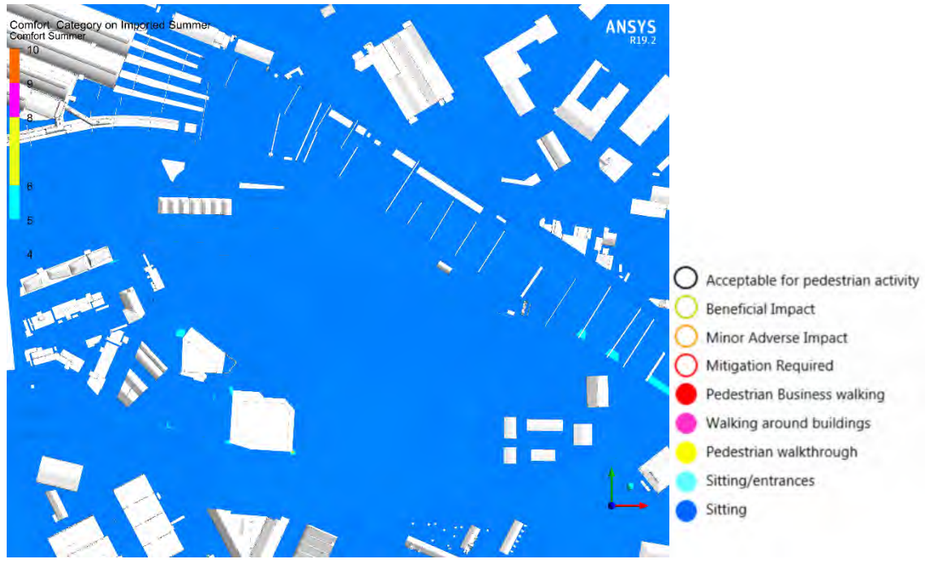

Figure 1-7 Phase 1 Application 1 + Application 2 in existing surroundings - summer composite comfort map (12 wind directions)

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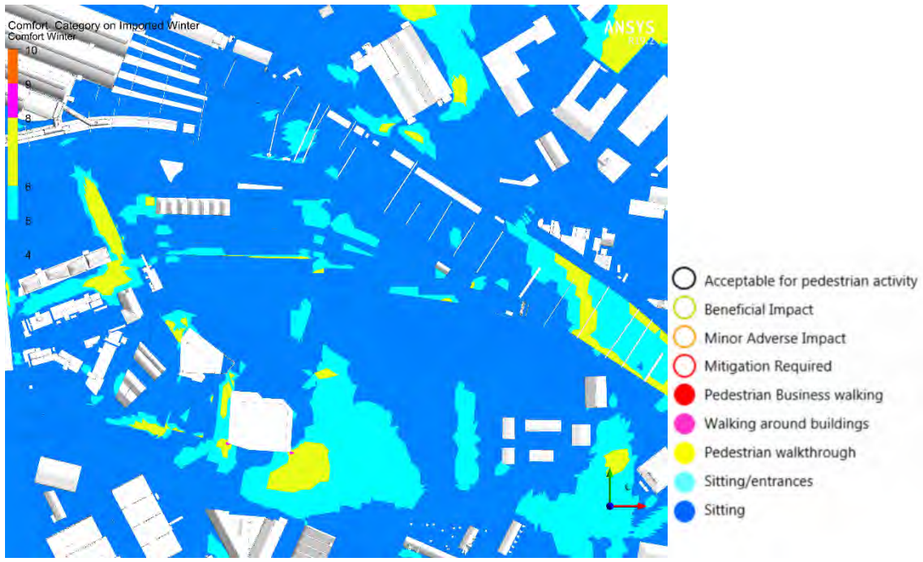

Figure 1-8 Phase 1 Application 1 + Application 2 in existing surroundings - winter composite comfort map (12 wind directions)

Supplementary mitigation measures

1.3.9 No further supplementary mitigation is required.

1.4 REVIEW OF CUMULATIVE EFFECTS

1.4.1 In this cumulative scenario, the same mitigation that was tested for the Application 1 and Application 2 scenario has been applied. The reduction in height of the Plot N slightly reduces the area where windy conditions occur. However, in terms of magnitude of effect no changes have been identified compared with the October 2019 ES. No safety concerns have been identified, in line with the October 2019 ES. Conditions for summer and winter for the cumulative scenario wind effects are presented in Figures 1-9 and 1-10 below.

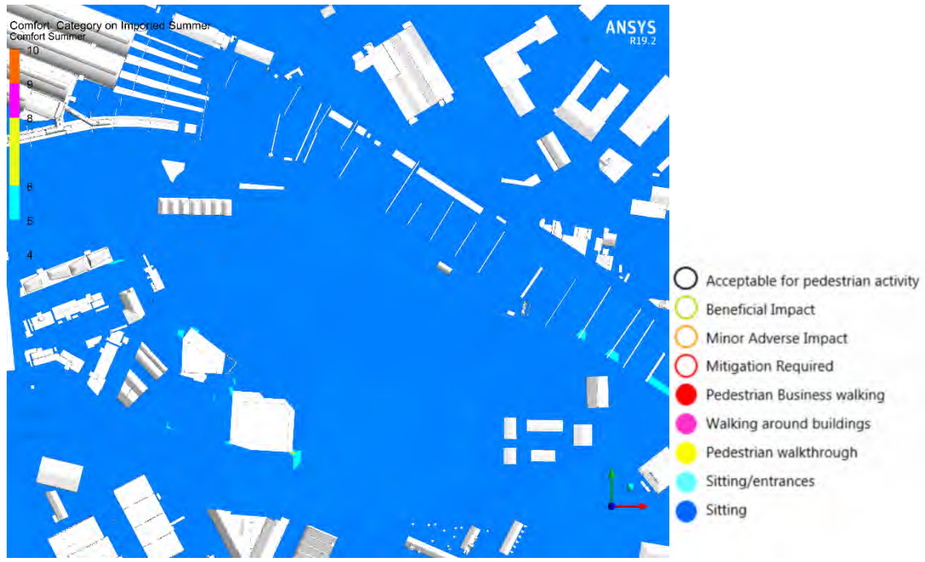

Figure 1-9 Cumulative scenario 1: Phase 1 Application 1 + Application 2 in future surroundings - summer composite comfort map (12 wind directions)

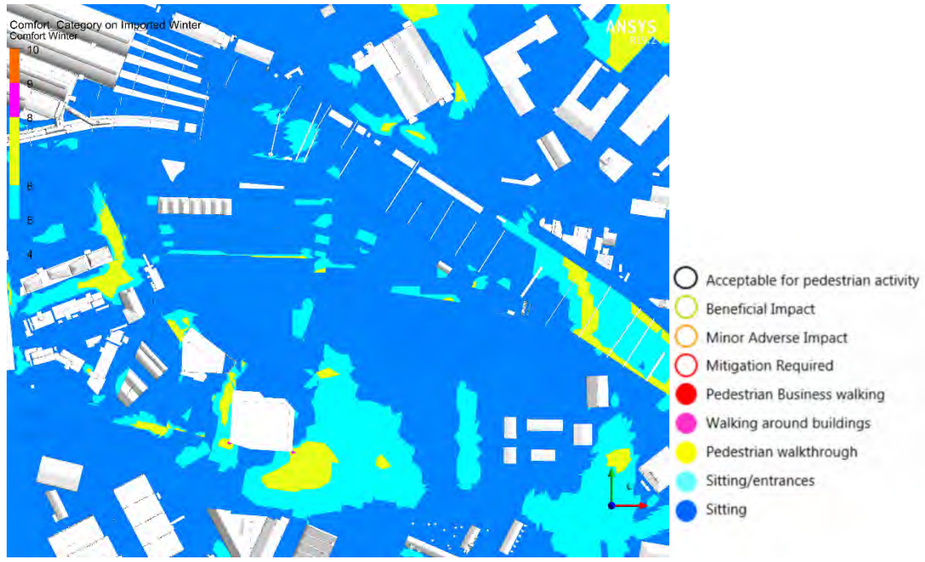

Figure 1-10 Cumulative scenario 1: Phase 1 Application 1 + Application 2 in future surroundings - winter composite comfort map (12 wind directions)

1.5 REVIEW OF RESIDUAL EFFECTS AND CONCLUSIONS

1.5.1 As mentioned before, some of the windier areas suitable for pedestrian walking show a slight beneficial impact from the reduction of height of Plot N. However, the magnitude of change remains the same. Therefore, the

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residual effects and conclusions remain unchanged from the October 2019 ES. Wind effects are summarised in the tables below.

1.6 FUTURE MONITORING OF SIGNFICIANT RESIDUAL ENVIRONMENTAL EFFECTS

1.6.1 Future monitoring of significant residual effects remains unchanged from the October 2019 ES.

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