178 PALATINE ROAD
DIDSBURY
MANCHESTER
M20 2YW

FLOOD RISK ASSESSMENT

VOLUME 1

REVISION S1

Prepared for

BELONG CONSTRUCTION

JUNE 2014

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VOLUME 1

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Document Revision Record

Revision	Details of Revision	Prepared by	Checked by	Date	Position
S1	Report Issue	L Moran	G Wilks	03/6/14	Director

DUTY OF CARE

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1.0 Introduction

1.1 Project Background

TRP Consulting was commissioned by the client, Belong Construction, to prepare a Flood Risk Assessment (FRA) to support a planning application for the redevelopment of the existing care home site.

A screening desktop study has been undertaken to identify flooding issues related to the development site that may warrant further consideration. The study is a holistic risk based assessment of potential flooding from all sources, including tidal and fluvial flooding from adjacent watercourses, groundwater and surface water run-off. The assessment also identifies and examines any residual risk of flooding to the site and neighbouring properties.

The aim of this report is primarily to consider flood risk, flooding consequences (as appropriate) and satisfy legislative requirements under The National Planning Policy Framework (NPPF) which replaced Planning Policy Statement 25 for Development and Flood Risk (PPS 25) in March 2012. Reference has been made to the Technical Guidance to the National Planning Policy Framework document issued in March 2012 by the Department for Communities and Local Government. The assessment has been undertaken in accordance with Ciria C624, 'Development and Flood Risk – Guidance for the Construction Industry (2004) and Flood Risk Assessment Guidance for New Development, Phase 2, R & D Technical Report FD2320/ TR2 (2005).

The Flood Risk Assessment is presented in a format consistent with the FRA Pro-forma contained in PPS 25 Development and Flood Risk - Practice Guide.

This flood risk assessment is based on information provided by Pozzoni, Belong Construction, the Environment Agency, Manchester City Council and other information available in the public domain.

In the event that new or additional information is received, the assessment may need to be reviewed and modified to incorporate the relevant issues.

1.2 Consultation

As part of the development of the flood risk assessment pre-application advice has been sought from the Local Authority and the Environment Agency. These consultations are outlined below.

Manchester City Council

Given that the site is located within a Critical Drainage Area (CDA), we have contacted Planning Liaison at Manchester City Council to request any information that is held in respect of historic flooding at the site and confirmation of the acceptable rate of surface water run-off to sewers.

David Lawless, Senior Planner at Manchester City Council has confirmed that:

- A 50% reduction in run-off rates will apply to the site.
- The site is not susceptible to groundwater flooding and no flood data is held.
- The use of SUDs is encouraged.
- The FRA will need to include a proposed drainage strategy for the site detailing discharge points, location and size of attenuation to achieve the 50% reduction in run-off rates and the indicative routes of the proposed overland flow for extreme events to avoid flooding of properties both on and off site.

The Environment Agency

We contacted the Environment Agency to provide advice on the following issues:

- Provide any information that is available in respect of flooding at the site
- Specific measures that the Environment Agency require to have implemented
- The acceptable rate of surface water run-off from the site
- Any particular information requirements

We are advised by Sylvia Whittingham of the Environment Agency (EA) that the EA no longer comments on applications under 1 hectare where the only constraint is that the proposals are within a Critical Drainage Area as these are relatively low risk and look only at surface water run-off.

Ms Whittingham confirmed that the application site lies within a Critical Drainage Area as described in the Council's Strategic Flood Risk Assessment (SFRA). She confirms that a Flood Risk Assessment to demonstrate, to the satisfaction of the LPA, that the proposed development will achieve a reduction in surface water run-off rate as evidenced by the SFRA should support the application.

Environment Agency Flood Mapping indicates that the site is located in Flood Zone 1 (low probability of flooding). Flood Zone 1 land has been assessed as having 0.1% (1 in 1000 year) chance of flooding from rivers or the sea in any given year.

General Environment Agency Advice

Environment Agency standing advice indicates that for developments greater than 1 hectare in Flood Zone 1, the FRA should be focused on the management of surface water run-off. Proposals for surface water management should seek to maintain, or where practicable reduce, the rate of run-off from the site taking into account the potential for climate change.

EA guidance on flood risk recommends that surface water runoff should be controlled as near to its source as possible through a sustainable drainage approach to surface water management (SUDS), including the use of soakaways, infiltration trenches, permeable pavements and grassed swales to reduce flood risk by attenuating the rate and quantity of surface water runoff from the site.

The run-off for developments on greenfield sites should be limited to the 1 in 1 year greenfield rate. The drainage system should be designed to ensure that a 1 in 100 year standard with a 20% capacity for climate change can be accommodated.

There is no objection, in principle, to storing surface water surcharge within hard paved areas (not immediately surrounding properties) on the understanding that the levels are not high and will be contained in the areas for only a short period.

2.1 Development Site

2.1.a Site Location and Description

The site, which is located approximately 6 km south of Manchester City Centre and 7km north east of Manchester Airport and occupies an area centred around grid reference 383900, 391530 in Didsbury, Manchester.

The site is located at 178 Palatine Road in a predominantly residential setting. The eastern site boundary is formed by Palatine Road, the southern boundary is formed by Spath Road. To the north the site is bounded by a residential property facing onto Palatine Road and to the west by Barfield House, an apartment block owned by Morris Feinmann Homes which faces onto Spath Road.



Aerial image of the site and surrounding area with the site outlined in red.

The site is roughly rectangular in shape and occupies an area of around 0.62 hectares.

The site is currently occupied by a care home. The existing buildings are to be demolished. The proposed development will comprise a new build 4-storey care home. Drawings of the proposed development are included in Appendix C.

2.1.b Vulnerability classification

The proposed development comprises a 'more vulnerable' use, as classified in Table D2 in Annexe D of Planning Policy Statement 25 (PPS25).

2.1.c Local Development Documents

Local development documents comprise:

1. The Core Strategy, adopted on 11th July 2012

   Policy EN 14 - Flood Risk

   'In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

   In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.

   All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure.

   Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.'

2. Manchester Council Unitary Development Plan (UDP) saved policies

3. Interactive Proposals Map - The interactive map shows both Core Strategy and extant Unitary Development Plan (UDP) policies.

The development complies with the local development policy.

2.1.d Evidence that the Sequential Test or Exception Test has been applied in the selection of this site for this development type.

The Sequential and Exception Tests are applied for sites where flood risk is outweighed by wider sustainability considerations and is designed to ensure that the flood risk posed to such sites is controlled and mitigated to an acceptable level taking account of climate change.

This is a previously developed site within a Critical Drainage Area. Critical Drainage Areas are identified in the SFRA, which designates them as high flood risk areas. Site area in this case is under 1 hectare. The EA has advised that sites under 1 hectare are considered to be of relatively low risk and the local authority has confirmed that the site is not susceptible to surface water flooding.

The risk-based Sequential Test aims to steer new developments towards areas with the lowest probability of flooding (i.e. Flood Zone 1). Environment Agency mapping indicates that the site lies within Flood Zone 1. This zone is compatible with all development uses.

The Exception Test requires that the development provides wider sustainability benefits to the community which must outweigh the flood risk. The Exception Test is therefore not required in this case.

2.2 Definition of the Flood Hazard

2.2.a What sources of flooding could affect the site? (see Annexe C PPS 25)

Consideration has been given to the possibility of flooding that could affect the site from sources such as rivers, the sea, reservoirs and other artificial sources, groundwater, sewers and surface water runoff.

2.2.b For each identified source, describe how flooding would occur, with reference to any historic records wherever these are available.

Fluvial and Tidal Flooding

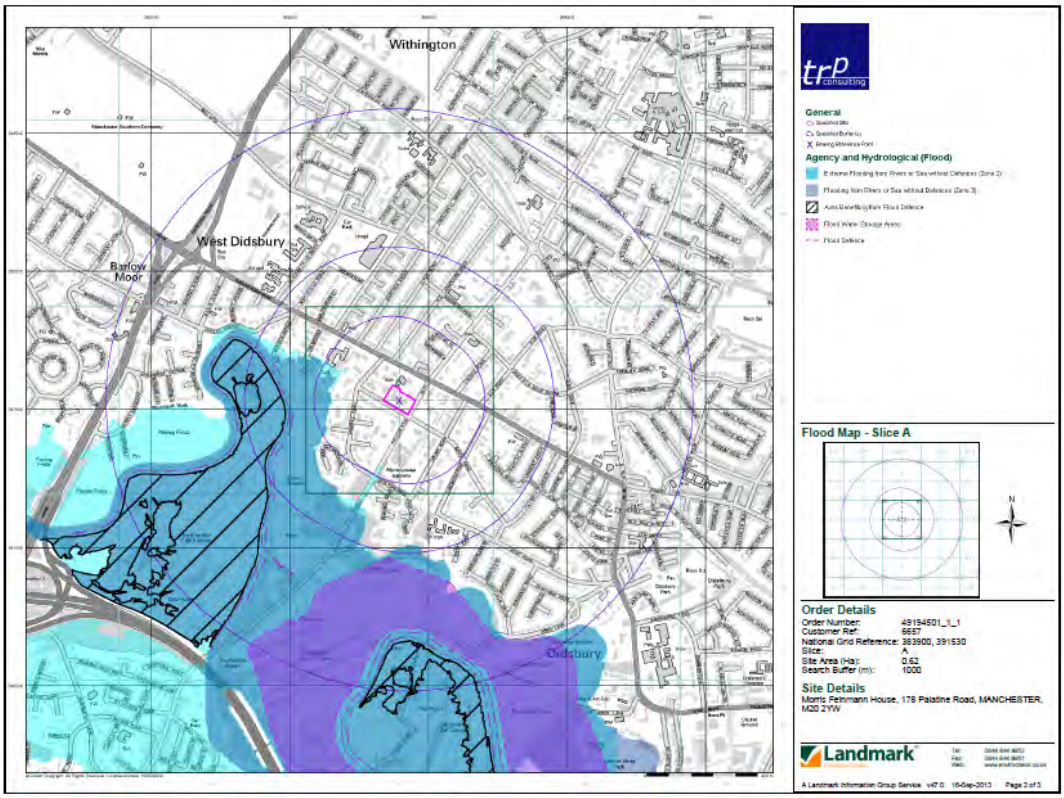
Environment Agency Flood Mapping indicates that the site is located within EA Flood Zone 1. EA Flood Zone 1 land has been assessed as having a minimal 0.1% (1 in 1000 year) chance of flooding from rivers or the sea in any given year.

The closest surface water feature is located 215m west of the site.

Ground levels across the site generally slope southwards, with levels varying between 34.19m AOD in north western corner, 33.23m AOD in south western corner, 32.88m AOD in south eastern corner and 34.34m AOD in north eastern corner. Levels in the vicinity of the buildings are generally just over 34m AOD.

The hydraulic gradient local to the site is assumed to flow to the south following the local topography.

The risk of flooding from fluvial or tidal flooding is considered to be low.



Environment Agency Flood Zones in area of the site (site outlined in pink)

Flooding from reservoirs, canals and other artificial sources

Examination of public records and maps has not revealed the presence of reservoirs or ponds in the close vicinity of the site or known records of flooding from artificial sources at the site. Therefore these are considered to be an unlikely source of flooding.

Flooding from Groundwater

The BGS Geology 1:10,000 Digital Map of Great Britain, Maps 1 (2008) indicates the succession of strata to be as shown in the table below:

Geological Mapping Summary	
Strata	**Description**
Artificial Ground and Landslip	Made Ground located 300m east of the site along the bank of the River Mersey
Superficial Geology	Glacial Fluvial Sheet Deposits, Devensian comprising sand and gravel
Bedrock	Scythian Wilmslow Sandstone Formation comprising Sandstone
Faults	No faults were indicated in the vicinity of the site

Environment Agency Groundwater Vulnerability maps have been consulted and the information is presented in the table below.

Vulnerability Mapping Summary	
Strata	**Northwest Corner of site**
Surface Conditions	Soils of high leaching potential
Superficial	Secondary A Aquifer
Bedrock	Principal Aquifer
Source Protection Zone	Outside

Groundwater flooding is not considered to represent a significant risk to the site.

Flooding from Sewers

There are no reported problems of flooding from sources in the vicinity of the site.

The risk of flooding from foul and surface water drainage systems is currently considered low.

There may be a residual risk of flooding associated with blockages in the site drainage systems or main sewers.

Flooding from Surface water run-off - Overland flow

The existing development is operated as a care home and car park.
Existing drainage at the care home is to public sewers. There is no record of flooding at the site.

2.2.c Existing surface water drainage arrangements for the site

There is an existing drainage network serving the care home. United Utilities sewer plans show a 375mm diameter public combined sewer along Spath Road and a 600mm combined sewer along Palatine Road.

United Utilities sewer mapping is included in Appendix D.

2.3 Probability of Flooding

2.3.a Which flood zone is the site located in?

Environment Agency mapping indicates that the site is in Flood Zone 1.

2.3.b If there is a SFRA covering this site, what does it show?

The Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA covers the site.

The Manchester City Council Interactive Proposals Map (Core Strategy) indicates that the site is located within a Critical Drainage Area.

Certain locations that are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development have been defined as Critical Drainage Areas in the SFRA. CDAs are designated as high flood risk areas. A detailed Flood Risk Assessment is required for all developments over 0.50 hectares within Critical Drainage Areas.

'*This should demonstrate that new development is not at risk from flooding from existing drainage systems or potential overland flow routes. It should also demonstrate that the development will not adversely affect existing flooding conditions by the use of*

appropriate mitigation measures. The FRA should define and address the constraints that will govern the design of the drainage system and layout of the development site. '

The Environment Agency Standing Advice notes that for developments in Flood Zone 1 FRA Guidance Note 113 should be followed '*In areas where the Local Planning Authority has identified drainage problems through a Strategic Flood Risk Assessment or Surface Water Management Plan and they have indicated that a formal flood risk assessment is required'.*

FRA Guidance Note 1 requires FRAs to provide *'Proposals for surface water management that aims to not increase, and where practicable reduce the rate of runoff from the site as a result of the development (in accordance with sustainable drainage principles, and the Local Planning Authority's published SFRA).'*

The Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010' (Section 3.4.1 Critical Drainage Areas, page 31) advises that Manchester requires that the surface water discharge from the site is reduced by 50% compared to the run-off from the existing developed site.

2.3.c What is the probability of the site flooding taking account of the contents of the SFRA and any further site-specific assessment?

Preliminary assessment of the site and surrounding area has identified that the main potential source of flooding is associated with surface water run-off.

2.3.d Existing rates and volumes of run-off generated by the site

The permeable and impermeable areas of site have been assessed as follows:

Buildings	1,700 m^2
Impermeable Hardstanding	1,760 m^2
Total Impermeable Area	**3,460 m^2**
Soft Landscaping	2,020 m^2
Total site area	5,480 m^2 (0.548ha)

An existing schematic drainage network has been constructed in Windes Microdrainage. For a rainfall intensity of 56mm/h an existing flow rate of 49.2litres/sec has been established for a 1 in 2 year storm event. Windes output is included in Appendix E.

2.4 Climate Change

2.4.a The EA recommends the following allowances are made in designing drainage systems to take into account future climate change (Table 5 taken from the Technical Guide to the National Planning Policy Framework, March 2012).

Table 5: Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	*+5%*	*+10%*	*+20%*	*+30%*
Peak river flow	*+10%*	*+20%*		
Offshore wind speed	*+5%*		*+10%*	
Extreme wave height	*+5%*		*+10%*	

Notes to table 5:

a. Refer to Department for Environment, Food and Rural Affairs *FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts,* October 2006, for details of the derivation of this table.

b. For deriving peak rainfall, for example, between 2025 and 2055 multiply the rainfall measurement (in mm per hour) by 10 per cent and between 2055 and 2085 multiply the rainfall measurement by 20 per cent. So, if there is a 10mm per hour event, for the 2025 to 2055 period this would equate to 11mm per hour; and for the 2055 to 2085 period, this would equate to 12mm per hour. Other parameters in table 5 are treated similarly.

The lifetime for the development has been assumed to be 100 years. A 30% increase in peak rainfall intensities has been incorporated in drainage and surface run-off calculations in line with Environment Agency Standing Advice.

The drainage system will be designed to contain a 1 in 100 year storm event including a 30% increase in peak rainfall intensity to allow for climate change. Flood risk at the site will therefore not be affected by climate change during the life of the proposed development.

2.5 Detailed Development Proposals

2.5.a Details of the development layout, referring to the relevant drawings

The existing buildings are to be demolished. The proposed development will comprise a new build 4-storey care home.

2.5.b Where appropriate, demonstrate how land uses most sensitive to flood damage have been placed in areas within the site that are at least risk of flooding

The site is located within Flood Zone 1. All forms of development are considered appropriate in Flood Zone 1 (see Table D.3 in Appendix D, PPS 25).

2.6 Flood Risk Management Measures

2.6.a How will the site be protected from flooding, including the potential impact of climate change, over the development's lifetime?

The site lies within Flood Zone 1, assessed as having a low probability of flooding.

Permeable and impermeable areas for the proposed development have been assessed as follows (figures are approximate):

The permeable and impermeable areas of site have been assessed as follows:

Buildings	1,434 m^2
Hardstanding	1,994 m^2
Total Impermeable Area	**3,428 m^2**
Soft Landscaping	2,052 m^2
Total development	5,480 m^2 (0.548 ha)

In order to protect the site and surrounding area from flooding a number of measures will be adopted in design of the surface water drainage to the proposed development.

A surface water drainage strategy has been designed that limits the flow from the site to 50% of the existing site drainage for 1:100 year storm including an allowance for climate change.

A quick storage estimate has been calculated for the site using Windes Microdrainage that gives an attenuation volume of between 63-115m^3. Attenuation storage will be provided below car parks and hardstanding that will be surfaced with permeable paving. Based on an approximate car park area of 1,060m^2 with a 400mm thick voided stone sub base providing 30% voids, around 127m^3 of attenuation will be provided.

Additional storage can be provided in dry swales within the garden areas if found to be required during detailed design.

The residual flows from the site will be directed to the public sewer network in Spath Road or Palatine Road. Existing connection points will be utilised if these are feasible.

Summary of measures to be adopted:

- The drainage network for the proposed development will be designed to achieve a 50% reduction in runoff rates compared to existing levels. Satisfactory performance of the drainage system will be based on achieving a reduction in peak surface water flow rates to the main sewers.
- The design of the new drainage system will incorporate an allowance for climate change in adopting a 30% increase in peak rainfall intensity.
- The new drainage system will be checked for a 1 in 100 year storm event and a range of storm durations to ensure that all run-off is retained on-site, below ground. This will be achieved by provision of storage within the on-site drainage system.

A proposed site layout is attached in Appendix C.

General Measures

The Environmental Agency (2004) recommendations for the management of surface water state that:

'Surface water should be controlled as near to its source as possible through a sustainable approach to surface water management. This approach involves using a range of techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved Document Part H of the Building Regulations 2000 sets out a corresponding hierarchy for surface water disposal which encourages a SUDS approach.'

The hierarchy of surface water disposal as noted in the Building Regulations H3 is as follows:

i) Sustainable urban drainage systems (SUDS)
ii) Discharge of surface water offsite direct to watercourse
iii) Discharge to adopted sewer

SUDS are made up of one or more structures built to manage surface water run-off. They are used in conjunction with good management of the site, to prevent flooding and pollution. There are five general methods of control:

- Prevention
- Filter strips and swales
- Permeable surfaces and filter drains
- Infiltration devices
- Basins and ponds

These controls should be located as close as possible to where the rainwater falls, providing *attenuation* for the run-off. They also provide varying degrees of treatment for surface water, using the natural processes of sedimentation, filtration, adsorption and biological degradation.

Investigation into ground conditions will need to be undertaken to establish the most appropriate form of SUDS to be adopted for the site. The presence of potentially contaminated fills and the underlying clay soils might restrict the use of infiltration drainage systems.

Following detailed liaison with the EA, United Utilities and Manchester City Council, it is proposed to discharge post development surface water to the adopted combined sewer system that serves the development site utilising the existing sewer connections from the development site.

The detailed design of the on site surface water drainage system will be in accordance with the Environment Agency stipulation that there are to be no off site surface water flood routes generated by the development during a 1 in 100 year storm.

SUDS will be used where possible in the redevelopment.

2.7 Off Site Impacts

2.7.a How will you ensure that your proposed development and the measures to protect your site from flooding will not increase flood risk elsewhere?

The drainage and attenuation system will be designed to accommodate a 1 in 100 year storm event without overland flow. The proposed development will not increase flood risk on or off site. The computer simulations incorporating attenuation indicate that run-off from the 1 in 100 year storm will be contained below ground.

2.7.b How will you prevent run-off from the completed development causing an impact elsewhere?

See measures set out in section 2.7 above.

2.8 Residual Risks

2.8.a What flood related risks will remain after you have implemented the measures to protect the site from flooding?

A residual risk will remain from surface water run-off caused by extreme storm events with annual probabilities of less than 1% (1 in 100 year). There may also be a residual risk of flooding associated with blockages in the site drainage systems or main sewers around the site.

2.8.b How, and by whom, will these risks be managed over the lifetime of the development?

The National Standards for SUDs were issued by DEFRA in December 2011. The National Standards set out what to design and construct in order to obtain approval from the SUDS Approving Body (SAB) and outline the operation and maintenance of SUDS which the SAB adopts.

The Flood and Water Management Act 2010 encourages the use of sustainable drainage in new developments and re-developments by requiring drainage systems to be approved against the National Standards before building can commence and a connection to the sewer can be allowed (if needed). The plans for the drainage system need to be approved pre-construction by the SUDS Approving Body (SAB), which will be the unitary or county council for the area. In addition, the Local Planning Authority may set local requirements for planning permission that have the effect of more stringent requirements than the National Standards.

The Sustainable Drainage (Approval and Adoption) (England) Order 2012 defines the exemptions to the requirement for approval.

The management of the on-site SUDS systems is the responsibility of the owners. The approved drainage plan must include the safe operation and maintenance of SUDS. Where appropriate this must make provision for a warning system and contingency arrangements. The owners should ensure that the systems are properly maintained and kept free of debris which will prevent them operating efficiently.

Reference should also be made to British Standard BS 8582:2013: Code of practice for surface water management for development sites regarding the maintenance requirements and programming for maintenance to surface water drainage systems.

In emergencies, Manchester City Council can maintain the surface water drainage system under the Land Drainage Act.

3.0 Conclusions

3.a The site is located at 178 Palatine Road, Didsbury, around 6km south of Manchester city centre, in a predominantly residential setting. The site is roughly rectangular in shape and occupies an area of around 0.62 hectares.

3.b The existing impermeable development comprises approximately 3,460m^2 of hard paved areas and buildings. The projected redevelopment comprises approximately 3,428m^2 of development which represents a modest decrease in the overall developed area.

3.c The site is located in Flood Zone 1. Flood Zone 1 is land assessed as having a minimal risk of flooding from rivers and the sea, less than 1 in 1,000 in any year. The site is located within a Critical Drainage Area in which the risk of flooding from surface water run-off could potentially be significant.

3.d The proposed development comprises demolition of an existing care home and construction of a 4- storey residential care home.

3.e The principal risk of flooding on the site and adjacent sites is considered to be related to surface water run-off within the critical drainage area that could be exacerbated by the proposed development. A surface water management plan and drainage design that takes a holistic approach taking into account all the sources of local flood risk, including from sewers, overland flow, culverted and open watercourses and groundwater will be implemented. This will incorporate the use of SUDs, as appropriate.

3.f It is proposed that the following criteria are adopted in developing the detailed design of the surface water drainage system of the site.

- The surface water runoff should be limited to 50% of the current runoff from the site. Current site runoff has been established as 49.2 l/sec for a 1 in 2 year storm.
- The peak surface water discharge for the site should be limited to 24.6 l/s in consideration of 1 in 100 year storms.
- Allowance should be made for an increase of 30% in peak rainfall intensity to allow for climate change.

- The drainage system should be designed for a 1 in 100 year storm event with run-off contained below ground. There should be no overland flow.
- Attenuation storage will be provided in the sub base below permeable car parks and hardstanding.
- If required, dry swales can be incorporated into the garden landscaping.
- Residual flow from the site will be directed to the public sewer network, where possible existing connections will be utilised.

3.g The overall risk of flooding to the site has been assessed as low. The principal risk of flooding on the site is considered to be associated with surface water run-off from the proposed development.

- The surface water drainage to the proposed development will be modelled and a simulation run for a range of storm durations. Computer simulation will confirm that the surface water run-off falls within the permitted level for the 1 in 1, 1 in 30 and 1 in 100 year storm events.
- The drainage system has to be tested to confirm that run-off for a 1 in 100 year storm can be contained below ground.

3.h If appropriate drainage design measures are implemented, the will be no adverse flood risk to areas in the vicinity of the site.

3.i Management of the on-site SUDs is the responsibility of the owners.

3.j Reference should also be made to British Standard BS 8582:2013: Code of practice for surface water management for development sites regarding the maintenance requirements and programming for maintenance to surface water drainage systems.

3.k The process of flood risk assessment has been undertaken for the site and the proposed development. It is considered that the proposed development will not increase the likelihood of flooding on-site or in the surrounding area provided that the criteria set out above are applied to the design.

APPENDIX A

A1 Photographs

A1 Site photographs


Front elevation - south west


Front elevation - south east


Eastern wing

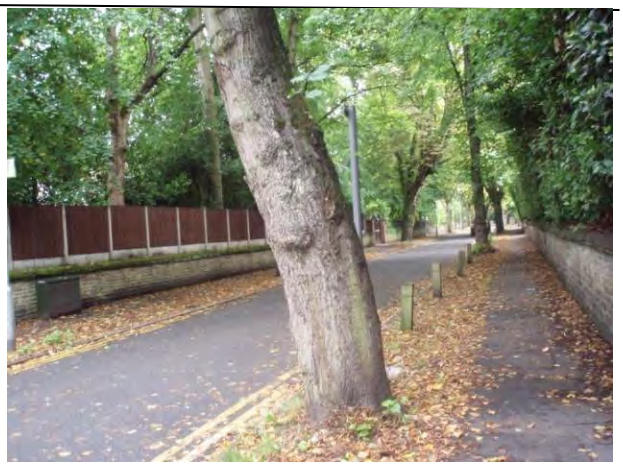

Western wing


Rear of care home (east)


Rear of care home (west)



Barfield House immediately west of the care home site

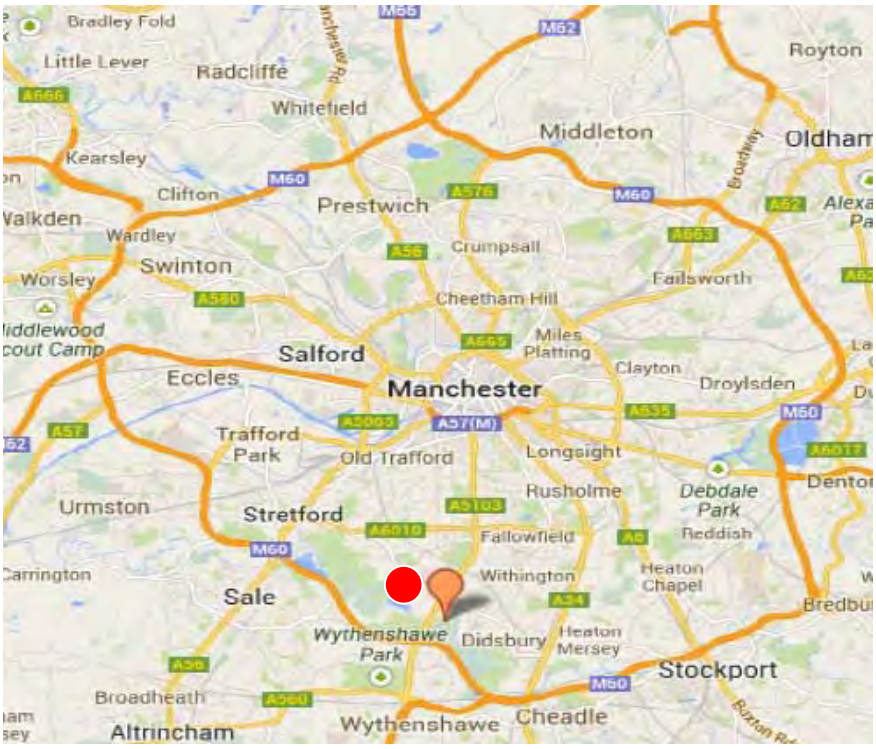


Spath Road

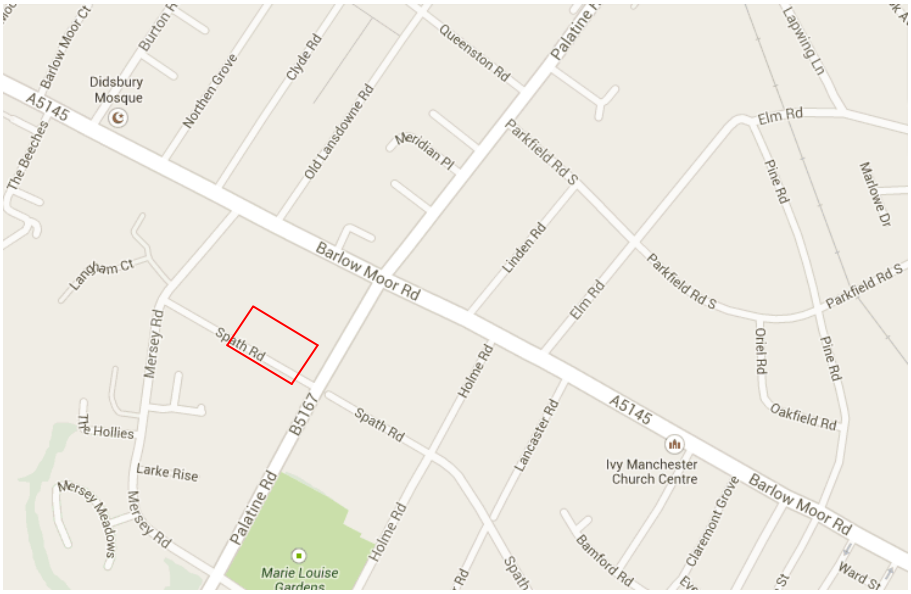
APPENDIX B

B1 Location maps

FIGURE B1 Location Maps



Site Location marked in red



APPENDIX C

C1 Proposed site layout

C2 Topographic survey data

C3 Flood map

FIGURE C1 Proposed Site Layout

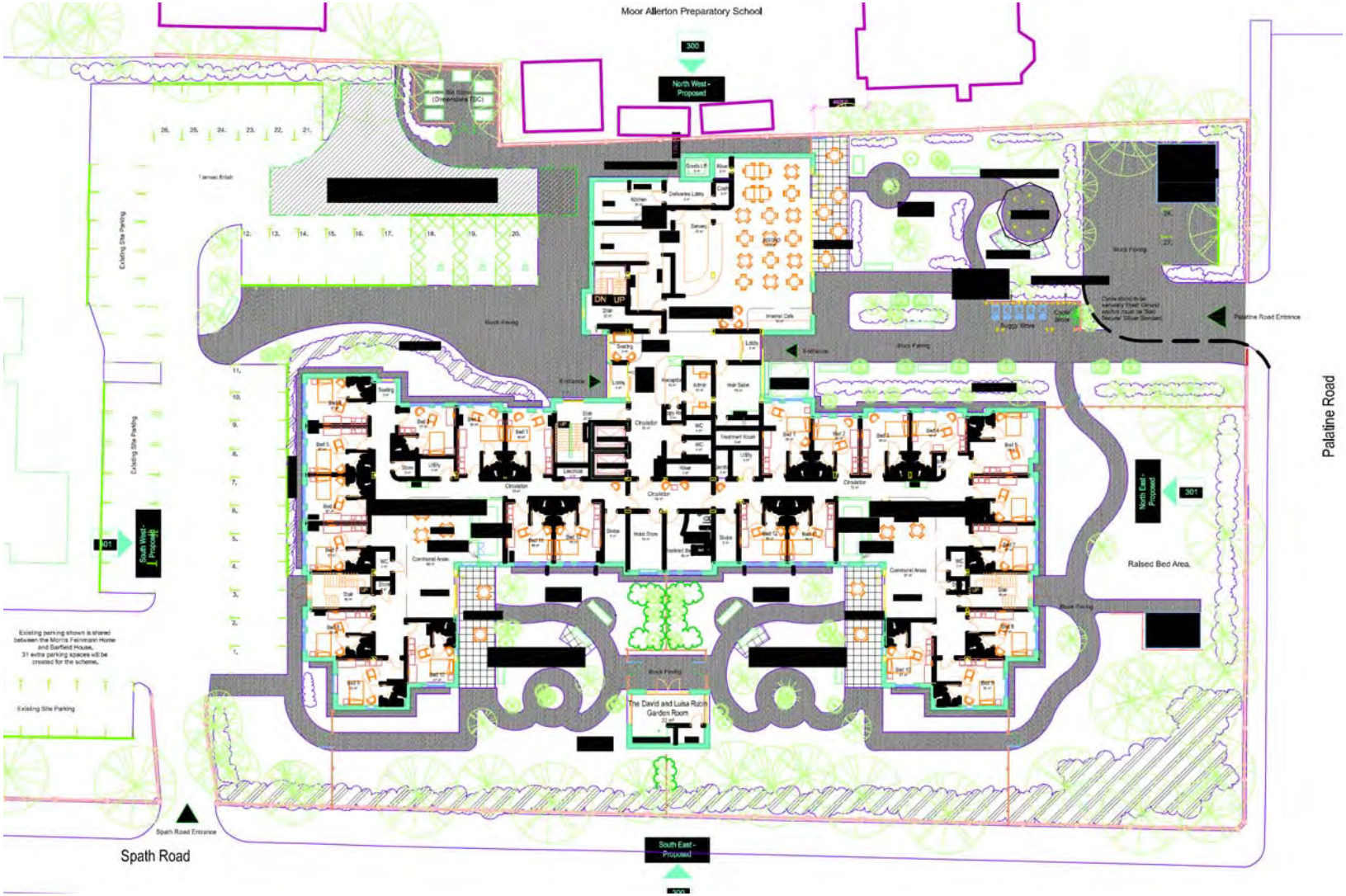
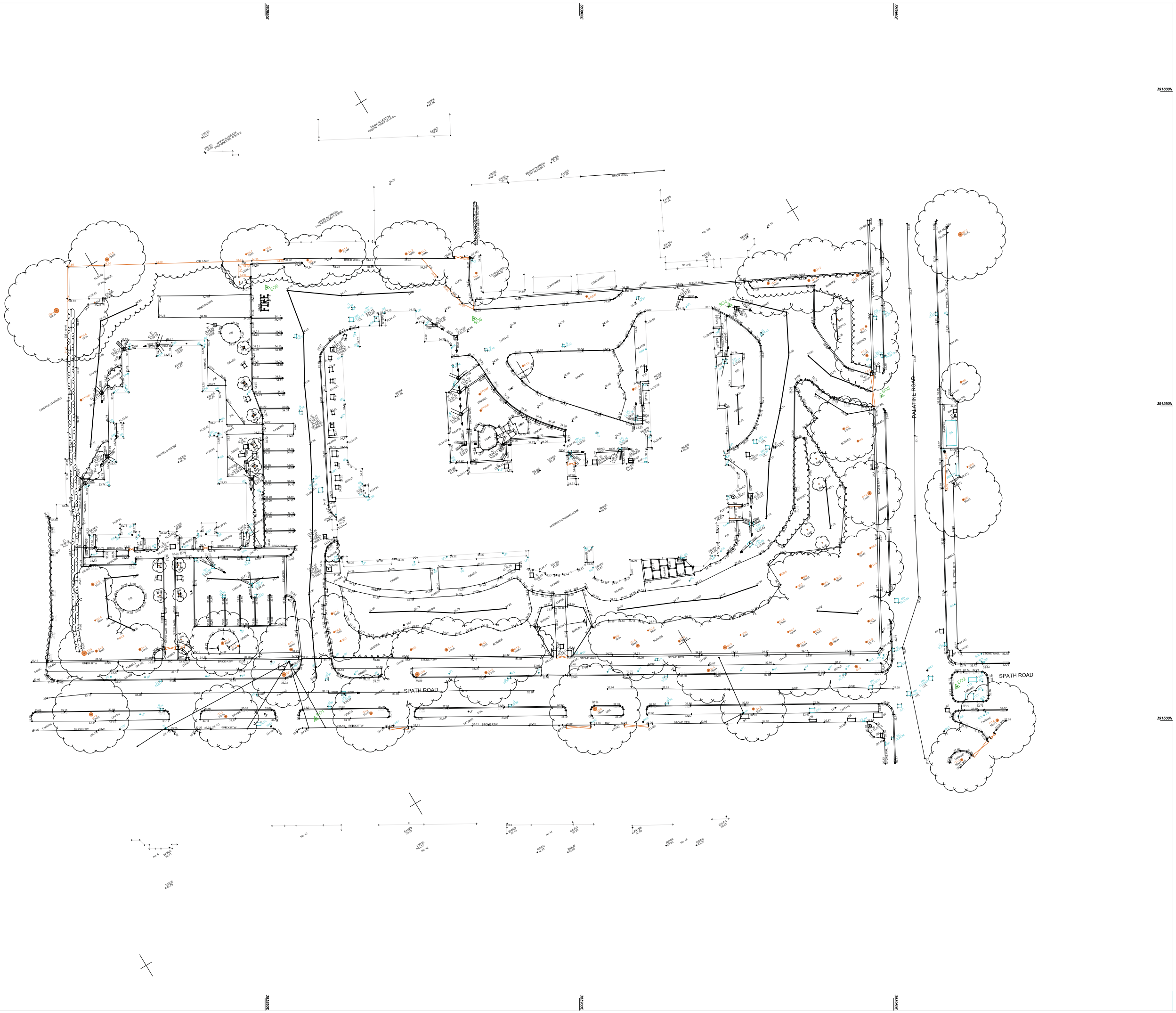


FIGURE C2 Topographic survey data



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Note:

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Drainage information must be verified with local authority records before use

Levels in parenthesis indicate top of wall height.

SURVEY STATIONS			
Name	Eastings	Northings	Height
S01	383643.33	391519.68	33.14
S02	383533.39	391471.55	32.83
S03	383410.61	391517.39	33.10
S04	383552.91	391561.27	34.31
S05	383697.69	391561.27	34.31
S06	383871.89	391582.48	34.22

STANDARD REFERENCE & ABBREVIATIONS

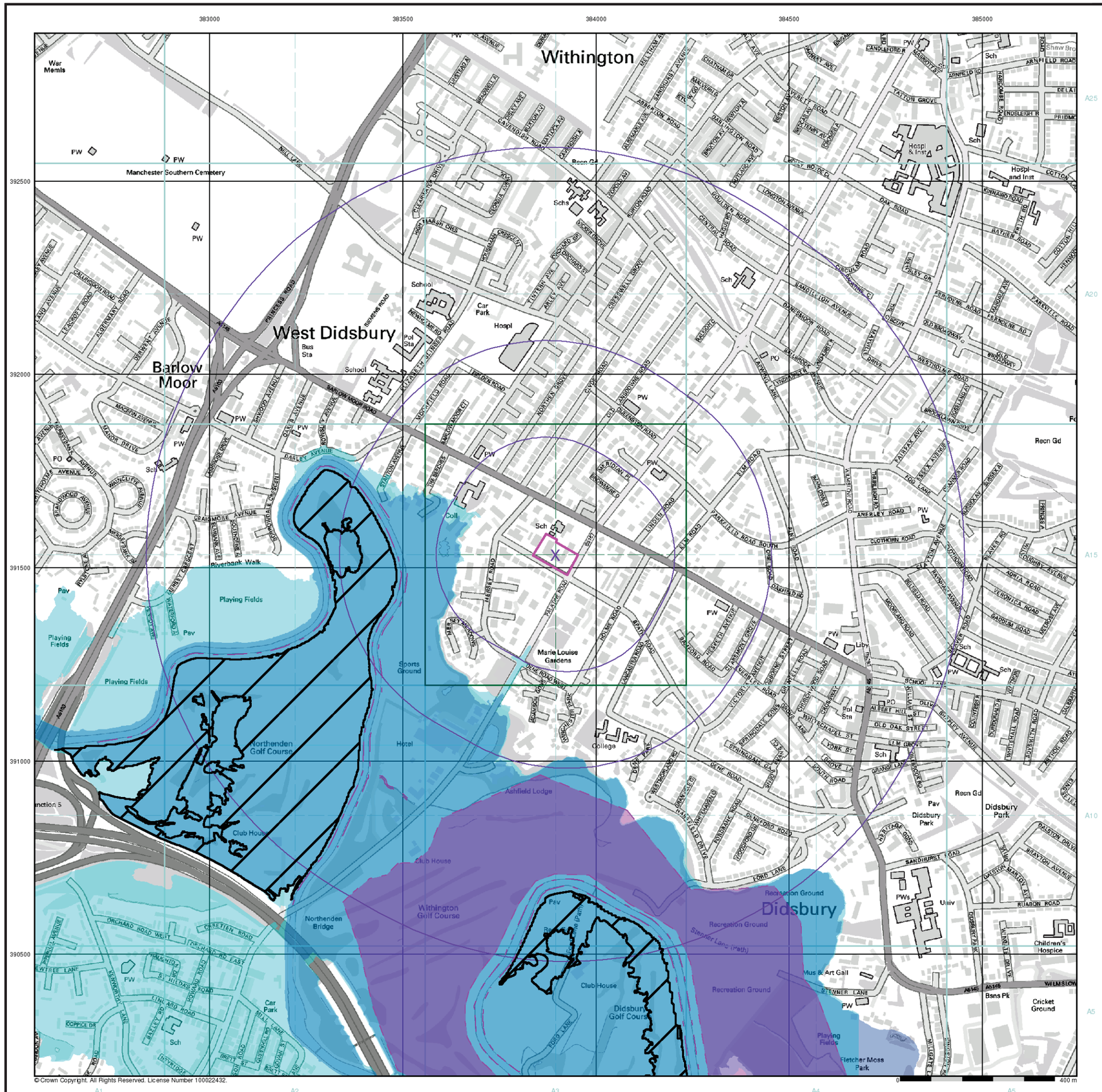
AM.....Ancient Marks	EC.....Inspection Cover
AT.....ATM Valve	EL.....Invert Level
B/S.....Bollard Stn	ES.....Fern Outlet
BB.....Bubble Beacon	ET.....Junction Box
BH.....Bollard	FP.....Fog Post
BL.....Bed Level	FS.....Air/Soil/Stn
BS.....Bus Stop	GA.....Garage
BT BOX.....British Telecom Box	GAR.....Garage
BT.....British Telecom Sl	GF/GR.....Grid Post or Stone
BW.....Brick Wall	GL.....Ground Beam Plate
BWP.....Bollard	GLY.....Guernsey
BY.....Buoy	GM.....Gas Marker
CA.....Concrete	GP.....Guy Post
CB.....Concrete Bollard	GPO.....Ordnance Survey Bench Mark
CC.....Corrugated Iron	HIL.....Post & Chain
CF.....Cathodic Prot/Sq	HP.....Post & Rail
CH.....Control Box	HR.....Post & Wire
CON.....Cobble Circuit Tr	HT.....Parking
CP.....Concrete Block Pol	HY.....Pillar Box
CR.....Concrete	HZ.....Pedestrian Crossing
CS.....Cable Marker	IC.....Petrol Pump
CT.....Cable Trunk/Duct	IP.....Post or Pillar
CV.....Chevron	IR.....Parking Bay
D.....Dormer	IS.....Parking Bay
DA.....Dwarf Wall	IT.....Metalling Rail
DB.....Distribution Box	JB.....Rail Guard Fence
DC.....Drainage Channel	JC.....Railway Level
DE.....Down Pipe	JD.....Rail Sign Fence
DF.....Down Pipe	JE.....Rail Sign Fence
DH.....Drain	JF.....Rail Sign Fence
DP.....Electricity Cable Pit	JG.....Railway Level
ES.....Electricity Inspection Cover	JH.....Traffic Bollard
ET.....Inspection Junct	JK.....Telemetry Bench Mark
EB.....Electricity Junction Box	JL.....Telephone Call Box
EL BOX.....Electricity Box Station	JM.....Fence Pole Junction
EL.....Invert Level	JN.....Water Main (Hydrant)
EL2.....Electricity Box	JO.....Traffic Light
EM.....Electricity Pole	JP.....Traffic Light Control Box
EN.....Earth Rod	JQ.....Fibre Manhole
ET.....Electricity Transformer Stn	JR.....Fence
FA.....Flower Bed	JS.....Miscellaneous Mine
FC.....Inspection Cover Level	JT.....Tell Pit
FL.....Fire Hydrant	JU.....Water Construction
FL.....Cover Level	JV.....Underground
FP.....Flagpole	JW.....Unable to GPS (Build etc)
GT.....Girth of tree	JX.....Position Detector Pad
G.....Gully	JY.....Fence Pole
GA.....Cable Mast	KJ.....Kiln Vent
GD.....Air Vent Valve	KP.....Water Level
HD.....Manhole	KR.....Water Valve
HL.....High Voltage	KT.....Water Tap
HT.....Height	KU.....Water Stop Tap (manhole)
I/G.....Iron Railing	KV.....Water Stop Valve (cabin)

Survey OPERATIONS
Smith Street, Skelmersdale, Lancs. WN8 8LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk – www.survops.co.uk

UKAS QUALITY MANAGEMENT ISO 9001 · UKAS ENVIRONMENTAL MANAGEMENT ISO 14001 · UKAS QUALITY MANAGEMENT OHSAS 18001

Client	Pozzoni Design Group
Drawing Title	Topographical Survey of Land at: Morris Feinmann House Didsbury
Scale(s)	1:200
Surveyor	CA
Date	Sep 13
Drawn	AC
Job Number	13H217
Checked	MG
Sheet Size & Drg Number & Revision	A0 13H217/001

FIGURE C3 Flood Map



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trp consulting

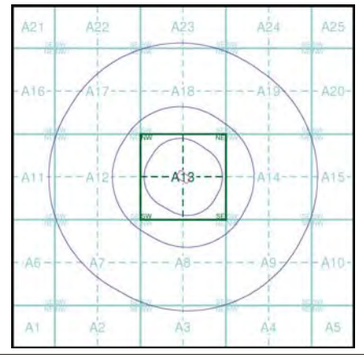
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

Order Number:	49194501_1_1
Customer Ref:	6657
National Grid Reference:	383900, 391530
Slice:	A
Site Area (Ha):	0.62
Search Buffer (m):	1000

Site Details

Morris Feinmann House, 178 Palatine Road, MANCHESTER, M20 2YW

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

APPENDIX D

D1 United Utilities Sewer Mapping

SEWER RECORD (KNOWN TO US AS 178) MORRIS FEINMANN HOUSE 178 & 180 PALATINE ROAD MANCHESTER M20 2YW



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water PLC will not accept any liability for any damage caused by the actual positions being different from those shown.

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United Utilities

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Overflow

- Sludge Main, Public
- Sludge Main, Private
- Sludge Main, S104

Abandoned Pipe

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

Foul Surface Combined

- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

Foul Surface Combined

- WW Site Termination
- Air Valve
- Cascade
- Non Return Valve
- Extent of Survey
- Flow Meter
- Gulley
- Hatch Box
- Head of System
- Hydrobrake / Vortex
- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- WW Pumping Station

Foul Surface Combined

- Sludge Pumping Station
- Sewer Overflow
- T Junction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works

Foul Surface Combined Overflow

- Screen Chamber
- Discharge Point
- Outfall

- Control Kiosk
- Unspecified

Legend

MANHOLE FUNCTION		SEWER SHAPE			
FO	Foul	CI	Circular	TR	Trapezoidal
SW	Surface Water	EG	Egg	AR	Arch
CO	Combined	OV	Oval	BA	Barrel
OV	Overflow	FT	Flat Top	HO	HorseShoe
		RE	Rectangular	UN	Unspecified
		SQ	Square		

SEWER MATERIAL			
AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	VC	Vitrified Clay
CO	Concrete	PP	Polypropylene
CSB	Concrete Segment	PF	Pitched Fibre
CSU	Concrete Segment	MA	Masonry, Coursed
CC	Concrete Box Culverted	MA	Masonry, Random
PSC	Plastic / Steel	RP	Reinforced Plastic
GR	Glass Reinforced	CI	Cast Iron
GRP	Glass Reinforced	SI	Spun Iron
PVC	Polyvinyl Chloride	ST	Steel
PE	Polyethylene	U	Unspecified

CLEAN WATER SYMBOLOGY

PIPE WORK

Live Proposed

- Trunk Main - PressurisedMain
- Raw Water Aqueduct - PressurisedMain
- Raw Water Aqueduct - GravityMain
- LDTM Raw Water Distribution - PressurisedMain
- LDTM Raw Water Distribution - GravityMain
- LDTM Treated Water Distribution - PressurisedMain
- LDTM Treated Water Distribution - GravityMain
- Private Pipe - LateralLine
- Distribution Main - PressurisedMain
- Comms Pipe - LateralLine
- Concessionary Service - LateralLine

ABANDONED PIPE

- Trunk Main
- Raw Water Aqueduct
- LDTM Raw Water Distribution
- LDTM Treated Water Distribution
- Private Pipe
- Distribution Main
- Comms Pipe
- Concessionary Service

NODES/FURNITURES

Live Proposed

- End Cap
- CC Valve
- AC Valve
- Air Valve
- Sluice Valve
- Non Return Valve
- Pressure Management Valve
- Change of Characterstic
- Anode
- Chlorination Point
- De Chlorination Point
- Bore Hole
- Inlet Point
- Bulk Supply Point
- Fire Hydrant
- Hydrant

Live Proposed

- Private Fire Hydrant
- Pump
- Site Termination
- Service Start
- Service End
- Process Meter
- Stop Tap
- Monitor Location
- Strainer Point
- Access Point
- Hatch Box
- IP Point
- Route Marker
- Sampling Station
- Logger Box

PROPERTY TYPES

Live Proposed

- Condition Report
- Pipe Bridges
- Tunnels (non carrier)
- Pumping Station
- Water Treatment Works
- Private Treatment Works

Live Proposed

- Valve House
- Water Tower
- Service Reservoir
- Supply Reservoir
- Abstraction Point
- Domestic meter
- Commercial meter
- Telemetry Outstation

Legend

MATERIAL TYPES		LINING TYPES	
AC	ASBESTOS CEMENT	CL	CEMENT LINING
CI	CAST IRON	TB	TAR OR BITUMEN
CU	COPPER	ERL	EPOXY RESIN
CO	CONCRETE		
DI	DUCTILE IRON	INSERTION TYPES	
GI	GALVANISED IRON		
GR	GREY IRON	DD	DIE DRAWN
OT	OTHERS	DR	DIRECTIONAL DRILLING
PB	LEAD	MO	MOLING
PV	uPVC	PI	PIPELINE
SI	SPUN IRON	SL	SLIP LINED
ST	STEEL		
UN	UNKONWN		
PE	POLYETHYLENE		

APPENDIX E **Windes Output**

Surface Water Attenuation Drawing

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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.380	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	75	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	21.742	0.372	58.4	0.066	5.00	0.0	0.600	o	150
1.001	20.206	0.345	58.6	0.048	0.00	0.0	0.600	o	150
1.002	31.797	0.791	40.2	0.000	0.00	0.0	0.600	o	150
2.000	30.213	0.517	58.4	0.076	5.00	0.0	0.600	o	150
2.001	17.405	0.298	58.4	0.039	0.00	0.0	0.600	o	150
2.002	37.602	0.693	54.3	0.040	0.00	0.0	0.600	o	150
1.003	15.047	0.257	58.5	0.056	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	60.21	5.27	0.000	0.066	0.0	0.0	0.0	1.32	23.3	10.7
1.001	59.00	5.53	-0.372	0.114	0.0	0.0	0.0	1.32	23.3	18.2
1.002	57.51	5.86	-0.717	0.114	0.0	0.0	0.0	1.59	28.1	18.2
2.000	59.70	5.38	0.000	0.076	0.0	0.0	0.0	1.32	23.3	12.3
2.001	58.67	5.60	-0.517	0.115	0.0	0.0	0.0	1.32	23.3	18.2
2.002	56.67	6.06	-0.815	0.155	0.0	0.0	0.0	1.37	24.2	23.8
1.003	56.06	6.21	-1.583	0.324	0.0	0.0	0.0	1.71	68.1	49.2

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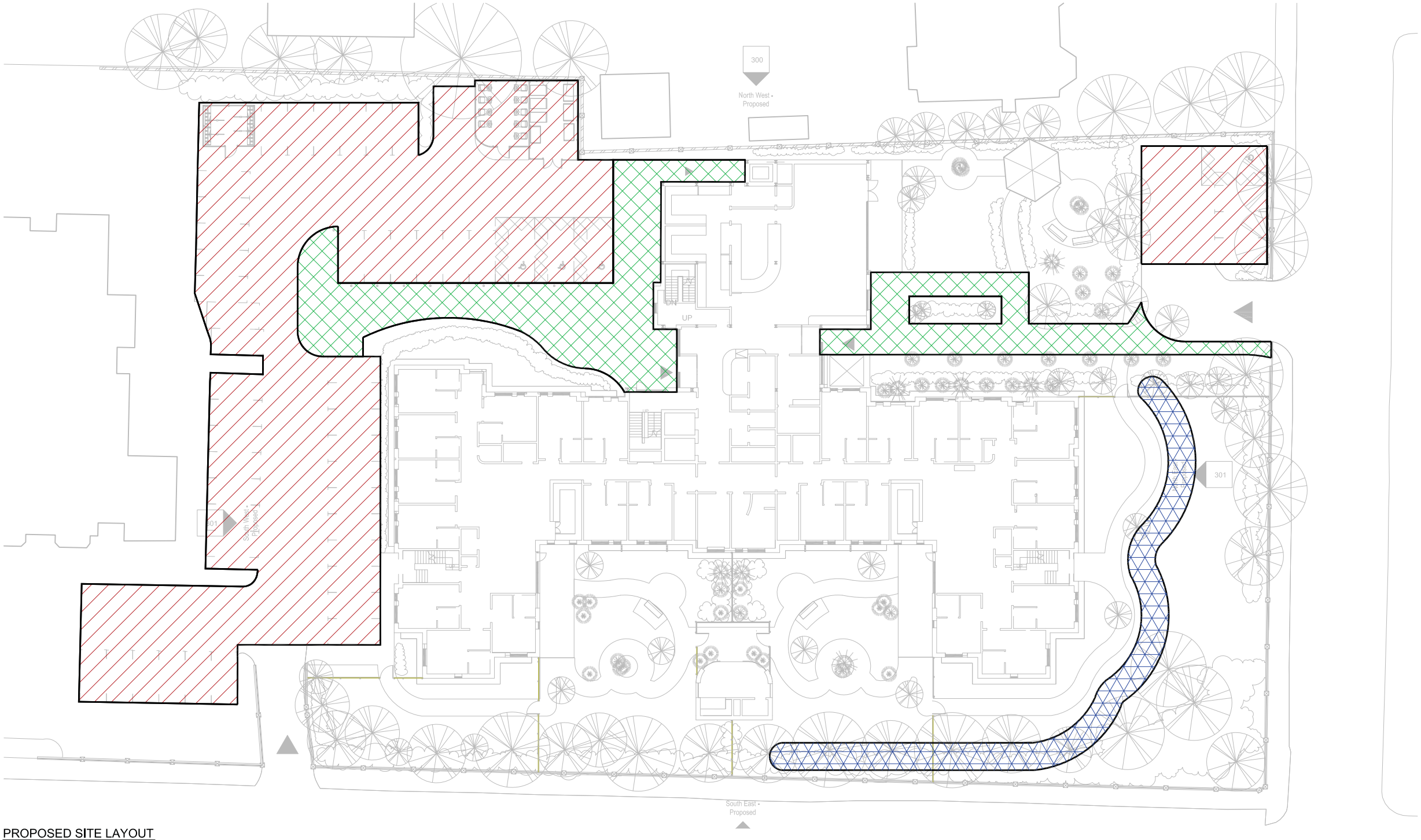
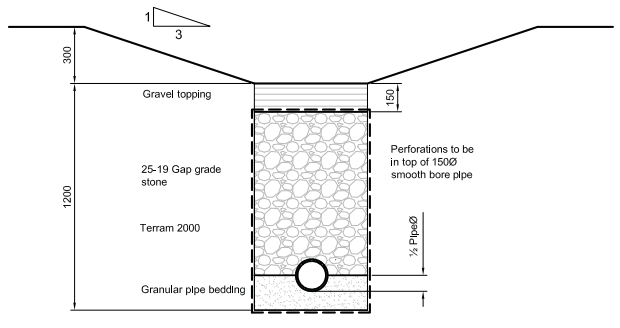


PROPOSED SITE LAYOUT

SCALE 1:200



TYPICAL DRY SWALE SECTION

SCALE 1:20

Notes

1. This Drawing is to be read in conjunction with all relevant TRP, Architects, Service Engineers and Subcontractor drawings.
2. Review all drawings and report any discrepancies to TRP Consulting prior to commencement.
3. Do not scale from this drawing. All dimensions and levels including any abutment to existing structures to be checked on site prior to commencement.
4. Work from figured dimensions only.
5. No deviation from details shown on this drawing is allowed without TRP Consultings prior permission in writing.
6. All work is to be carried out in accordance with the relevant specifications issued by TRP Consulting, British Standard Codes of Practice, Statutory requirements and the Contract Documents.

KEY:

- DENOTES CAR PARK PERMEABLE PAVING WITH SUB BASE STORAGE
- DENOTES HARDSTANDING PERMEABLE PAVING WITH SUB BASE STORAGE
- DENOTES DRY SWALE IF REQUIRED

REVISION STATUS

S - Information issued for feasibility, scheme or tender purposes only.

C - Information Issued for Construction

Note - Only C Revision Drawings to be used for Construction.

Rev	Description	Date / By
S1	Issued for Information	02.06.14 SH

Project: Didsbury

Client: CLS Belong

Drawing Title: SURFACE WATER ATTENUATION STRATEGY

TRP Consulting
The Landmark
21 Back Turner Street
Manchester
M4 1FR

Tel 0161 839 9113
Fax 0161 839 9114
Email manchester@trpconsult.com

Drawn By	Date	Scale	Checked
SH	06.2014	Varies	GW

Project No,	Drawing No,	Revision
6657	(L)-E500	S1

A1

APPENDIX F Correspondence

F1 Correspondence with Environment Agency

Lynda Moran

From: Lynda Moran [l.moran@trpconsult.com]
Sent: 19 March 2014 10:15
To: 'sylvia.whittingham@environment-agency.gov.uk'
Cc: 'enquiries@environment-agency.gov.uk'
Subject: 178 Palatine Road, Didsbury M20 2YW

Importance: High

Sylvia

TRP Consulting has been appointed to prepare a Flood Risk Assessment and Surface Water Drainage Strategy for the site at 178 Palatine Road, Didsbury M20 2YW. EA mapping indicates that the site is located within land assessed as Flood Zone 1. The SFRA Critical Drainage map shows the site to be located within the Didsbury Critical Drainage Area. As the site appears to lie in a critical drainage area I hope that you don't mind me referring my queries regarding this site to you.

The site is located at 178 Palatine Road, adjacent to the corner with Spath Road. OS Grid reference is 383900, 391530

The site is roughly rectangular in shape and occupies an area of around 0.62 hectares.

The existing care home buildings on the site are to be demolished. The proposed development will comprise a new build 4-storey care home.

We have referred to 'Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010'. (Section 3.4.1 Critical Drainage Areas, page 31).

1. We understand that in general, the discharge from the site should be reduced compared to the run-off from the existing developed site. Within critical drainage areas in Manchester we understand that surface water run-off should be reduce by 50% on brownfield sites. Please confirm that this will apply to this site.

2. Please provide any information that you hold regarding flooding at the site.

3. Please confirm any specific measures you would expect to be implemented at the site.

4. What specific information would you require to be included within the FRA?

We look forward to hearing from you at your earliest convenience.

Regards
Lynda Moran

TRP Consulting
The Landmark. 21 Back Turner Street. Manchester. M4 1FR
T 0161 839 9113
E L.Moran@trpconsult.com

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1

Lynda Moran

From: Whittingham, Sylvia [sylvia.whittingham@environment-agency.gov.uk]
Sent: 19 March 2014 17:35
To: 'Lynda Moran'
Cc: Enquiries, Unit
Subject: RE: 178 Palatine Road, Didsbury M20 2YW

Linda,

We no longer comment on applications under 1 hectare where the only constraint is that the proposals are within a critical drainage area. Since these are relatively low risk and looking at surface water run-off only, we will defer these back to the LPA.

The application site lies within a Critical Drainage Area as described in the Council's Strategic Flood Risk Assessment (SFRA). The enquiry should be supported by a Flood Risk Assessment to demonstrate, to the satisfaction of the LPA, that the proposed development will achieve a reduction in surface water run-off rate as evidenced by the SFRA.'

Should you have any further queries, these should be directed to the Manchester City Council, Planning Department.

Many thanks
Sylvia

Sylvia Whittingham
Planning Liaison Officer
(Bury, Rochdale, Oldham
Manchester, Salford and Trafford)

Environment Agency
Environment, Planning and Engagement
Sustainable Places Team
Richard Fairclough House
Knutsford Road
Warrington
WA4 1HT

Tel: 01925 542529
Email: sylvia.whittingham@environment-agency.gov.uk
Team Email: SPPLANNING.RFH@environment-agency.gov.uk



NEW: Charging for Planning Advice
As of 3rd March 2014 we have been charging for some of our planning advice.
For more information please see our web pages at http://www.environment-agency.gov.uk/research/planning/33580.aspx or speak to your local Sustainable Places team.

F2 Correspondence with Manchester City Council

Lynda Moran

From: Lynda Moran [l.moran@trpconsult.com]
Sent: 19 March 2014 10:23
To: 'planning.tst@manchester.gov.uk'
Subject: 178 Palatine Road, Didsbury M20 2YW - FRA
Attachments: 6657_EC_A_SiteSenSeg2500_2.pdf

Importance: High

Sir

TRP Consulting has been appointed to prepare a Flood Risk Assessment and Surface Water Drainage Strategy for the site at 178 Palatine Road, Didsbury M20 2YW (Map attached. Site is outlined in pink). EA mapping indicates that the site is located within land assessed as Flood Zone 1. The SFRA Critical Drainage map shows the site to be located within the Didsbury Critical Drainage Area. As the site appears to lie in a critical drainage area I hope that you don't mind me referring my queries regarding this site to you.

The site is located at 178 Palatine Road, adjacent to the corner with Spath Road. OS Grid reference is 383900, 391530

The site is roughly rectangular in shape and occupies an area of around 0.62 hectares.

The existing care home buildings on the site are to be demolished. The proposed development will comprise a new build 4-storey care home.

We have referred to 'Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010'. (Section 3.4.1 Critical Drainage Areas, page 31).

1. We understand that in general, the discharge from the site should be reduced compared to the run-off from the existing developed site. Within critical drainage areas in Manchester we understand that surface water run-off should be reduce by 50% on brownfield sites. Please confirm that this will apply to this site.

2. Please provide any information that you hold regarding flooding at the site.

3. Please confirm any specific measures you would expect to be implemented at the site.

4. What specific information would you require to be included within the FRA?

We look forward to hearing from you at your earliest convenience.

Regards
Lynda Moran

TRP Consulting
The Landmark. 21 Back Turner Street. Manchester. M4 1FR
T 0161 839 9113
E L.Moran@trpconsult.com

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Lynda Moran

From: d.lawless@manchester.gov.uk
Sent: 26 March 2014 11:55
To: Lynda Moran
Subject: Fw: Flood Risk Assessment and Surface Water Drainage Strategy for the site at 178 Palatine Road, Didsbury, M20 2YW

Lynda,

comments from our Flood Risk Management Team are enclosed below in bold

regards

David Lawless,
Senior Planner,
Development Management South,
Planning, Building Control and Licensing,
Growth and Neighbourhoods Directorate,
Manchester City Council,

0161 234 4543
(internal 800 4543)

POSTAL ADDRESS:

Manchester City Council
Planning
PO Box 532
Town Hall
Manchester
M60 2LA

LOCATION:

Manchester City Council
Planning
Level 6
Town Hall Extension

1. We understand that in general, the discharge from the site should be reduced compared to the run-off from the existing developed site. Within critical drainage areas in Manchester we understand that surface water run-off should be reduce by 50% on brownfield sites. Please confirm that this will apply to this site.

The reduction of runoff rates by 50% would apply on this site.

2. Please provide any information that you hold regarding flooding at the site.

We do not hold information of any flooding incident in the area. The site is not susceptible to surface water flooding.

3. Please confirm any specific measures you would expect to be implemented at the site.

We encourage the use of SUDS to manage surface water from the sites.

4. What specific information would you require to be included within the FRA?

The FRA would need to include a proposed drainage strategy for the site detailing discharge point(s), location and size of attenuation provisions to achieve 50% reduction of surface water runoff rates and the indicative routes of the proposed overland flows for extreme events that would avoid flooding of the properties on and off site.

APPENDIX G

G1 Sources of Information

Data and information has been obtained from the following sources:

a) Consultation and correspondence with the Environment Agency and the Local Planning Authority
b) Environmental Agency Flood Zone maps
c) Topographic survey data prepared Survey operations Ltd: Drawing 13H217/001
d) Inspection of site photographs
e) Information provided by Pozonni, including the proposed site plan
f) Sewerage plans provided by United Utilities
g) Ordnance survey maps
h) Publicly available data regarding local conditions.