



402-404 Wilmslow Road

Withington

Manchester M20 3BN

Proposed Residential Rear Extension/Conversion

Flood Risk Assessment

For: Concorde No.1 Ltd.

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Environmental

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1.0 INTRODUCTION

- 1.1 Integra Consulting has been commissioned by Mr. Stuart Wall of Concorde No.1 Ltd to undertake a Flood Risk Assessment (FRA) for the site at 402-404 Wilmslow Road, Withington, Manchester M20 3BN (refer to Appendix 1 for details). This document has been prepared to accompany the full planning application for the extension and re-modelling, from 7 No flats and a large 11 No bedroom house of multiple occupation to 18 No flats and associated infrastructure.
- 1.2 The objective of the FRA is to identify potential flooding issues and any consequent implications on the proposed site development. This report covers flood risk from the local Cringle Brook to the new lower ground floor accommodation and also new lower ground floor drainage.
- 1.3 The FRA has been undertaken in accordance with the pro-forma guidance contained in:
- Department for Communities and Local Government document 'National Planning Practice Guidance: Flood Risk and Coastal Change'
 - Manchester City, Salford City and Trafford Councils Level 2 Strategic Flood Risk Assessment by JBA Consulting dated March 2011
 - DEFRA / Environment Agency publication SC030219 'Rainfall Runoff Management for Developments' dated October 2013.
- 1.4 To date, consultations have been undertaken with the Environment Agency (EA).

2.0 EXECUTIVE SUMMARY

The proposals are to convert 7 No flats and a large 11 No bedroom house of multiple occupation into private flats with a minor extension (90m² on plan) to the rear of the site. It is noted that the existing lower ground floor houses two of the flats together with habitable spaces of the large house of multiple occupancy.

The flats generally lie in Flood Zone 1 except for 2 No lower ground floor flats located at the front of the property which lie in defended Flood Zone 3a due to flood risk from the local culverted Cringle Brook. Cringle Brook has been modelled by the Environment Agency and risk level data supplied to us.

The flats that lie in Flood Zone 1 are evidently not at risk from a critical fluvial flood event. The 2 No lower ground floor flats located at the front of the property will have separate drainage systems to the main building and will utilise pumped drainage to ensure that 1 in 1000 year Cringle Brook storm flows cannot affect them and that their standard of defence against flooding is the same as a normal Flood Zone 1 dwelling.

The existing building already connects to the adjacent adopted combined sewer system however there will be a new roof extension area of circa 90m². It has been agreed with the LLFA to adopt a pragmatic post-development surface water drainage strategy maintaining the existing adopted sewer network connection from the site and introducing underground crate attenuation and a downstream hydrobrake to limit surface water flows to 2 litres per second and provide a degree of betterment to the UU sewer network.

3.0 STANDARDS AND LIMITATIONS

This report has been prepared solely for use by Concorde No.1 Ltd.

It shall not be relied upon or transferred to any other party without the prior written authorisation of Integra Consulting.

The findings and opinions in the report are based on information derived from a variety of different sources. Integra Consulting do not accept any liability for the accuracy or otherwise of any information provided by third parties.

It should be noted that some of the aspects considered in this study may be subject to change with time. Therefore, if the development is delayed or postponed, consideration may need to be given to reviewing such issues to confirm that no changes have taken place, either at the site or within relevant legislation.

Further consultations with statutory bodies are likely as the scheme progresses. It should be noted that even where responses have been received from Regulators, these could be subject to change at a later date.

4.0 EXISTING SITE, FLOOD RISK, EXISTING DRAINAGE MODE

The existing site includes 7 No flats and a large 11 No bedroom house of multiple occupation and Cringle Brook is a nearby culverted 'main river' brook which gives rise to flooding risk to the existing building lower ground floor during heavy storms (refer to Appendix 2 for topographical survey details).

We are in receipt of Environment Agency (EA) data for Cringle Brook and modelled risk levels for river nodes around the site (refer to Appendix 3 for details).

Node 1	Node 2	Node 3	Node 4	
35.49	35.37	35.03	34.97	1 in 100 year
35.52	35.41	35.06	35.03	1 in 100 year +35% cc
35.59	35.58	35.22	35.20	1 in 1000 year
Wilmslow Rd E	Wilmslow Rd W	Wellington Rd-south	Wellington Rd-north of site	

We understand from the site owner that the building has had no flood history for at least the past twenty years and it is therefore considered reasonable to assume it is 'defended' and therefore the existing lower ground floor flats sit in defended Flood Zone 3a.

It is also noted that the local area has underground river culverts and combined sewers plus highway drains. The anticipated flood mode is therefore one of reverse flow out of river culvert highway drain connections. Accordingly, the pattern is slow velocity road ponding with the 'degree of flood hazard' as low as per Table 3.2 of the DEFRA / EA methodology ref: FD2321/TR1 (refer to Appendix 10 for details).

The existing building drainage mode is a combined system with the roof having a central dished area which drains through the internal areas of the building.

5.0 PROPOSALS, NEW DRAINAGE

The proposals are to convert the building into private flats with 4 No lower ground floor units – the front two lower ground floor units are to have an FFL of 34.85m AOD whilst the rear two lower ground floor units are to have an FFL of 36.12m AOD (refer to Appendix 6 for these details together with ground floor flat FFL's and threshold levels). It is noted that the building is currently in operation with permitted use as 7 No flats and a large 11 No bedroom house of multiple occupation (refer to Appendix 5 for existing site plan details).

In relation to the two lower ground floor flats at the front of the existing building where the finished floor levels cannot pragmatically be raised above 34.85m AOD, it is noted that the lower ground floor level flats will have pumped drainage arrangements (separate from the remainder of the building) to ensure that 1 in 1000 year Cringle Brook storm flows cannot affect them, that their standard of defence against flooding will be the same as a normal Flood Zone 1 dwelling and also that no backflow from existing drains and public sewers can occur.

The lower ground finished floor level of 36.12m AOD which applies for the two rear lower ground floor flats corresponds to the 1 in 100 year + 35% climate change level (35.52m AOD) plus 600mm freeboard. This FFL also compares favourably with the risk level average of the relevant nodes for the 1 in 1000 plus 30% climate change risk level of 35.5m AOD.

The proposed site drawings contained in Appendix 6 outline the flood evacuation plan identifying the safe access and egress routes from the lower ground floor level flats to a safe external level.

The ground floor building entrances lie at a minimum level of 37.23m AOD which is 1640mm above the 1 in 1000 year risk level and 1710mm above the EA 1 in 100 year + 35% climate change levels respectively (refer to Appendix 3 for details).

The proposals have entrance thresholds significantly higher than the published 1 in 1000 year + climate change risk levels (refer to Appendix 3).

The proposed lower ground floor flats at the front of the property will have pumped drainage systems with no backflow that are completely separate to the main building. On this basis, all proposed accommodation either lies in Flood Zone 1 or defended Flood Zone 3. The lower ground floor flats at the front of the development are defended as this situation will be 'engineered' by there being no internal drains that could be subject to flooding – all surface water drainage will remain external and all foul drainage will be pumped.

Flood risk related proposals are therefore summarised below:

1. All existing building drainage from above the 2 No lower ground floor units at the front of the building will be connected to the new sewers either side of the building using new drainage under the ground floor plus any existing drainage just beneath the ground floor.
2. The 2 No lower ground floor flats at the front of the building will have waterproof floors and wall linings plus all window sills to be above 35.5m AOD.
3. To waterproof the existing building basement areas, we advise an internal waterproof concrete tanking system. For the new basements, we advise integrated waterproof concrete floors and walls with hydrophilic water bars at joints.
4. The building footprint will increase at the north (rear) end of the site and a compensatory Flood Zone 3a storage volume of 65m³ will be provided by lowering the existing 25m x 15m rear car park area by circa 160mm (refer to Appendix 9 for site photographs at the rear of the property). No flood water will therefore displace onto third party land.

Details and calculations of how the above noted compensatory storage volume has been calculated are set out below:

- This storage volume is provided by lowering the existing 25m x 15m rear car park by circa 160mm.
 - The replacement volume of $25 \times 15 \times 0.16 = 65\text{m}^3$ compensates for top of Flood Zone 3a + climate change level of 35.25m AOD (average of the 4 No applicable nodes) providing a degree of betterment.
 - The volume taken up by the new extension is $90\text{m}^2 \times 0.55\text{m} = 50\text{m}^3$. The 0.55m figure is derived from the difference between 35.25m AOD (average of the 4 No applicable nodes) and 34.7m AOD (average level of existing ground in the extension area).
5. Toilets to the 2 No lower ground floor units at the front of the property will be Saniflo (pumped) units. Showers and washbasins, sinks and kitchen appliances will drain to small manholes with submersible pumps which will pump up into the underground floor drainage.
6. The 2 No lower ground floor flats at the front of the property will have flood risk handbooks describing the safety measures and stating that the flood risk catered for by the safety measures incorporated mean that it is effectively the same as a normal Flood Zone 1 property.
7. All power points will be set at a minimum of 35.5m AOD and will be fed from above. No electrical items such as the incoming supply box or feeder cables will be set lower than 35.5m AOD.

8. In terms of emergency planning, the building occupants will sign up to receive flood warnings from the Environment Agency flood warning service which can be accessed on www.gov.uk.

In addition, a private flood warning system is to be installed at the development incorporating an echo sounder unit to be fixed to an external face of the building at high level that is linked to a telemetry unit which will in turn send an automated voice message to the building manager and all occupants when water levels reach 34.85m AOD i.e. the lowest finished floor level of the lower ground floor flats.

Should the roads next to the site start to shallow flood in an extreme storm event, building occupants can decant to the south towards Withington village which is generally higher ground and lies in Flood Zone 1 as evidenced by the Flood Map for Planning.

6.0 SURFACE WATER RUNOFF

The issue of surface water drainage to the proposed development has been considered with reference to the hierarchy of surface water disposal as noted in the Building Regulations H3:

- i) Sustainable Urban Drainage Systems (SUDS)
- ii) Discharge of surface water off site direct to watercourse
- iii) Discharge to adopted sewer

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

- Filter strips and swales
- Filter drains and permeable surfaces
- Infiltration devices
- Basins and Ponds

In this specific case, an existing drainage survey has been undertaken which has shown that the existing site building and associated hard surfaced external areas drain freely to the local adopted United Utilities combined sewer network beneath Wilmslow Road (refer to Appendices 4 and 14 respectively for adopted sewer plan and existing drainage survey details).

The additional building footprint area is circa 90m² and pragmatically we propose that the existing drainage connections to the adopted sewer network are maintained and surface water underground crate attenuation is provided in relation to this additional footprint area based on greenfield runoff rates (subject to a reasonable minimum discharge rate of 2 litres per second) as opposed to undertaking BRE 365 soakaway testing and following the above noted surface water drainage hierarchy in this specific instance given the overall nature of the project i.e. refurbishment.

The above proposed drainage methodology has been discussed at length and subsequently agreed with Oliver Timmins from the LLFA (refer to Appendix 8 for details). As agreed with Oliver, a flow control (hydrobrake) device has been specified and located directly downstream of the underground crate attenuation to limit surface water flows to 2 litres per second @ 1.1m head and provide a degree of betterment to the UU sewer network (refer to Appendix 11 for details).

On the above basis, the estimated preliminary surface water storage volume to cater for a 1 in 30 year event is circa 20m³ and for a 1 in 100 year plus 40% climate change event is circa 50m³ (refer to Appendices 12 and 13 for details). It is intended that underground crate storage will accommodate the 1 in 100 year water with the circa 10m³ additional storage requirement to meet the 40% climate change figure accommodated between kerb faces in the rear car park area.

The post-development surface water drainage strategy will naturally need to be agreed in principle with the LLFA officer and United Utilities.

Discharge of post-development surface water into the adjacent adopted combined sewer system will also naturally require a formal S104 application to be made to United Utilities.

Ultimately the final design of the drainage system will be subject to the finalised site arrangement, further targeted site investigation and subsequent development of a detailed drainage scheme.

7.0 NATIONAL PLANNING POLICY FRAMEWORK, TECHNICAL GUIDANCE AND EA MAPPING

The proposed residential conversion is classed as 'more vulnerable' in Table 2 and is 'appropriate' in Flood Zone 1 as per Table 3 of the Technical Guidance to the NPPF. There is no need for the exception test or the sequential test. The two lower ground floor flats at the front of the existing building are different as they are 'defended' development with a defence standard of 1 in 1000 year.

Types of flooding that could affect the site are:

1. River - the site is mainly Flood Zone 1 above any local 1 in 1000 year risk levels next to Wilmslow Rd. The two lower ground floor flats at the front of the property are defended Flood Zone 3a, defended to a 1 in 1000 year risk standard whilst the lower ground floor flats at the rear of the property lies in Flood Zone 1.
2. Sea - no tidal influence.
3. Land - no undrained land slopes towards the site.
4. Groundwater – negligible risk (refer to Appendix 7).
5. Sewers - there are no local internet reports of sewer surcharge.
6. Reservoirs & canals - none nearby. All public reservoirs are maintained to a 1 in 10,000 year standard.

Environment Agency mapping is as follows:-

Flood Map for Planning - the site lies Flood Zone 1, 2, and 3a.

Risk of flooding from rivers and sea - this shows the effect of any flood defences.

Flood warning service - this is available for the site.

Groundwater – negligible risk (refer to Appendix 7 for details).

Risk of flooding from reservoirs - this shows reservoir risk - all utility company reservoirs are maintained to a 1 in 10,000 year risk standard under the Reservoirs Act legislation and this is a very rare and unlikely risk.

Risk of flooding from surface water - this mapping shows surface water flood risk. Pluvial mapping is the subject of a separate Environment Agency paper and is useful in locating possible ground low points and depressions. We quote - 'the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled' - so whilst the EA mapping shows pathways and confirms the stream paths the mapping generally takes little account of any existing drainage and in practice there is a very low risk.

The mapping is based on JFlow software and the EA paper 'National Scale Surface Water Flood Mapping Methodology' states that the method does not take account of existing drainage systems except by subtracting an average rain depth from storm profiles.

8.0 RESPONSE TO EA / LLFA CONSULTATION COMMENTS

The Environment Agency consultation response letter dated 6 September 2021 (refer to Appendix 8) sets out five specific reasons for objecting to the granting of planning permission – responses to each of these reasons is set out below using the same numbering system as the Agency letter:

1. The ground floor building entrances lie at a minimum level of 37.23m AOD which is 1640mm above 1 in 1000 year risk level and 1710mm above the EA 1 in 100 year + 35% climate change data supplied to us (refer to Appendix 3).
2. Compensatory flood storage has been proposed by lowering the rear car park by 160mm (refer to section 5 of this report).
3. The area has underground river culverts and combined sewers plus highway drains. The flood mode is therefore one of reverse flow out of river culvert highway drain connections. Accordingly, the pattern is slow velocity road ponding with the 'degree of flood hazard' as 'low' as per page 8 of FD2321/TR1 (refer to Appendix 10).
4. The proposal has entrance threshold levels significantly higher than the 1 in 1000 year + climate change risk levels and the proposed basements with pumped drainage are completely separate with no backflow - all the proposals are therefore Flood Zone 1 or defended Flood Zone 1. The basement is defended as we are effectively 'engineering' it to be so by having no internal drains that could be subject to flooding – all surface water drainage will remain external and all foul drainage is to be pumped.
5. In terms of emergency planning, the building occupants will sign up to receive flood warnings from the Environment Agency and should the roads next to the site start to shallow flood, they can walk south into Withington village which is higher and in Flood Zone 1 as per the flood map for planning.

The Manchester LLFA consultation response commentary dated 18 August 2021 (refer to Appendix 8) details proposed two planning conditions in relation to the application – responses to each of these proposed conditions is set out below:

Condition 1

Bullet point 1: All forms of flooding are considered in this report including data to confirm that groundwater flood risk at the site is negligible

Bullet point 2: The proposed scheme ‘reduces’ 1 in 100 year plus climate change volume at the site which equates to circa 65m³ – lowering the circa 25m x 15m rear car park area by 160mm will cater for the required storage volume.

Bullet point 3: The Architect has issued updated plans (refer to Appendix 6) to show finished floor levels for the ground floor and basement levels together with estimated flood levels.

Bullet point 4: To waterproof the existing building basement areas, we advise an internal waterproof concrete tanking system. For the new basements, we advise integrated waterproof concrete floors and walls with hydrophilic water bars at joints.

Bullet point 5: If we lower the rear car park by circa 160mm, this will prevent any displacement of floodwater

Bullet point 6: The Architect has issued updated plans (refer to Appendix 6) to describe the proposed flood evacuation plan.

Condition 2

This condition relates to the surface water drainage design for the project

Bullet point 1: It has been agreed, through later correspondence with the LLFA that, in this specific case, no soakaway testing or soakaway drainage is required due to pragmatic / spatial related considerations.

Bullet point 2: An existing drainage survey has been undertaken to address this item - we propose to utilise the existing surface and foul water discharge points to the adopted sewerage system in the post-development situation. As agreed with Oliver Timmins of the LLFA, a flow restriction is to be installed for post-development surface water runoff to ensure a degree of betterment to the UU network.

Bullet point 3: This point has now been removed from the latest LLFA proposed drainage related planning conditions.

Bullet point 4: This point has now been removed from the latest LLFA proposed drainage related planning conditions.

Bullet point 5: Agreed - provided with this report, refer to Appendices 11 to 13 inclusive.

Bullet point 6: Agreed - provided with this report, refer to section 9.

Integra Consulting e-mail dated 19 November 2021 addressed to the LPA officer (refer to Appendix 8) covers the following points as agreed with the LLFA:

- Proposed lower ground floor plan illustrating all the finished floor levels of the new and existing basement dwelling required - *The Architect has issued updated plans (refer to Appendix 6) to show finished floor levels for the ground floor and basement levels together with estimated flood levels.*
- Sight of the EA correspondence which stipulates that a finished floor level of 36.12mAOD is an appropriate minimum floor level – *it is understood that this level has been discussed and agreed by a previous flood risk consultant with the statutory flood risk authorities in relation to this development. This agreed basement FFL of 36.12m AOD corresponds to the 1 in 100 year + 35% cc (35.52m AOD) plus 600mm freeboard level. Based on the current EA modelling data provided for this site, this proposed FFL of 36.12m AOD compares favourably with a risk level average of the relevant nodes for 1 in 1000 plus 30% climate change risk of 35.5m AOD which demonstrates the adequacy of the proposed FFL in flood risk terms.*
- Why are some basement floor levels are being raised to 36.12mAOD and others are only being raised to 34.85mAOD – *given that we understand that an FFL of 36.12m AOD had previously been discussed and agreed with the statutory flood risk authorities, this has been proposed as the basement FFL to the whole floor area of the new flats. This proposed FFL lies above the risk level average of the relevant nodes for 1 in 1000 plus 30% climate change risk of 35.5m AOD which demonstrates the adequacy of this proposed FFL in flood risk terms. It is also noted that all areas within the existing building and the proposed extension are guarded against the 1 in 1000 year plus climate change event either by the proposed drainage measures and/or by the proposed FFL's.*

- Details and calculations of how the compensatory storage volumes have been calculated – *as stated in item 4 of section 5.0 of our FRA, this storage volume is provided by lowering the existing 25m x 15m rear car park by circa 160mm. The replacement volume of 25 x 15 x 0.16 = 61m³ compensates for top of Flood Zone 3a + climate change level of 35.25m AOD (average of the 4 No applicable nodes). The volume taken up by the new extension is 90m² x 0.55m = 50m³. The 0.55m figure is derived from the difference between 35.25m AOD (average of the 4 No applicable nodes) and 34.7m AOD (average level of existing ground in the extension area).*

The Manchester LLFA consultation response commentary dated 14 December 2021 (refer to Appendix 8) details proposed two updated planning conditions in relation to the application – responses to each of these proposed conditions is set out below:

Condition 1

Bullet point 1: It has been agreed, through later correspondence with the LLFA (refer to Appendix 8) that, in this specific case, no soakaway testing or soakaway drainage is required due to pragmatic / spatial related considerations.

An existing drainage survey has been undertaken as we propose to utilise the existing surface and foul water discharge points to the adopted sewerage system in the post-development situation. As agreed with the LLFA in our e-mail exchange dated 22 December 2021, a flow restriction is to be installed for post-development surface water runoff to ensure a degree of betterment to the UU network.

The existing drainage survey that has been undertaken (refer to Appendix 14 for details) has been used as a basis for developing a schematic drainage drawing and associated design calculations – refer to Appendices 11 to 13 inclusive for details.

All other bullet points agreed.

Condition 2

Agreed.

9.0 MANAGEMENT AND MAINTENANCE OF SUDS

The management and maintenance of the SuDS measures to serve the proposed development will be undertaken by a maintenance management company to be appointed for the project. The appointment of the maintenance and management company is to be confirmed at the completion of the build phase. All parts of the drainage network are to be accessible and are to be constructed from materials that are suitable and robust for the lifetime of the development.

The maintenance activities required for the drainage network are as follows:

Cellular Storage Structure

The maintenance for the cellular storage structure is as follows:

Operation	Frequency
Inspect and identify any areas that are not operating correctly and if required take remedial actions	Monthly for three months then six monthly intervals
Debris caused from catchment surface (where it may cause risk to performance)	Monthly
Where rainfall infiltration into cellular storage from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required but at least twice a year
Remove sediment from upstream surface water network by jetting	Annually or as required
Repair / check all inlets, outlets, overflows and vents	As required
Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually and after severe storms

Flow Control

The maintenance for the flow control is as follows:

Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required take remedial actions	Monthly for three months then at six monthly intervals
Debris removal from catchment surface (where it may cause risk to performance)	Monthly
Check control chamber for blockage or silt, algae or other matter by jetting	As required, but at least four times a year
Remove sediment from upstream drainage network and sediment from within manhole by jetting	As required, but at least twice a year
Repair / check all inlets and control mechanics	As required
Inspect / check all inlets and control mechanics to ensure that they are operating as designed	Twice a year as a minimum and after severe storm events

Flow Control Chamber Design Criteria

In addition to the above maintenance methods, the flow control chamber will be designed so it works effectively throughout the lifespan of the development and will have precautionary features to ensure maintenance work can be carried out promptly and efficiently to ensure no control failure which may otherwise subsequently lead to flooding.

Details of the flow control chamber are as follows:

High Water Level Alarm: Alarm installed and directed to site maintenance team

Spares: Control spares to be kept on site for efficient maintenance

Flood Routes

A visual monthly inspection of flood routes should be made in order to check that routes are not blocked by new fences, walls, soil or other rubbish with removal undertaken as necessary.

Spillage – Emergency Action

Most spillages on development sites are of compounds that do not pose a serious risk to the environment as they enter the drainage system in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommend by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then the spillage should be isolated using soil, turf or fabric and outlet pipes from chambers downstream of the spillage blocked with bungs. Bungs for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric. The Environment Agency should be contacted immediately.

Linked and Further Maintenance

The maintenance of the drainage network and SuDS features is to be linked with the landscape maintenance plan for the proposed development.

Maintenance Activities

A log of all maintenance activities is to be kept and made available to the Local Planning Authority (LPA) and / or the Lead Local Flood Authority (LLFA) on request.