Peel Investments (North) Limited

GM ALLOCATION 33 - PORT SALFORD EXTENSION

Site Appraisal - Drainage and Flood Risk

OUR REF. NO. 70032760-GMALLOCATION33
MARCH 2019

CONFIDENTIAL

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WSP

8 First Street
Manchester
M15 4RP

+44 1612 005 000

WSP.com

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1 PROJECT BACKGROUND

1.1 APPOINTMENT AND BRIEF

1.1.1. WSP have been instructed by Peel Investments (North) Limited (hereafter referred to as 'the Client') to undertake a high-level drainage appraisal to support the draft allocation of the Port Salford Extension (referred to as GM Allocation 33). There are two masterplan options for the site; Option 1 is the expansion of Port Salford to deliver a multi-modal logistics and distribution hub and Option 2 is an expanded logistics scheme.

1.2 AIM OF STUDY

1.2.1. The purpose of this study is to provide an overview of the drainage opportunities and constraints on the development site (for both Options 1 and 2) from a drainage and flood risk perspective. The study is entirely desk based and is predominantly our interpretation of publicly available information. Flood risk mapping data, including fluvial, tidal, surface water and reservoir flood maps were obtained from the Environment Agency webpage. The key sources of information are noted below, namely:

- Manchester, Salford and Trafford Strategic Flood Risk Assessment;
- The Environment Agency webpage; and
- The British Geological Survey (BGS Online) Geology of Britain Viewer.

1.3 REFERENCE

1.3.1. The scope of this Flood Risk Appraisal has been developed based on the requirements of the Client and a review of all relevant policy information.

1.3.2. It is anticipated that this report will fulfil the required criteria and provides a preliminary appraisal of flood risk within the proposed site. As the site exceeds 1 hectare in area and will be subject to a change of use, there will be a requirement to provide a detailed Flood Risk Assessment, including a Drainage Strategy, to support any future planning application for the site.

1.4 LIMITATIONS

1.4.1. This report is based on the interpretation and assessment of data provided by third parties.

1.4.2. Whilst every care has been taken to ensure this information is accurate and up-to-date, WSP cannot guarantee the accuracy of third party data, and the findings of this report may change if the data is amended or updated after consultation.

2 PLANNING POLICY AND CONSULTATION

2.1 RELEVANT LOCAL PLANNING POLICY AND STRATEGY DOCUMENTS

2.1.1. The following documents were reviewed as part of this Flood Risk Appraisal:

- Defra Sustainable Drainage Systems Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015)
- Environment Agency Climate Change Guidance (February 2016 – updated February 2017)
- Flood and Water Management Act (April 2010)
- National Planning Policy Framework (July 2018) and Planning Practice Guidance (March 2014)
- Sustainable Drainage Systems Written Statement HCWS161 (December 2014)
- The Greater Manchester Strategic Flood Risk Assessment; and
- The Manchester, Salford and Trafford Strategic Flood Risk Assessment (2011).

2.2 NATIONAL PLANNING POLICY

NATIONAL PLANNING POLICY FRAMEWORK

2.2.1. The National Planning Policy Framework (NPPF) ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest flood risk.

2.2.2. Where new development is exceptionally necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

2.2.3. On the 6th March 2014 the Department for Communities and Local Government launched the Planning Practice Guidance web resource to supplement the framework. On this date, PPS 25 (Development and Flood Risk) was cancelled and replaced by the Flood Risk and Coastal Change Planning Practice Guidance.

DEFRA SUSTAINABLE DRAINAGE SYSTEMS NON-STATUTORY TECHNICAL STANDARDS FOR SUSTAINABLE DRAINAGE SYSTEMS (MARCH 2015)

2.2.4. This document sets out non-statutory technical standard for sustainable drainage systems. It should be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance.

2.2.5. For developments which were previously developed, the peak run-off rate from the development to any drain, sewer or surface water body for the 1 in 1year rainfall event and the 1 in 100year rainfall event must be as close as reasonably practicable to the greenfield run-off rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

2.2.6. Where reasonably practicable, for developments which have been previously developed, the run-off volume from the development to any highway drain, sewer or surface water body in the 1 in 100year, 6hour rainfall event must be constrained to a value as close as is reasonably practicable to the Greenfield run-off volume for the same event, but should never exceed the run-off volume from the development site prior to re-development for that rainfall event.

2.2.7. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event,

2.2.8. The drainage system must be designed so that, unless an area is designate to hold and/ or convey water as part of the design, flooding does not occur during a 1 in 100year rainfall event in part of: a building (including a basement); or in any utility plan susceptible to water (e.g. Pumping Station or Electricity Sub-station) within the development.

2.2.9. The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100year rainfall event is managed in exceedance routes that minimise the risks to people and property.

SUSTAINABLE DRAINAGE SYSTEMS WRITTEN STATEMENT HCWS161 (DECEMBER 2014)

2.2.10. The Secretary of State for Communities and Local Government laid a Written Ministerial Statement in the House of Commons on 18th December 2014 setting out changes to planning that will apply for major development from 6th April 2015. This confirms that in considering planning applications, local planning authorities should consult the relevant Lead Local Flood Authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

2.2.11. Therefore, from 6th April 2015, local planning policies and decisions on planning applications relating to major development are required to ensure that sustainable drainage systems (SuDS) are used for the management of surface water.

2.2.12. A “Major Development” is a development involving any one or more of the following:

- The winning and working of minerals or the use of land for mineral-working deposits;
- Waste development;
- The provision of 10 dwellings or more;
- The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
- Development carried out on a site having an area of 1 hectare or more.

ENVIRONMENT AGENCY CLIMATE CHANGE ALLOWANCES (FEBRUARY 2016)

2.2.13. On the 19th February 2015, the Environment Agency updated the Climate Change Allowances for rainfall, rivers flows and sea level rises for Flood Risk Assessments. This revised guidance came into effect immediately and is applicable to proposed development sites in England and Wales. The changes apply to all new planning applications within the NPPF. Further information regarding the allowances applicable to the proposed development herein is provided within Section 8.

2.2.14. It should also be noted that on 3rd February 2017 the guidance was further updated to clarify the climate change considerations for increased flood levels in relation to Flood Zone 1 site (low risk).

2.3 LOCAL PLANNING POLICY

SALFORD CITY COUNCIL UNITARY DEVELOPMENT PLAN (JUNE 2006)

2.3.1. The Salford Unitary Development Plan was adopted in June 2006 and contains the following saved policy relating to flood risk and drainage.

*"**Policy EN 19***

Development, including the alteration of land levels, will not be permitted where it would:

i. be subject to an unacceptable risk of flooding;

ii. materially increase the risk of flooding elsewhere; or

iii. result in an unacceptable maintenance liability for the city council or any other agency in terms of dealing with flooding issues.

Any application for development that is considered likely to be at risk of flooding, or to increase the risk of flooding elsewhere materially, will need to be accompanied by a formal flood risk assessment that should accurately assess the level of flood risk involved. Where appropriate, it should clearly identify the mitigation or other measures to be incorporated into the development or undertaken on other land which are designed to reduce that risk of flooding to an acceptable level.

In determining the potential impact of the proposed development on the risk of flooding elsewhere, particular regard will be given to the extent to which the development:

a. is located within or impacts upon a functional floodplain or flood zone;

b. incorporates protection, attenuation or mitigation measures, and the use of source control techniques and sustainable drainage systems; and

c. provides adequate access to watercourse for maintenance purposes.

Where development would be subject to a significant flood risk, including on allocated sites, and it is not possible to reduce the risk to an acceptable level through design solutions or other measures secured through development, it will be allowed to proceed only in co-ordinate with the completion of those elements of the River Irwell Flood Control Scheme which are necessary to mitigate the identified satisfactorily.

Development will not be permitted unless adequate provision is made for the discharge of foul and surface water associated with the proposal."

3 EXISTING SITE

3.1 SITE LOCATION

3.1.1. GM Allocation 33 is located southeast of the M62 and northwest of the A57 in Salford.

3.1.2. An approximate postcode for the site is M30 7QH with approximate Ordnance Survey Co-ordinates for the centre of the site of: (373774 Easting, and 397610 Northing). A site location plan for masterplan Options 1 and 2 have been included in **Appendix A** of this report.

3.2 SITE DESCRIPTION

3.2.1. For masterplan Option 1, the site is currently predominantly Greenfield, with limited hardstanding areas associated with existing farms and Barton Moss Road. For development Option 2, the site is predominantly Greenfield, limited hardstanding areas associated with Barton Moss Road and farms including: Tunnel Farm, Marriots Farm and Parkhall. The southern section of the site is partially occupied by Boysnorpe Park Golf Club.

3.2.2. Table 3-1 below, describes the general site characteristics for Option 1. Table 3-2 below, describes the general site characteristics for Option 2.

Table 3-1 – General Site Characteristics, Option 1

Characteristic		Description
Area		The overall site area is approximately 122 hectares in size, with draft allocation for industrial uses.
Existing Usage		As noted above, the site is designated as Greenfield with some limited hardstanding areas associated with Barton Moss Road and farms including: Tunnel Farm, Marriots Farm and Parkhall.
Boundaries	North	The site is immediately bounded to the north by the M62 Motorway.
	South	The site is bounded to the south by a large proportion of Boysnorpe Park Golf Club and Irlam Football Club.
	East	The site is bounded to the east by Barton Aerodrome (northern section) and A57 Liverpool Road (southern section).
	West	The site is bounded to the west by the M62 Motorway beyond which lies further Greenfield Land.
General Topography		Reference to Ordnance Survey contours indicates that levels within the site are generally flat with levels ranging between 22 – 25m AOD.

Table 3-2 – General Site Characteristics, Option 2

Characteristic		Description
Area		The overall site area is approximately 163.26 hectares in size, with draft allocation for industrial uses and an expanded logistics scheme.
Existing Usage		As noted above, the site is designated as Greenfield with some limited hardstanding areas associated with Barton Moss Road and farms including: Tunnel Farm, Marriots Farm and Parkhall. The southern section of the site is partially occupied by Boysnorpe Park Golf Club.
Boundaries	North	The site is immediately bounded to the north by the M62 Motorway.
	South	The site is bounded to the south by Irlam Football Club and Barton Moss.
	East	The site is bounded to the east by Barton Aerodrome (northern section) and A57 Liverpool Road (southern section).
	West	The site is bounded to the west by the M62 Motorway beyond which lies further Greenfield Land.
General Topography		Reference to Ordnance Survey contours indicates that levels within the site are generally flat with levels ranging between 22 – 25m AOD.

3.3 EXISTING WATERCOURSES

3.3.1. For both masterplan options, there are a number of field drains present within the northern part of the site. No further watercourses are located within the boundary of the Option 1 site. A drain is identified to extend from Grange Bungalow in a south easterly direction along the southern boundary of the Option 2 site.

3.3.2. Salteye Brook, an Environment Agency defined Main River, is located approximately 700m east of the site and passes under the Manchester Ship Canal located approximately 300m from the southeast corner of the site. In addition, two other Main Rivers, Boyles Brook and Bent Lanes Brook are noted to running approximately 500m and 370m east of the site respectively.

3.3.3. A number of small ponds are located within Boysnape Park Golf Club.

3.3.4. The Manchester Ship Canal is located to the east of the south eastern section of the site. In addition, the old course of the River Irwell is also located to the east of the site, adjacent to Liverpool Road. A review of historical mapping pre-dating the completion on the Manchester Ship Canal

identifies that the River Irwell meandered in a southerly direction and did not historically extend within the site.

3.4 EXISTING DRAINAGE

3.4.1. For both masterplan options, whilst the site is predominantly Greenfield in nature, some limited hardstanding is present and it is likely that this will be served by private drainage networks. In addition, there is potential for the existing golf course to be positively drainage however further investigation will be required within a detailed Flood Risk Assessment. The existing field drains are likely to provide drainage for the Greenfield areas of the site only and not a wider catchment. The interconnection of these features will need to be confirmed via a full topographical survey.

3.4.2. For both masterplan options, based on the site's setting adjacent to the urban area of Irlam / Barton the presence of a network of public sewers serving the existing properties located in the immediate vicinity of the site is highly likely. There will be a requirement to confirm the presence and existing condition of the existing public sewers as part of a Detailed Flood Risk Assessment for the site.

3.5 GEOLOGY AND HYDROGEOLOGY

3.5.1. The British Geological Survey (BGS) Geology of Britain Viewer[1] indicates that a majority of the both option sites appears to be underlain by superficial deposits of Peat. The north-eastern corner and south-eastern corner are shown to be underlain by superficial deposits of Glaciofluvial Sheet Deposits which are described as comprising Sand and Gravel.

3.5.2. For both masterplan options, BGS mapping identifies that the northern portion of the site is underlain by bedrock deposits from the Chester Pebble Beds Formation which is described as comprising Sandstone. The southern portion of the site is shown to be underlain by bedrock deposits from the Wilmslow Sandstone Formation which is also described as comprising Sandstone.

3.5.3. Based on the nature of the superficial deposits including Peat, the potential for the use of infiltration based Sustainable Urban Drainage (SuDS) is limited. However, the presence of Sand and Gravels within the site indicates that infiltration could be feasible. There will be a requirement for Infiltration Tests to confirm the suitability of these types of SuDS on the site dependent on this and potential groundwater levels.

3.5.4. The Land Information System Soilscapes Map[2] classifies the soil beneath a majority of the as "*raised bog peat soils*". The soil within the north eastern and south-eastern corners of the site is classified as "*slowly permeable seasonally wet acid loamy and clayey soils*".

3.5.5. The Environment Agency Groundwater Maps indicate that the superficial deposits of Glacial Sheet Deposits are classified as a Secondary "A" Aquifer. The deposits of Peat are classified as an unproductive strata. The underlying bedrock is classified as a Principal Aquifer. The site is not located within a groundwater Source Protection Zone.

3.5.6. Copies of relevant Geotechnical Maps have been included in **Appendix B** of this report.

[1] mapapps.bgs.ac.uk/geologyofbritain
[2] landis.org.uk/soilscapes

4 DEFINITION OF FLOOD RISK

4.1.1. The risk of flooding to the site from all current and future potential sources of flooding has been assessed in accordance with NPPF and BS 8533 2011 - assessing and managing flood risk in development - code of practice

4.1.2. Tables 4-1 and 4-2 summarise the findings of the assessment. A more detailed explanation of the flood risk issues on the site and determination of flood risk ratings are presented in Sections 4.2 to 4.7 below.

4.1.3. It should be noted that the designation of risk outlined below is prior to the inclusion of any mitigation measures, which may subsequently act to reduce the risk.

Table 4-1 - Degree of risk from each source of flooding, Option 1

Source		Risk
Fluvial		Low; A small area within the north-eastern corner of the site is identified to be partially located within Flood Zone 2, associated with Salteye Brook.
Tidal		Not at risk
Groundwater		Medium
Surface Water		Variable (low to high)
Sewer		Low
Artificial Sources	Reservoir	Not at risk
	Canal	No risk identified

Table 4-2 – Degree of risk from each source of flooding, Option 2

Source		Risk
Fluvial		Low; A small area along the south eastern boundary, by Boysnorpe Park Golf Club, is located within Flood Zone 2. This extends from a wider area of Flood Zone 2 associated with the Manchester Ship Canal located adjacent to the south eastern boundary of the site
Tidal		Not at risk
Groundwater		Medium
Surface Water		Variable (low to high)
Sewer		Low
Artificial Sources	Reservoir	Not at risk
	Canal	No risk identified

4.2 FLUVIAL FLOOD RISK

FLOOD MAPS

4.2.1. The National Planning Policy Framework (NPPF) categorises flood risk as follows:

- Zone 1 (low probability) is assessed as having less than a 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Zone 2 (medium probability) is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year; and
- Zone 3 (high probability) is assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

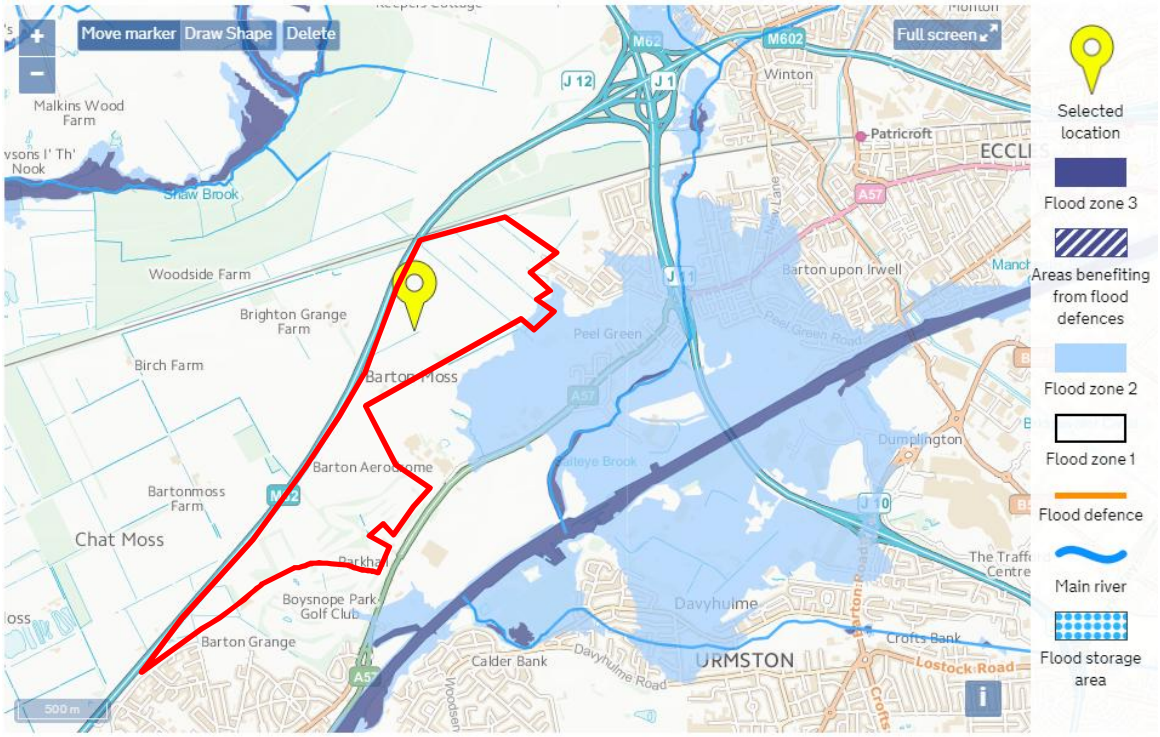
4.2.2. The Environment Agency Flood Map for Planning identifies that development Option 1 predominantly lies within Flood Zone 1. A very small area within the south-eastern corner of the site is identified to be partially located within Flood Zone 2, associated with Salteye Brook. A detailed flood risk assessment will be required to confirm the extent and depth of Flood Zone 2 within the site.

4.2.3. The Environment Agency Flood Map for Planning identifies that development Option 2 predominantly also lies within Flood Zone 1. Similarly, a very small area along the south eastern

boundary, by Boysnorpe Park Golf Club, is shown to be located within Flood Zone 2. This extends from a wider area of Flood Zone 2 associated with the Manchester Ship Canal located adjacent to the south eastern boundary of the site.

4.2.4. On the basis of the above, both Options can therefore be generally assessed to have a low risk of fluvial flooding.

Figure 4-1 - Extract from the Environment Agency Flood map for planning, Option 1

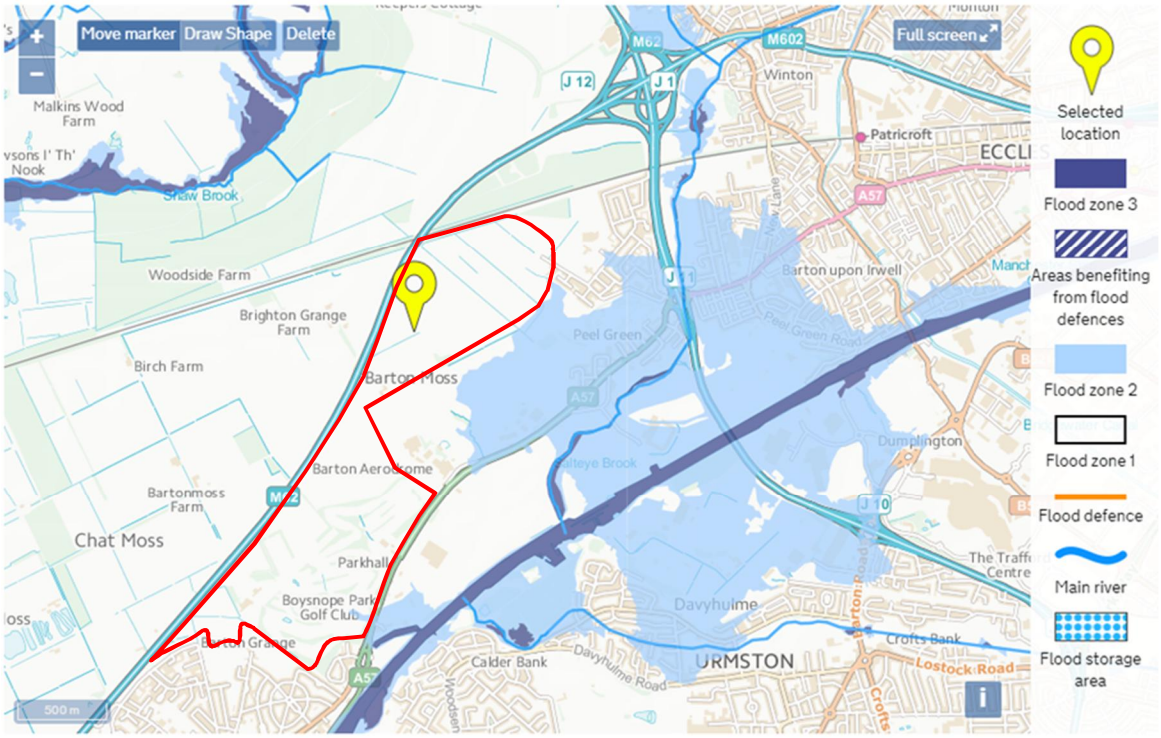


4.2.5. The Manchester, Salford and Trafford Strategic Flood Risk Assessment identifies that although technically a canal, the Ship Canal is a canalised watercourse and hence its flooding mechanisms have more in common with a watercourse than a typical canal. Therefore, for the purpose of this report, the risk of flooding from the canal is considered fluvial in nature. The Ship Canal is managed by the Manchester Ship Canal Company and water levels in the canal are carefully monitored and controlled by a system of sluices. The risk of flooding is therefore considered to be a residual risk.

4.2.6. The SFRA states "*Development needs to be carefully considered and planned for in areas at the highest risk of residual flooding from the Manchester Ship Canal. Carefully considered urban design and the layout of sites will be a key response to the level of flood risk*".

4.2.7. Based on the above, the risk of fluvial flooding is considered to be low for both options.

Figure 4-2 – Extract from the Environment Agency Flood Map For Planning, Option 2



4.3 TIDAL / COASTAL FLOOD RISK

4.3.1. Both masterplan options are located a significant distance away from the coast. Ordnance Survey contours indicates that levels on both sites generally range between 22 – 25m AOD. Therefore, both development options are not considered to be at risk from tidal or coastal flooding.

4.4 GROUNDWATER FLOODING

4.4.1. For both development options, the SFRA identifies that the site is located within an area that is at potential risk of groundwater flooding. Further consideration will be required within a detailed Flood Risk Assessment and intrusive investigations on groundwater levels.

4.4.2. Based on the above and the identified soil conditions, the risk of groundwater flooding to both options has been assessed to be medium.

4.5 SURFACE WATER FLOODING

4.5.1. For Options 1 and 2, the Environment Agency's Surface Water Flood map indicates that significant areas of the site have a very low risk of surface water flooding. Notwithstanding this, small areas within the site are identified to have a variable risk of flooding (low to high). These areas are predominantly located along the course of the existing field drains. In addition, areas of variable risk are identified within the golf course where topography is likely to vary, this is most notable in development Option 2.

Figure 4-3 - Extract from the Environment Agency surface water mapping, Option 1

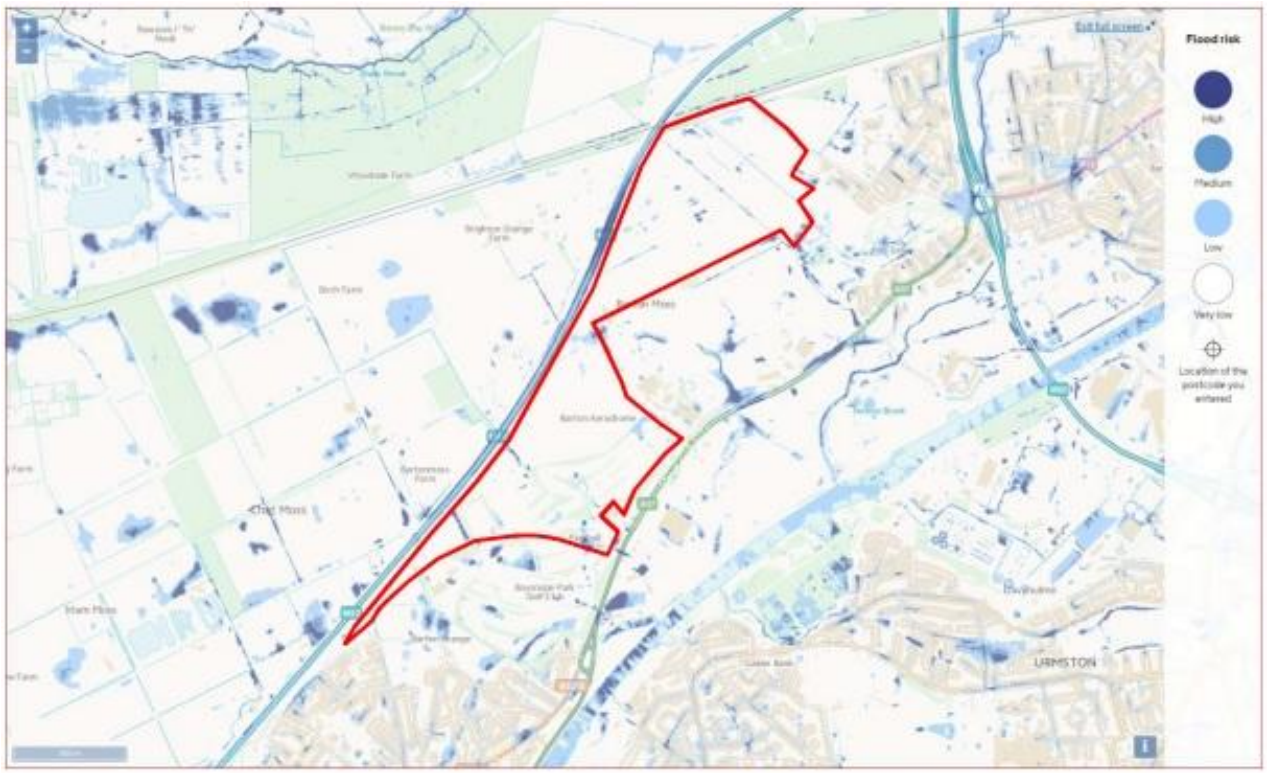
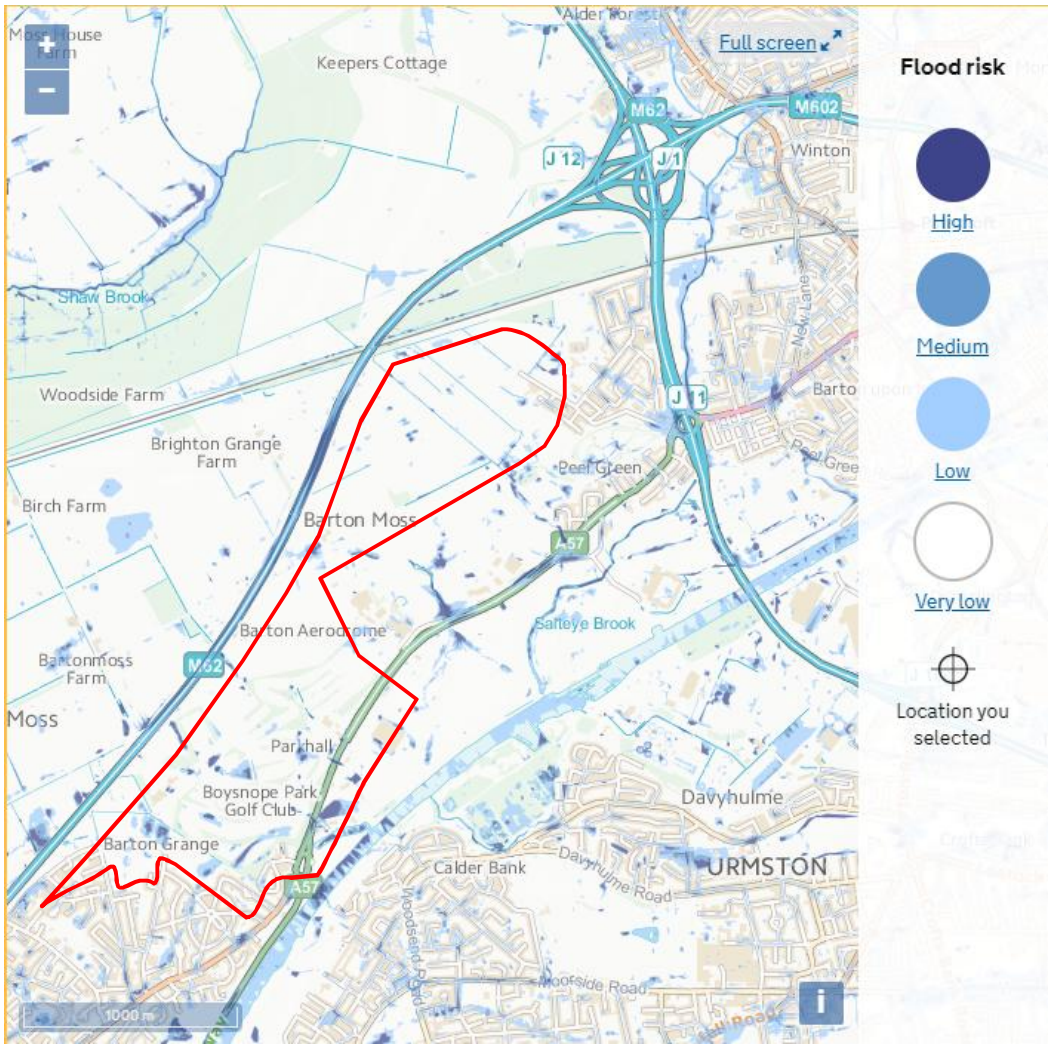


Figure 4-4 - Extract from Environment Agency Surface Water Mapping, Option 2



4.6 SEWER FLOODING

4.6.1. The Manchester, Salford and Trafford Strategic Flood Risk Assessment does not provide any site-specific information relating to sewer flooding for either masterplan options. Consultation will be required with the Local Authority and United Utilities to confirm any local flood risk issues as a result of sewer flooding.

4.6.2. As both masterplan options have a draft allocation for future development within the Greater Manchester Spatial Framework, United Utilities have an obligation to provide offsite sewerage facilities for the development site. Further consultation with United Utilities will be required during the planning stage. In addition, discharge rates from the proposed development site to the existing public sewer network will have to be agreed where appropriate to ensure that there is no increase in the risk of sewer flooding to the site or downstream of the site.

4.6.3. Based on the information above, the risk of sewer flooding is considered to be low for both options.

4.7 RESERVOIR/ ARTIFICIAL SOURCES FLOODING

4.7.1. Non-natural or artificial sources of flooding can include reservoirs, lakes, canals etc. need to be considered. The presence of the Manchester Ship Canal to the south and its potential effects of flood risk management infrastructure and other structures needs to be considered.

RESERVOIRS

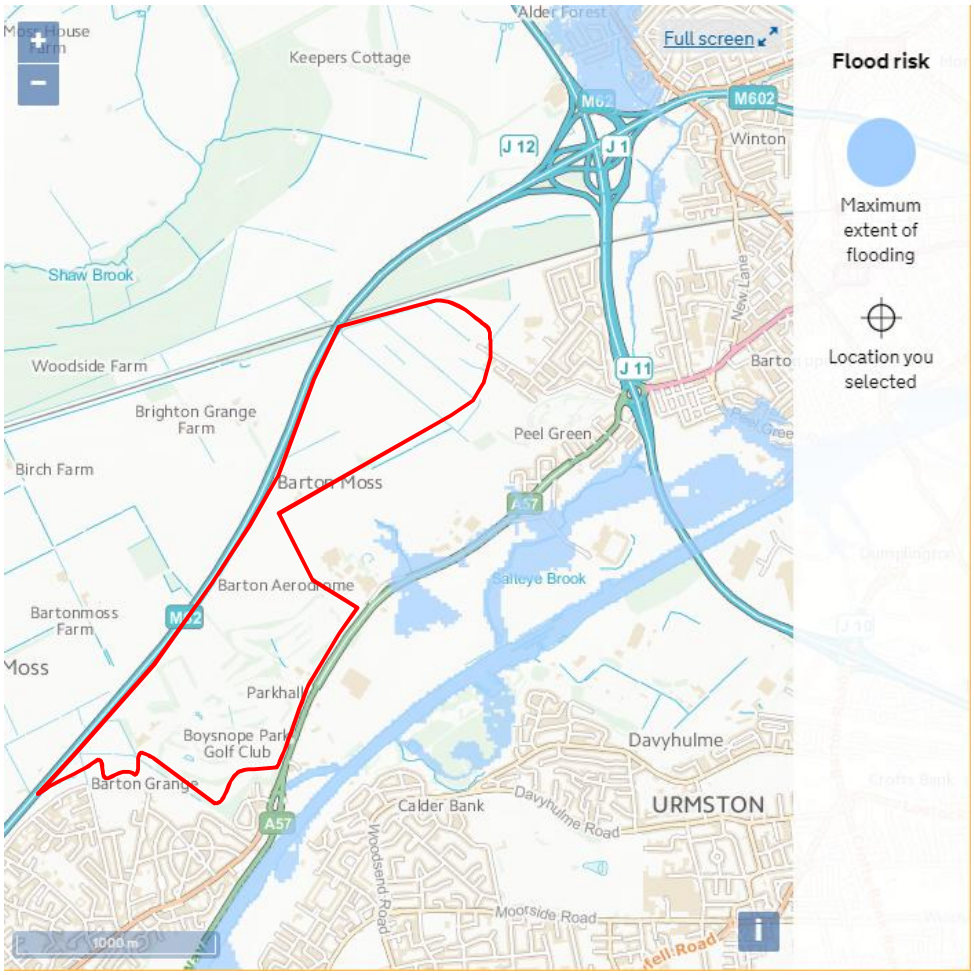
4.7.2. Following the June 2007 floods and the incident at Ulley Reservoir, Sir Michael Pitt was asked by the government to carry out a review of the emergency services' response. He called for reservoir flood maps to be made available to the public and to local emergency planners to allow them to respond quickly to a reservoir flood.

4.7.3. As a result, reservoir flood maps have been created for over 2,000 reservoirs in England and Wales. These maps show the likelihood of flooding from large reservoirs that retain at least 25,000 cubic meters of water above natural ground level. The maps show the largest area that might be flooded if a reservoir were to fail in a credible worst-case scenario.

4.7.4. The Environment Agency's Online Reservoir Flooding Map shows that both masterplan options are outside the extent of any reservoir flooding. As a result, both sites are not considered to be at risk from reservoir flooding.

Figure 4-5 - Extract from Environment Agency reservoir mapping, Option 1

Figure 4-6 - Extract from Environment Agency reservoir mapping, Option 2



CANALS

4.7.5. For development Option 1, The Manchester Ship Canal is located, at its closest, approximately 300m southeast of the furthest southern part of the site. The site is not considered to be at risk from flooding associated with the Ship Canal.

4.7.6. For development Option 2, the risk of flooding from the Manchester Ship Canal is discussed in Section 4.2. There are no further canals within the vicinity of the site.

5 DRAINAGE

Drainage Strategy – both Options

5.1.1. Surface water arising as a result of development will be contained within the site via an appropriately designed surface water management strategy developed in accordance with NPPF and national and local surface water management strategies.

5.1.2. Based on the current Greenfield nature of the site it is likely that surface water run-off from future development will be restricted to the Greenfield run-off rate in accordance with the Non-statutory technical standards for sustainable drainage systems and The Manchester, Salford and Trafford Strategic Flood Risk Assessment which states "*Development should aim to deliver greenfield run-off on Greenfield sites up to a 1 in 100-year storm event, considering climate change*."

5.1.3. The existing Greenfield run-off rate for a range of rainfall return periods has been calculated using the Interim Code of Practice for Sustainable Drainage Systems method (ICP SuDS). The results are summarised in Table 5-1 (Option 1) and Table 5-2 (Option 2) below.

5.1.4. In addition, indicative storage requirements have been calculated using the Quick Storage Module in WinDES Micro-Drainage 2016 Software. Implementing the indicative storage requirements will ensure that anticipated surface runoffs from the proposed development site will be maintained at existing Greenfield run-off rates in accordance with the SFRA. The calculations have been based on the following assumptions namely:

- Surface runoff from all rainfall events, up to and including the 1 in 100-year rainfall event plus a 40% allowance for climate change, is managed safely on the site; and
- Development on the site has been assessed in this review based on the site being allocated for industrial use. For the preliminary calculations below, WSP has assumed that 70% of the developable area would be classed as impermeable.

Table 5-1 - Indicative attenuation volumes for existing Greenfield runoff rates Option 1

Rainfall Return Period	Greenfield Run-off rate (l/s)	Indicative Surface Water Storage Requirement (m^3)
1 in 1	232.5	9698 - 15990
1 in 2.2 (QBAR)	267.3	12164 - 19311
1 in 30	453.2	22902 - 33776
1 in 100	556.0	47495 - 66690

Table 5-2 - Indicative attenuation volumes for existing Greenfield runoff rates Option 2

Rainfall Return Period	Greenfield Run-off rate (l/s)	Indicative Surface Water Storage Requirement (m^3)
1 in 1	512.6	11795 - 19898
1 in 2.2 (QBAR)	589.3	14912 - 23897
1 in 30	999.1	28401 - 42772
1 in 100	1225.8	59618 - 85236

5.1.5. There will be a requirement to develop a suitable surface water drainage strategy as part of any Flood Risk Assessment developed to support a planning application. This will ensure that the above surface runoff rates and indicative storage volumes are validated in consultation with the Lead Local Flood Authority and United Utilities.

5.1.6. The drainage strategy will consider discharging surface water using the following hierarchy:

- Infiltration to the ground, if not possible then;
- Discharge to a watercourse, if not possible then;
- Connection to a surface water sewer, if not possible then;
- Connection to a combined sewer.

5.1.7. The presence of Sands and Gravels within the sites could enable the use of infiltration based SuDS techniques have potential to be used on the site. However, there will be a requirement to undertake further site investigations to confirm the permeability of the underlying strata on the site and the site-specific design criteria that would be used. The potentially high groundwater within the site may limit the depth of any infiltration feature.

5.1.8. The provision of an appropriately designed drainage strategy will ensure that there is no increase in surface water flooding downstream as a result of the proposed development. Surface water arising from the proposed development will be retained on site prior to discharging to the receiving body at an appropriate rate. Consultation will be undertaken with the Lead Local Flood Authority, United Utilities and the Environment Agency to confirm an appropriate discharge rate.

5.1.9. A high level indicative SuDS Plan is included as **Appendix C.** This indicates areas of both option sites that could be used for the provision of attenuation and potential linkages within and around he site. Further design and consideration will be required during the production of a Flood Risk Assessment and Drainage Strategy.

5.1.10. It should be noted that due to the proximity of the adjacent airfield that some constraints on the type of SuDS features and extent of open water may be imposed to reduce the potential for bird strike. It is recommended that the design of the SuDS features is discussed with the neighbouring operator to confirm if any additional measures are to be employed.

5.1.11. By controlling site generated run-off, the downstream areas form both options can be better protected from the variability of rainfall events following development.

6 NPPF SEQUENTIAL AND EXCEPTION TEST

6.1 THE SEQUENTIAL TEST

6.1.1. The Sequential Test, as defined in the National Planning Policy Framework, aims to steer all new developments to areas at the lowest risk of flooding and to ensure that the development type proposed is appropriate by reference to the flood risk.

6.1.2. According to the records maintained by the Environment Agency, for both masterplan options, the site is predominantly located within Flood Zone 1, with small areas in Flood Zone 2. It is therefore encouraged that development is sequentially located within Flood Zone 1 where possible to better safeguard the long-term flood resilience of the development.

6.2 THE EXCEPTION TEST

6.2.1. Table 2 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2014) classifies different types of development depending upon their vulnerability. It classes the proposed industrial / commercial development as “Less Vulnerable”.

6.2.2. Table 3 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2014) shows that “‘Less Vulnerable” land uses are appropriate development in Flood Zones 1 and 2 areas and that no Exception Test is required for either development option being proposed.

7 CONCLUSIONS

7.1.1. This Flood Risk Appraisal has been produced to support the Client's proposed land use allocations within the Greater Manchester Spatial Framework.

7.1.2. For development Option 1, the Environment Agency Flood Map for Planning locates majority of the site within Flood Zone 1 (low risk). Land located in Flood Zone 1 is assessed as having less than a 1 in 1,000 annual probability of flooding from river or sea flooding. A small area in the north-eastern part of the site is located within Flood Zone 2.

7.1.3. For development Option 2, the Environment Agency Flood Map for Planning locates majority of the site within Flood Zone 1, with the south eastern part of the site partially situated within Flood Zone 2.

7.1.4. For Option 1, the site is identified to have a predominantly very low risk of surface water flooding. However, areas of variable risk (low to high) are observed along the routes of the existing watercourses present within the site.

7.1.5. For masterplan Option 2, the site is identified to have a predominantly very low risk of surface water flooding. Areas of variable risk are observed within the existing golf course, where topography is likely to vary, in addition to areas around the existing field drains.

7.1.6. The Environment Agency Online Reservoir Flooding Map shows that for both options, the site is outside the extent of reservoir flooding, therefore not at risk from reservoir flooding.

7.1.7. The Manchester, Salford and Trafford Strategic Flood Risk Assessment identifies that the site is located within an area that is potentially at risk of groundwater flooding for both options.

7.1.8. No site-specific information in relation to sewer flooding is contained within the SFRA for either development option. Further consultation with the Local Authority, Environment Agency and United Utilities will be required to confirm the risk of groundwater and sewer flooding.

7.1.9. As the options are greater than 1 hectare in area and will be subject to a change in use, a detailed Flood Risk Assessment and supporting Drainage Strategy will also be required to support a planning application for any variation of the site.

7.1.10. A Flood Risk Assessment will consider in detail the risk of surface water flooding within the site. In addition, consultation will be undertaken with the Environment Agency, United Utilities and the Lead Local Flood Authority in order to ensure early statutory authority involvement and to secure any necessary agreements.

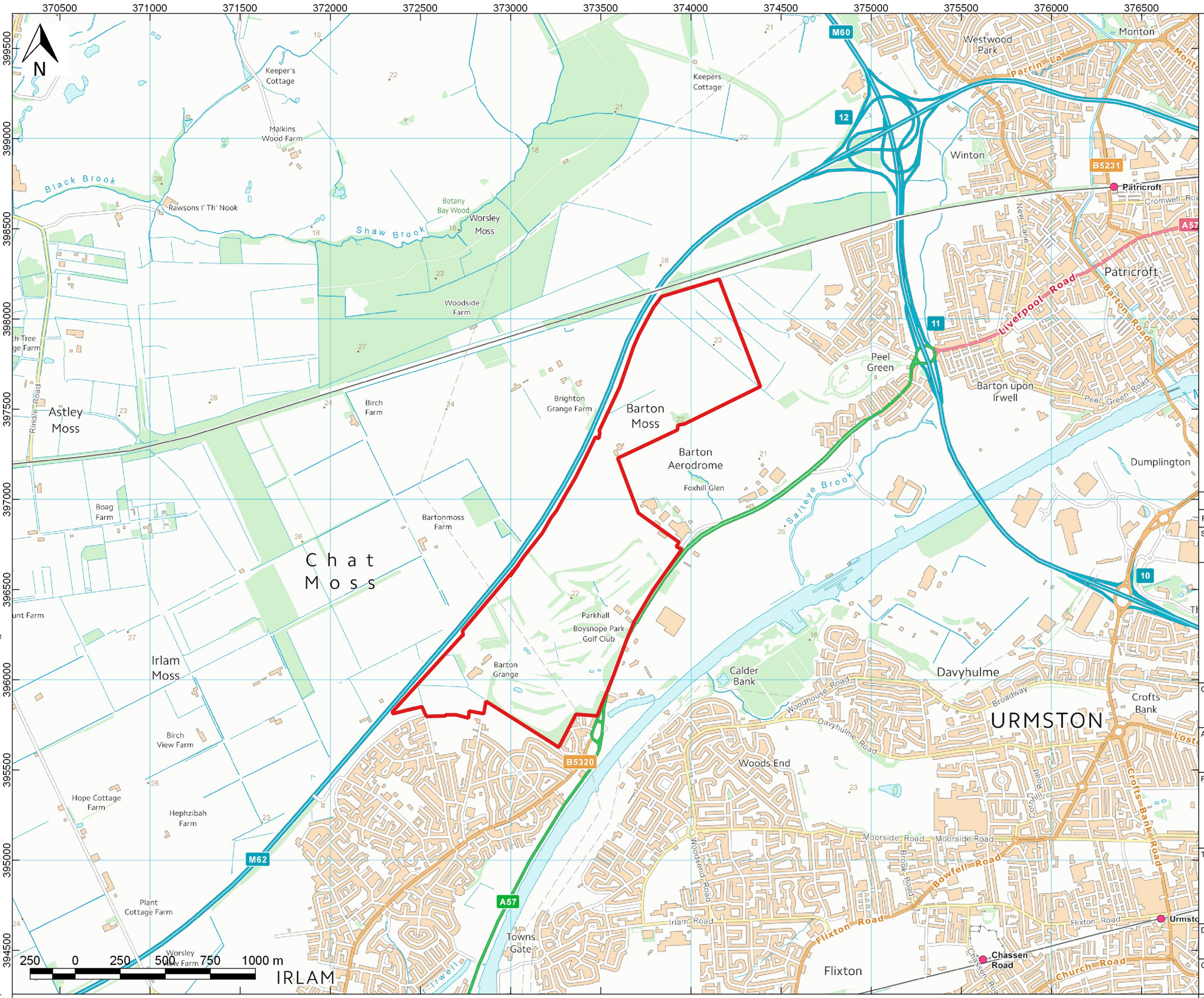
7.1.11. Surface water management for future developments will ensure that surface water run-off rates do not exceed existing Greenfield rates, as stipulated within the SFRA

7.1.12. The Flood Risk Assessment and Drainage Strategy will be produced in accordance with National and Local Planning Policies.

7.1.13. Based on the above, both options for the site are considered suitable for industrial / commercial development. It is also recommended that development is sequentially located within Flood Zone 1.

Appendix A

SITE LOCATION PLAN



KEY:

Site Boundary

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	15/03/19	CM	FIRST ISSUE	MQ	CP

STATUS: FOR INFORMATION ONLY

Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PEEL INVESTMENTS (NORTH) LIMITED

ARCHITECT: -

PROJECT: GM ALLOCATION 33 - PORT SALFORD EXTENSION

TITLE: SITE LOCATION PLAN

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
Port Salford - Site Location Plan.qgs	1:20,000	15/03/19

PROJECT No:	DRAWING No:	REV:
70032760	Port Salford - Site Location Plan	A

Created by: UKCLM008 - 2019-03-15 15:57:19 - C:\Users\ukclm008\Documents\Port Salford - Site Location Plan.qgs

Appendix B

COPIES OF RELEVANT GEOTECHNICAL MAPS

FLOOD RISK PACK

Client:
Peel Investments (North) Limited

Project Reference:
70032760 - GM Allocation 33 - Port Salford Extension Option 1

Site Reference:
GM Allocation 33 - Port Salford Extension

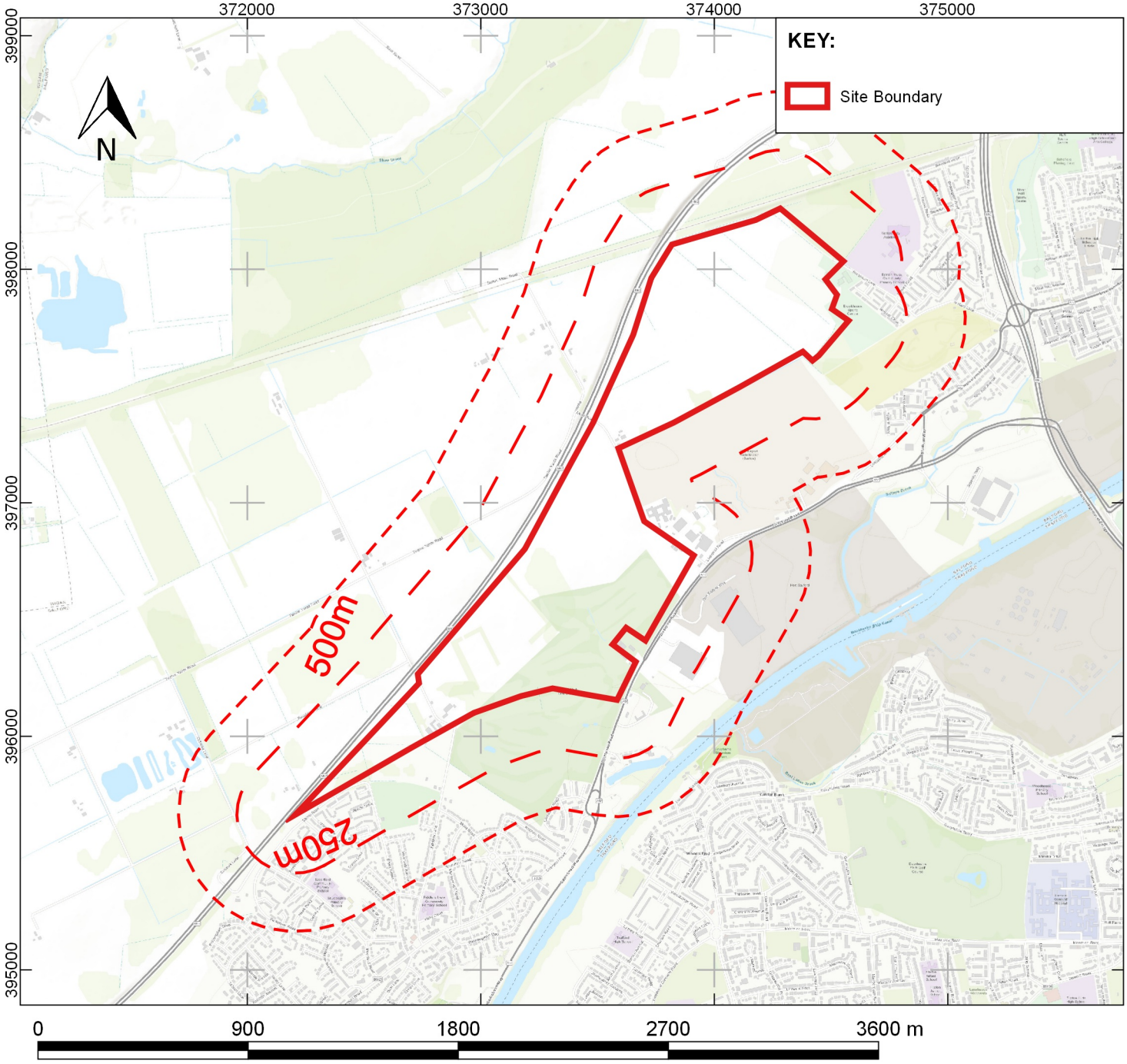
Site Location
373603, 397071

Site Area:
139.19 hectares

Map Scale:
1:25000
CONTENTS:

Created by: UKCLM008 - 2019-03-15 18:43:07
\\uk.wspgroup.com\central data\Projects\700327xx\70032760 - GMSF Peel Reps\02 issue\20190214 - Issue 6\Revised\New GM Allocation 33 - Port Salford Extension\New folder\70032760 - GM Allocation 33 - Port Salford Extension Option 1.qgs

SITE LOCATION



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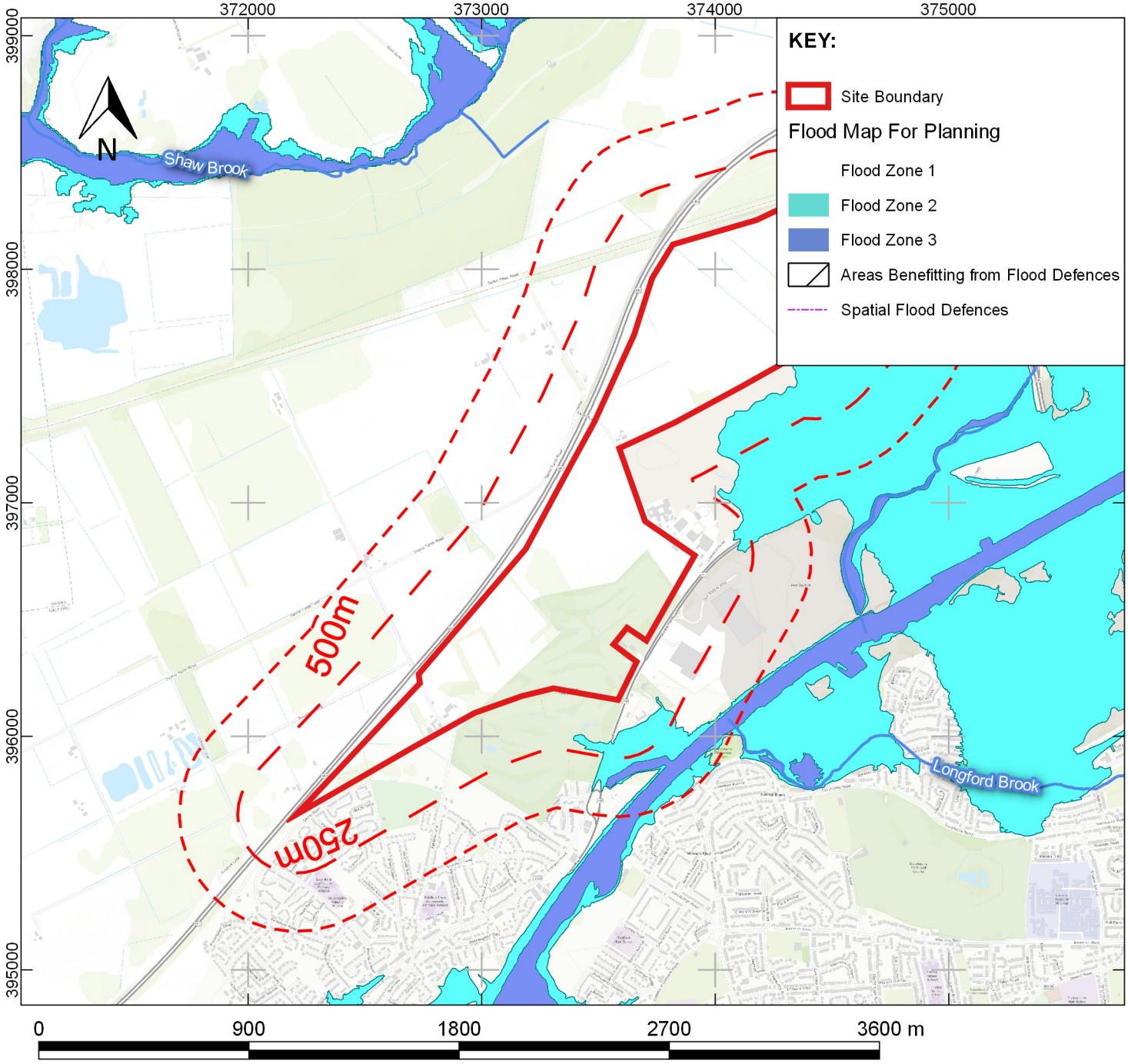
Registered in England and Wales No. 01383511

ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING



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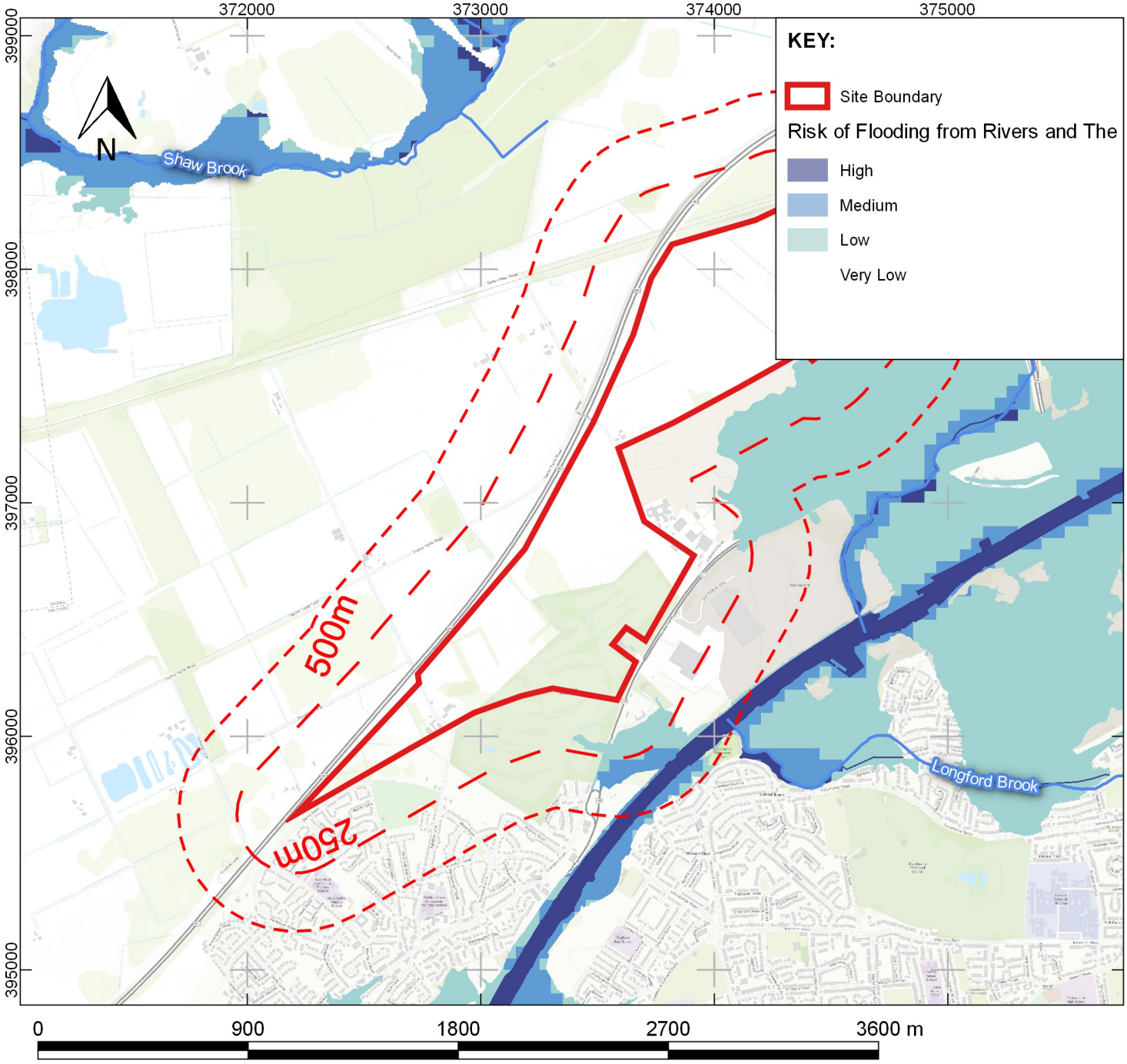
ENVIRONMENT AGENCY RISK OF FLOODING FROM RIVERS AND THE SEA



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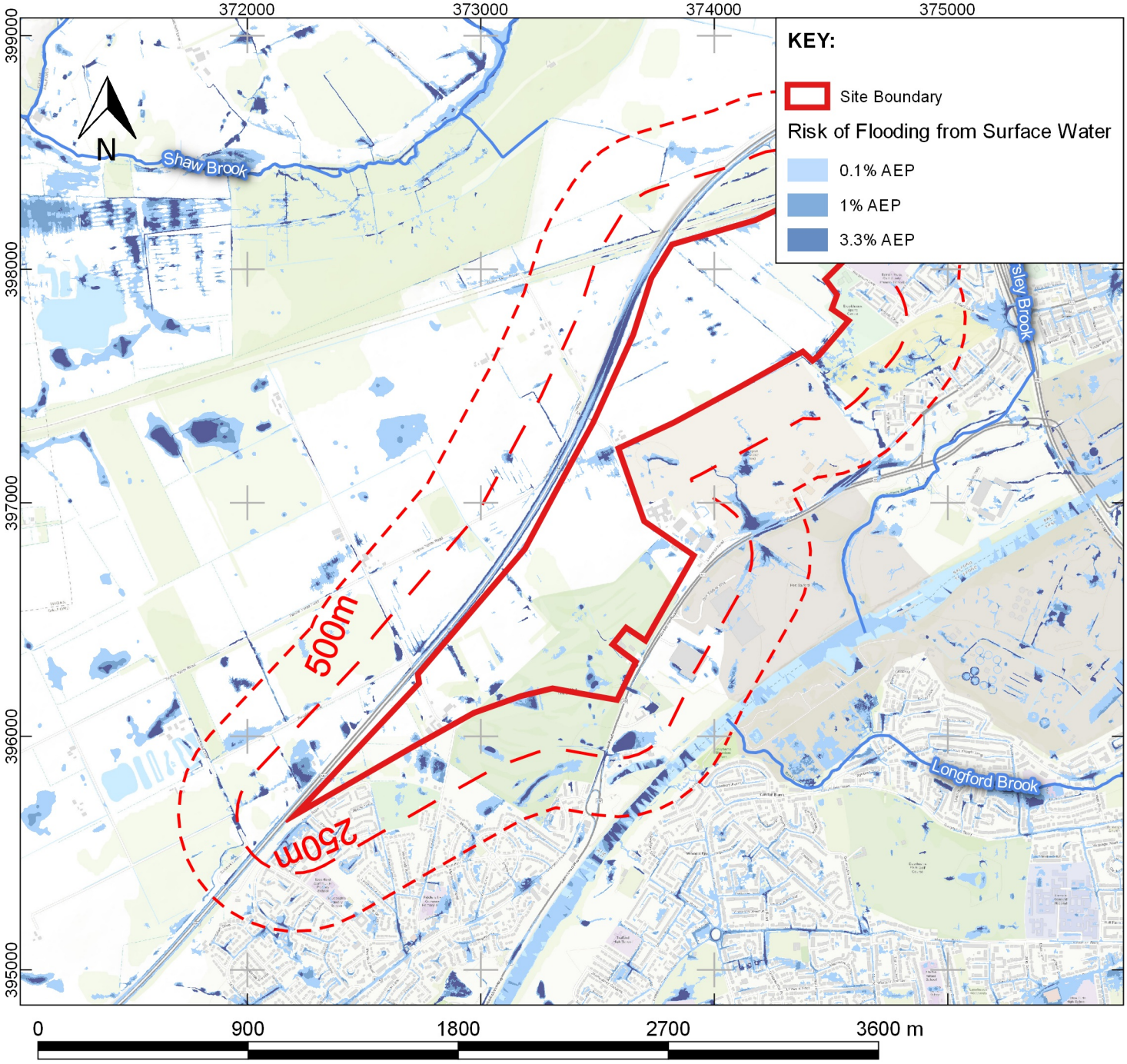
ENVIRONMENT AGENCY RISK OF FLOODING FROM SURFACE WATER



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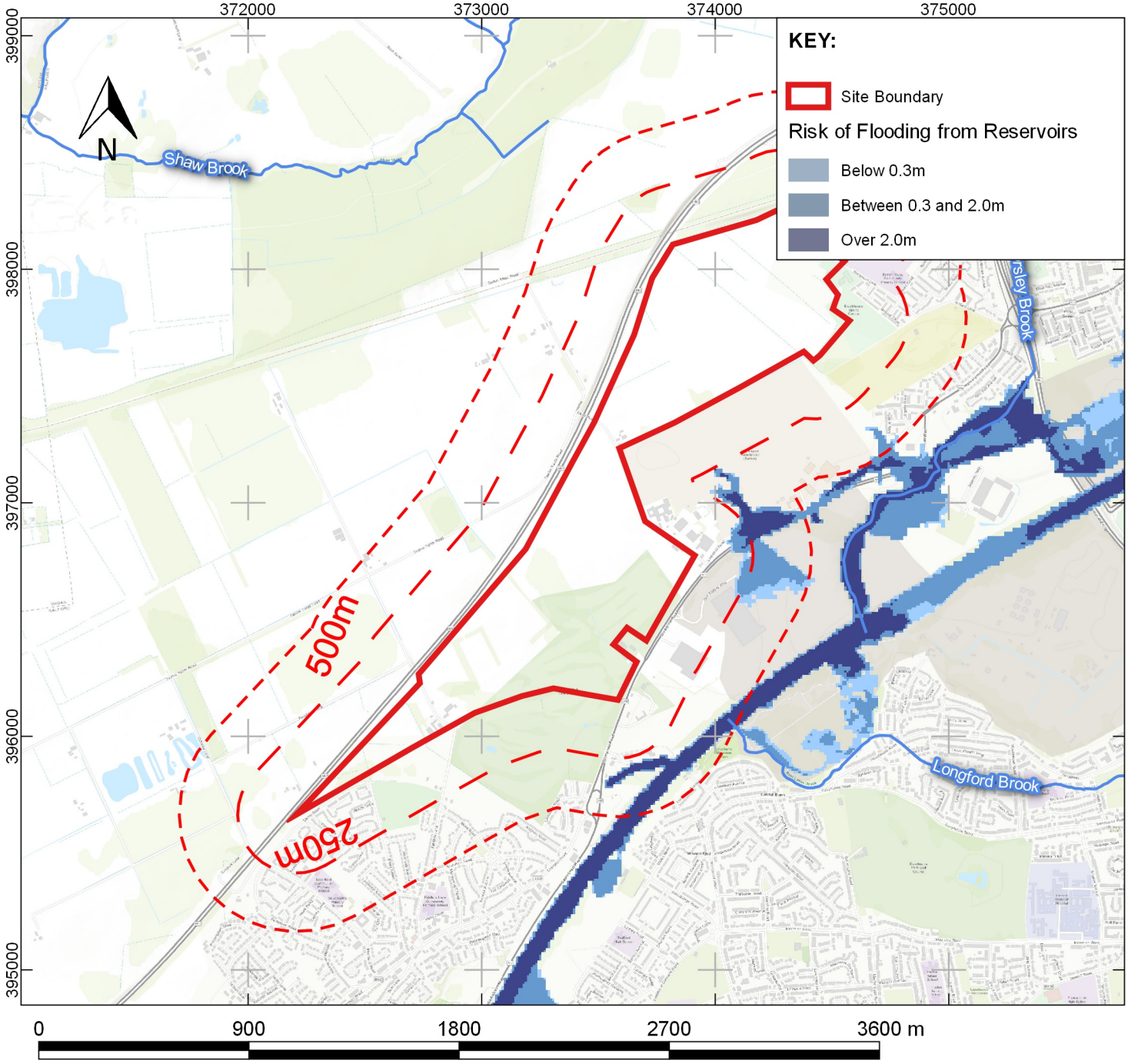
ENVIRONMENT AGENCY RISK OF FLOODING FROM RESERVOIRS



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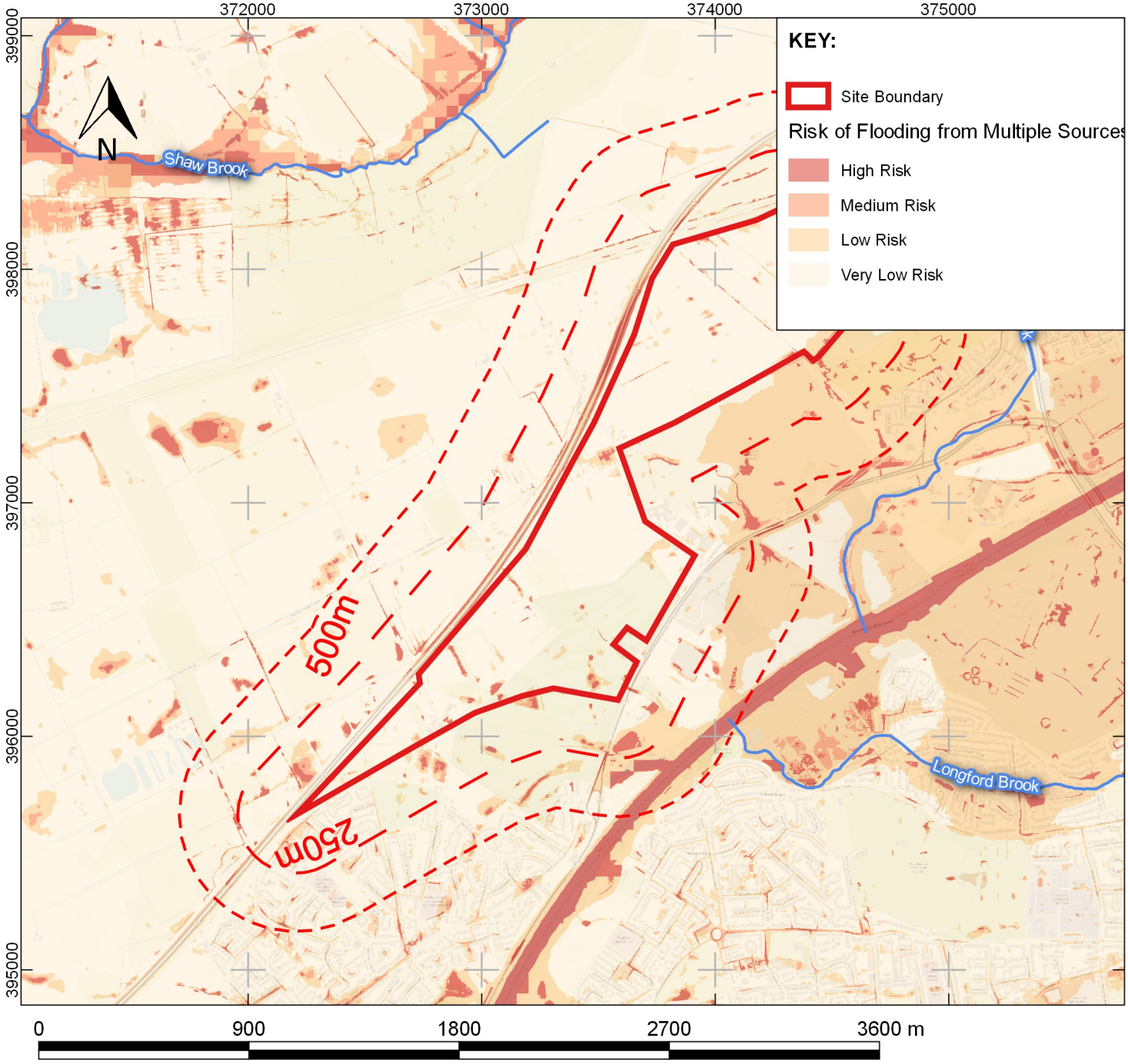

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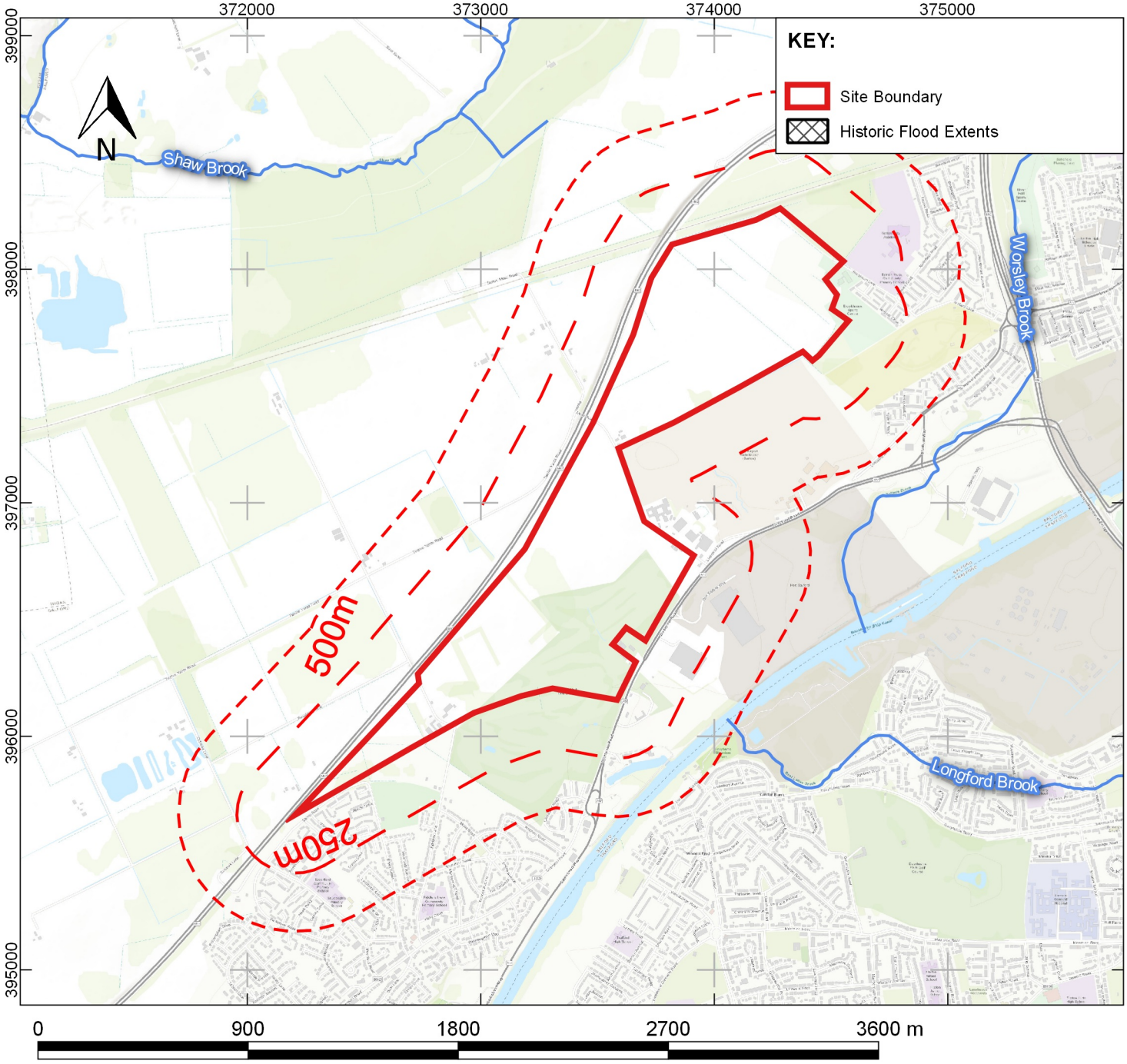
ENVIRONMENT AGENCY HISTORIC FLOOD MAP



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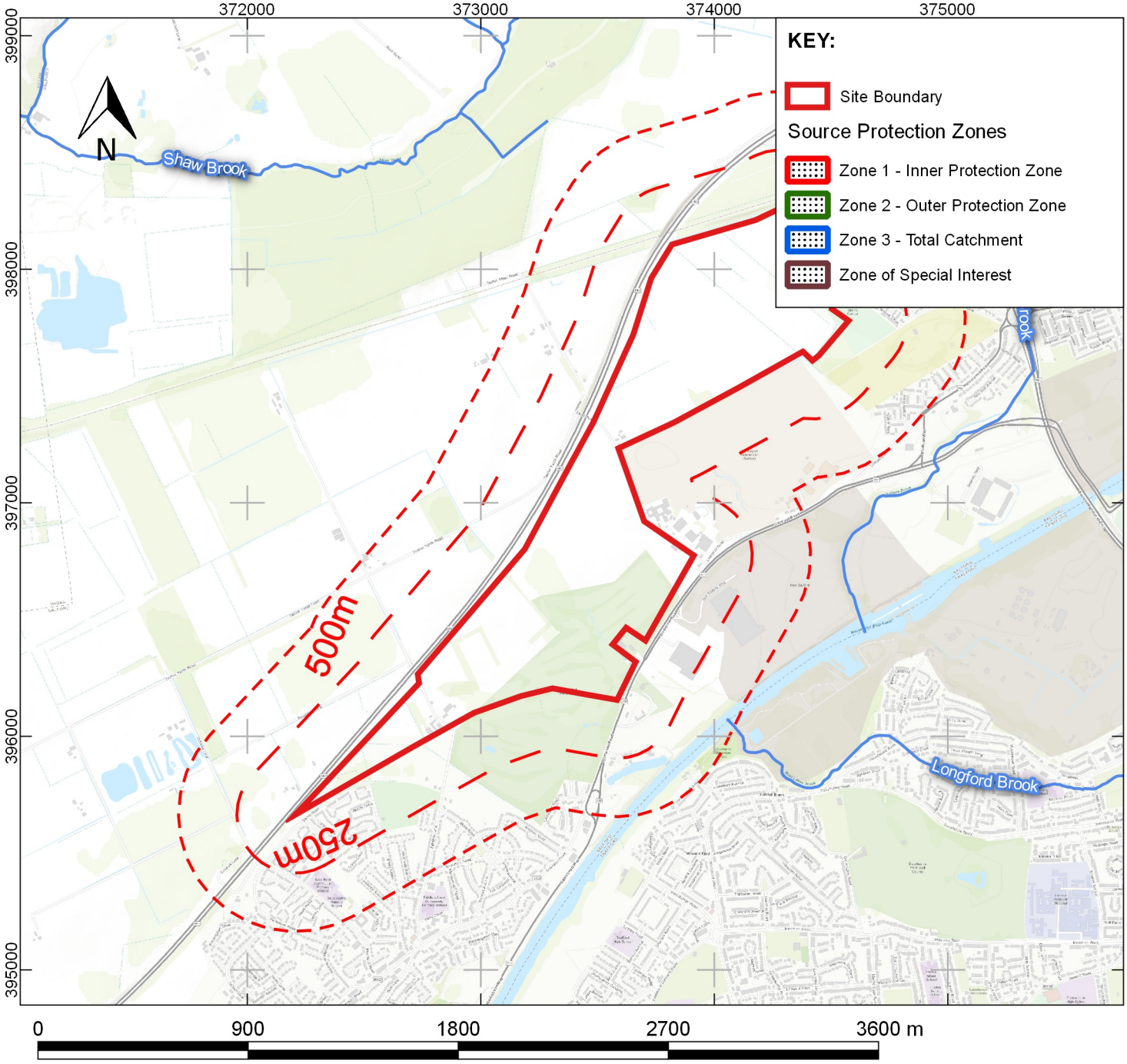
The absence of coverage by the Historic Flood Map for an area does not mean that the area has never flooded, only that we do not currently have records of flooding in this area. It is also possible that the pattern of flooding in this area has changed and that this area would now flood under different circumstances. The Historic Flood Map will take into account of the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It will include flood extents that may have been affected by overtopping, breaches or blockages. Flooding shown to the land and does not necessarily indicate that properties were flooded internally.

ENVIRONMENT AGENCY SOURCE PROTECTION ZONES



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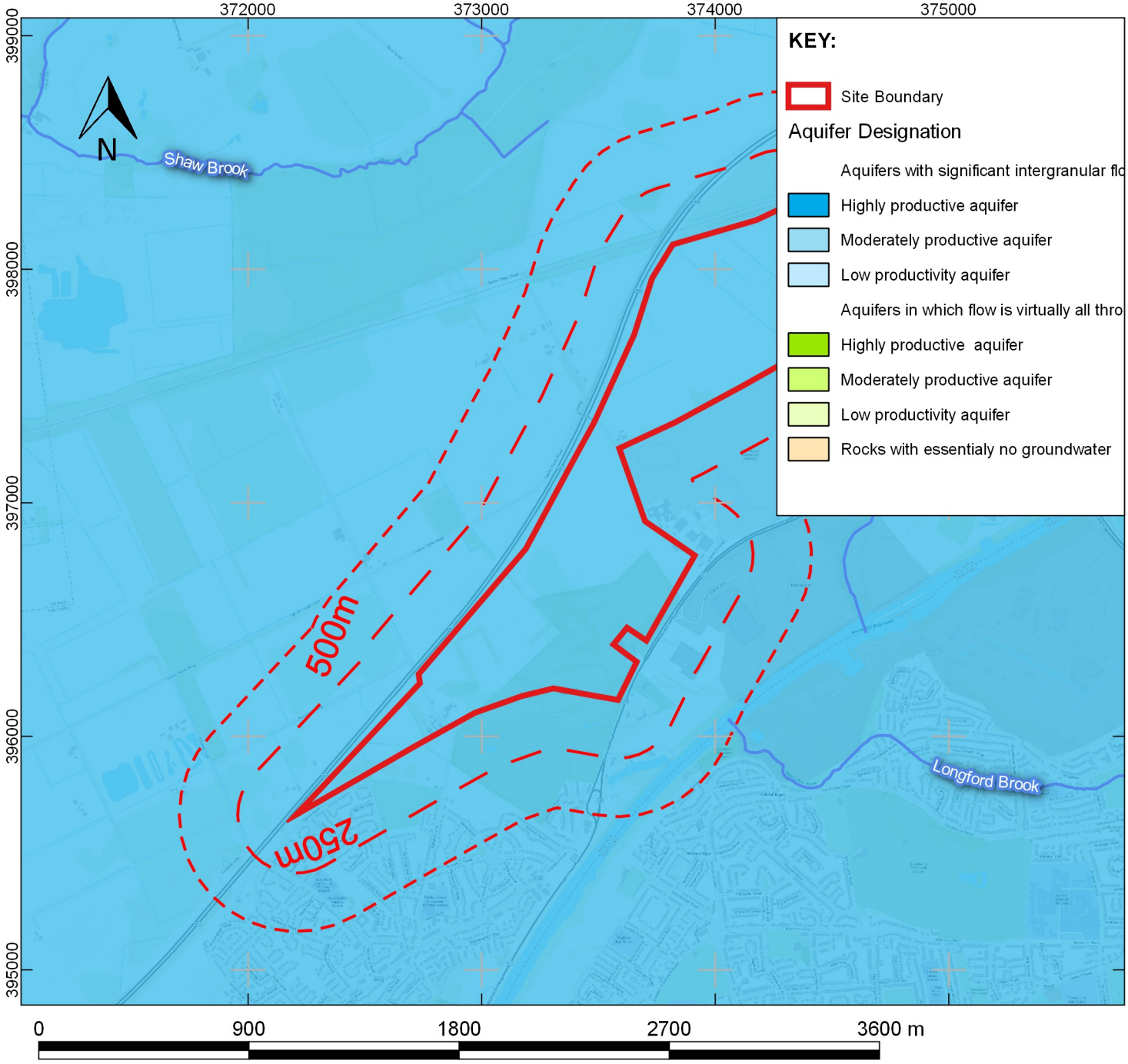
ENVIRONMENT AGENCY 1:625,000 SCALE AQUIFER DESIGNATION

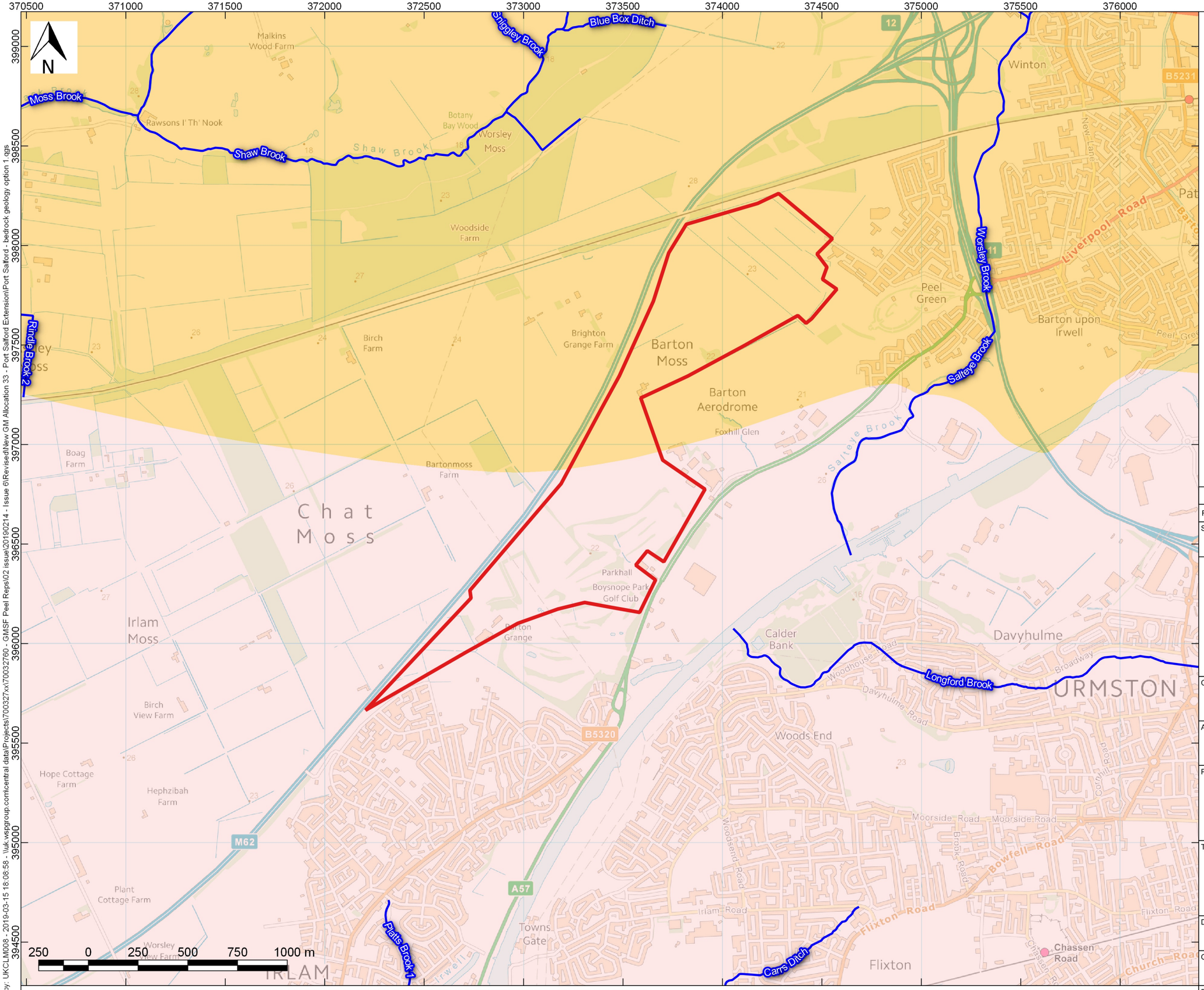


The hydrogeological map indicates aquifer potential in generalised terms using a threefold division of geological formations:

1. those in which intergranular flow in the saturated zone is dominant
2. those in which flow is controlled by fissures or discontinuities
3. less permeable formations including aquifers concealed at depth beneath covering layers

Highly productive aquifers are distinguished from those that are only of local importance or have no significant groundwater. Within each of these classes the strata are grouped together according to age or lithology.

The 1:625 000 scale data may be used as a guide to the aquifers at a regional or national level, but should not be relied on for local information.



KEY:

- Site Boundary

BGS Bedrock

- Chester Formation - Sandstone
- Wilmslow Sandstone Formation - Sandstone

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	15/03/19	CM	FIRST ISSUE	MQ	CP

STATUS: FOR INFORMATION ONLY

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Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PEEL INVESTMENTS (NORTH) LIMITED

ARCHITECT: -

PROJECT: GM ALLOCATION 33 - PORT SALFORD EXTENSION

TITLE: BRITISH GEOLOGICAL SURVEY 1:50,000 BEDROCK GEOLOGY

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
Port Salford - bedrock geology option 1.qgs	1:18,000	15/03/19

PROJECT No:	DRAWING No:	REV:
70032760	Port Salford - bedrock geology option 1	A

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371000 371500 372000 372500 373000 373500 374000 374500 375000 375500 376000 376500

399500 399000 398500 398000 397500 397000 396500 396000 395500 395000

N

Moss House Farm Brook
Moss Brook
Shaw Brook
Sniggley Brook
Shaw Brook
Blue Box Ditch
Worsley Brook
Folly Brook
Worsley Brook
Saltaye Brook
Longford Brook

Keeper's Cottage
Malkins Wood Farm
Rawsons I' Th' Nook
Botany Bay Wood
Worsley Moss
Keepers Cottage
Westwood Park
Winton
Patricroft
Woodside Farm
Birch Farm
Brighton Grange Farm
Barton Moss
Peel Green
Barton upon Irwell
Liverpool Road
Barton Road
Peel Green Road
Barton Aerodrome
Foxhill Glen
Boag Farm
Bartonmoss Farm
Chat Moss
Parkhall
Boysnope Park Golf Club
Barton Grange
Irlam Moss
Birch View Farm
Hephzibah Farm
Cottage Farm
Calder Bank
Davyhulme
Woodhouse Road
Broadway
Davyhulme Road
Woods End
URMSTON
Moorside Road
Bowfell Road
Woodsend Road
Brook Road
Cornhill Road
Crofts Bank Road

12 11 10 B5231 B5320 M62 A57

250 0 250 500 750 1000 m

KEY:

- Site Boundary

BGS Superficial

- Peat - Peat
- Glaciofluvial Sheet Deposits, Devensian - Sand and Gravel
- Alluvium - Clay, Silt, Sand and Gravel
- Till, Devensian - Diamicton
- Glaciolacustrine Deposits, Devensian - Clay and Silt
- Alluvial Fan Deposits - Sand and Gravel

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A	15/03/19	CM	FIRST ISSUE	MQ	CP

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Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT:

PEEL INVESTMENTS (NORTH) LIMITED

ARCHITECT:

-

PROJECT:

GM ALLOCATION 33 - PORT SALFORD EXTENSION

TITLE:

BRITISH GEOLOGICAL SURVEY
1:50,000 SUPERFICIAL DEPOSITS

DRAWN:	CHECKED:	APPROVED:

QGIS FILE:	SCALE @A3:	DATE:
Port Salford - superficial deposits option 1.qgs	1:18,000	15/03/19

PROJECT No:	DRAWING No:	REV:
70032760	Port Salford - superficial deposits option 1	A

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FLOOD RISK PACK

Client:
Peel Investments (North) Limited

Project Reference:
70032760 - GM Allocation 33 - Port Salford Extension Option 2

Site Reference:
GM Allocation 33 - Port Salford Extension

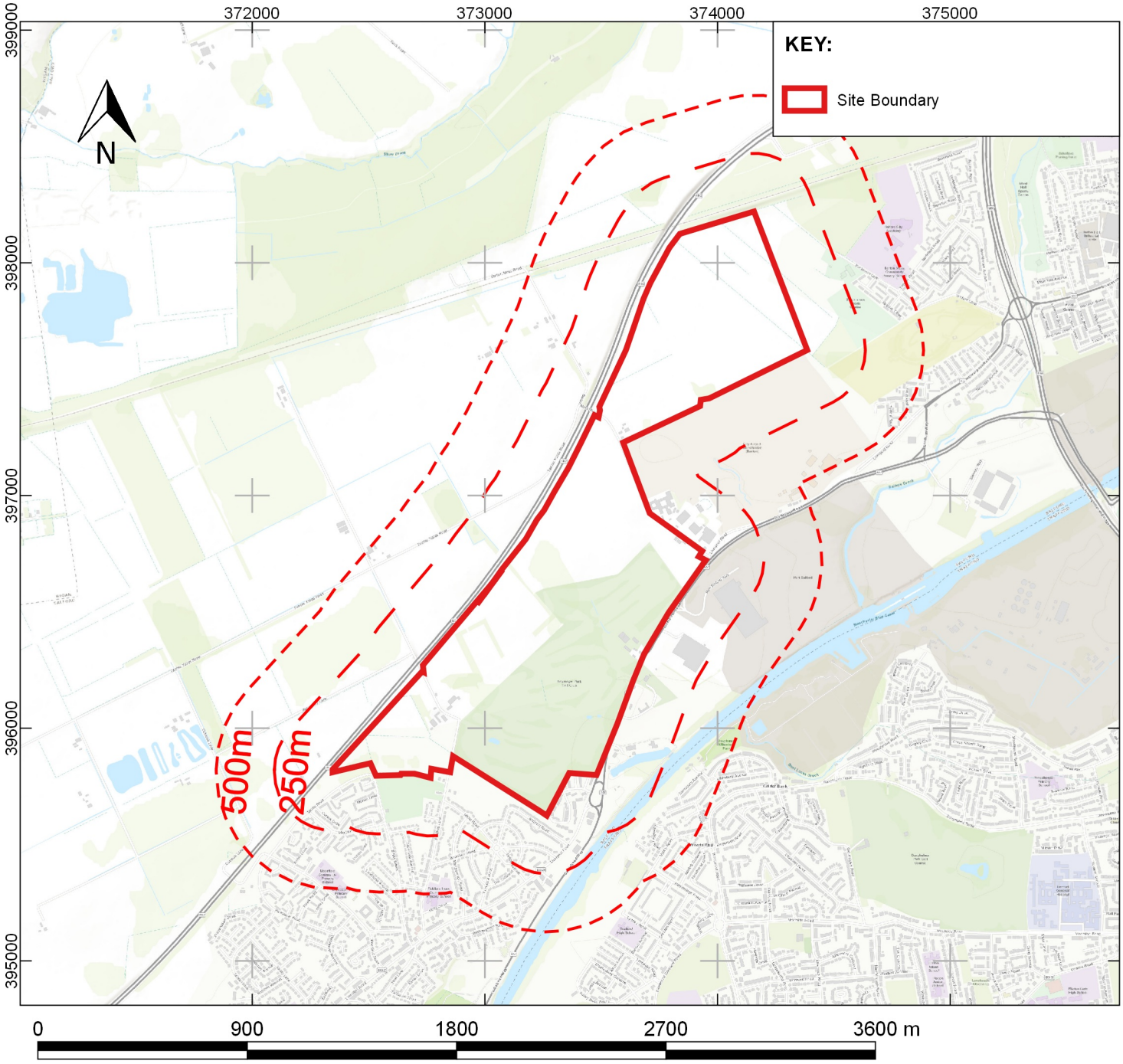
Site Location
373462, 396777

Site Area:
163.07 hectares

Map Scale:
1:25000
CONTENTS:

Created by: UKCLM008 - 2019-03-15 17:51:39
\\uk.wspgroup.com\central data\Projects\700327xx\70032760 - GMSF Peel Reps\02 issue\20190214 - Issue 6\Revised\New GM Allocation 33 - Port Salford Extension\70032760 - GM Allocation 33 - Port Salford Extension Option 2.qgs

SITE LOCATION



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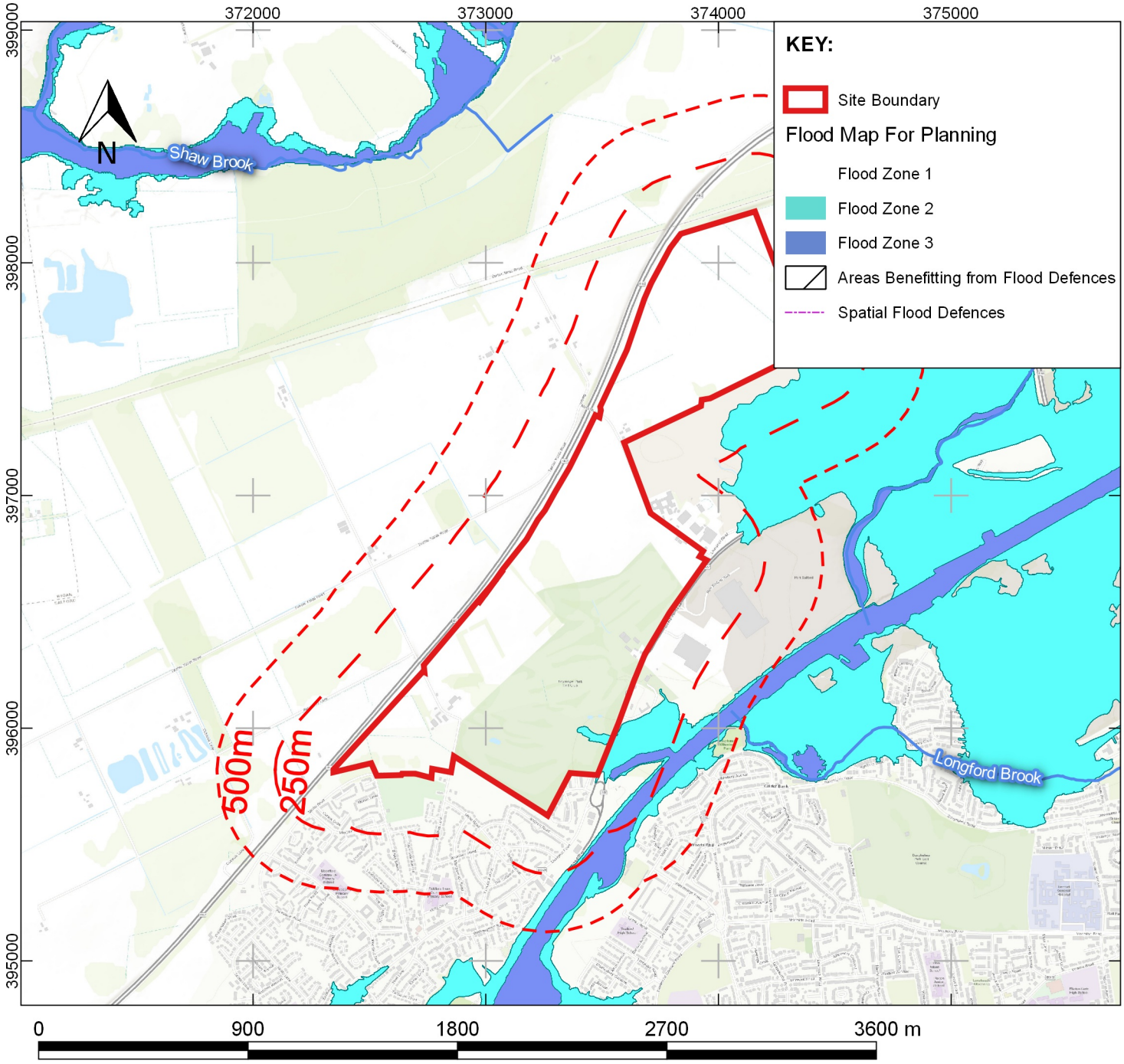
ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING



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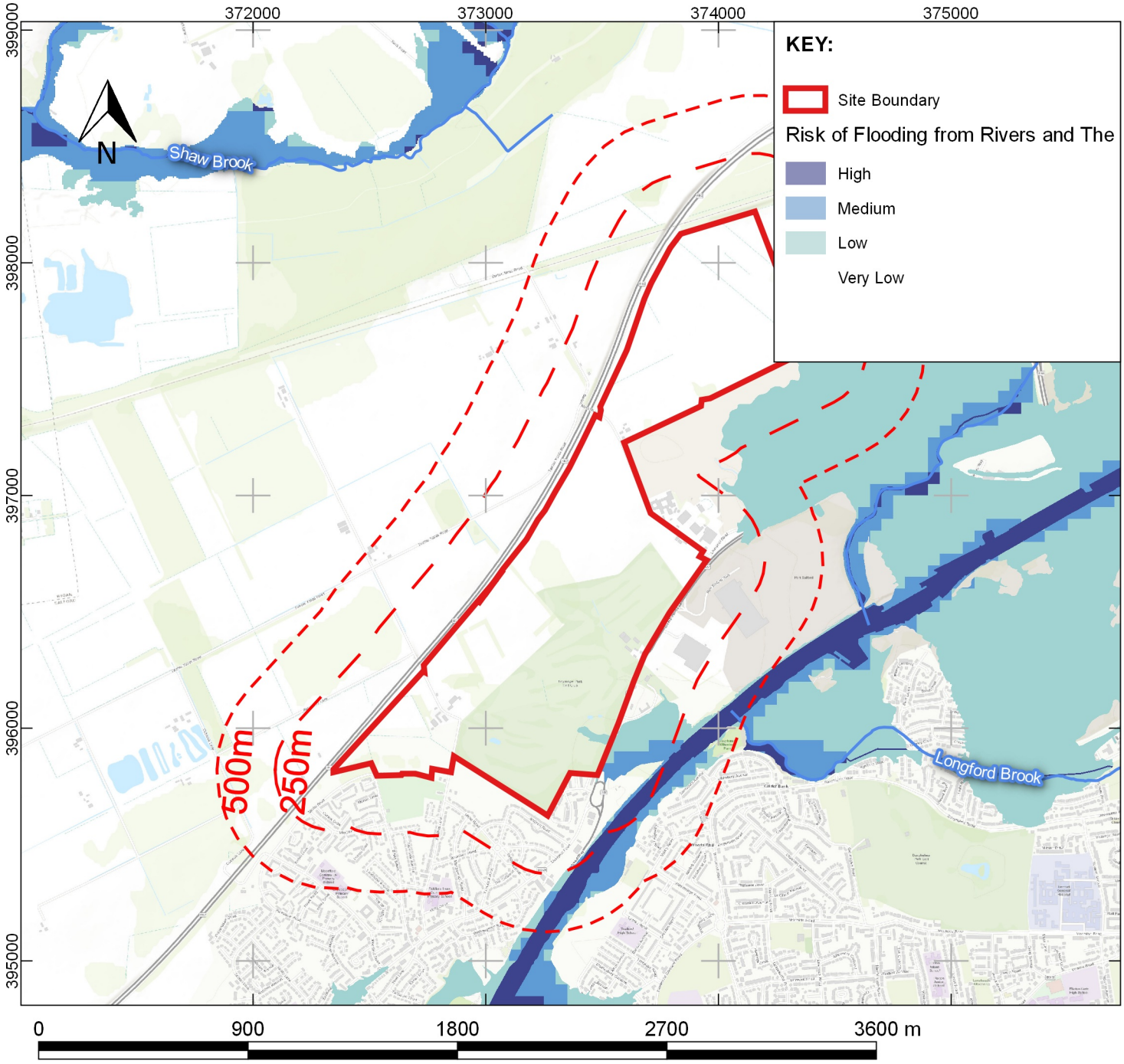
ENVIRONMENT AGENCY RISK OF FLOODING FROM RIVERS AND THE SEA



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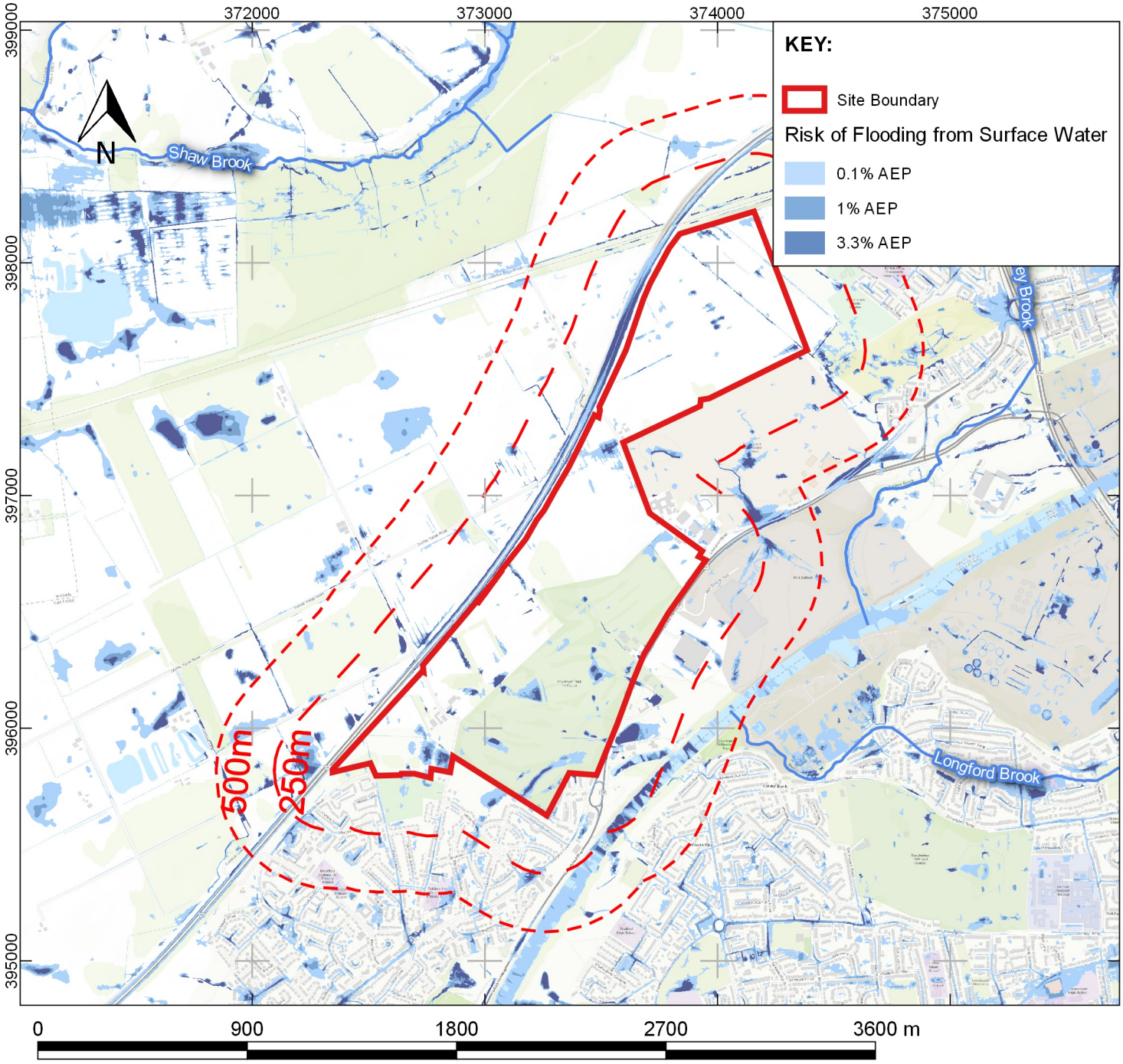

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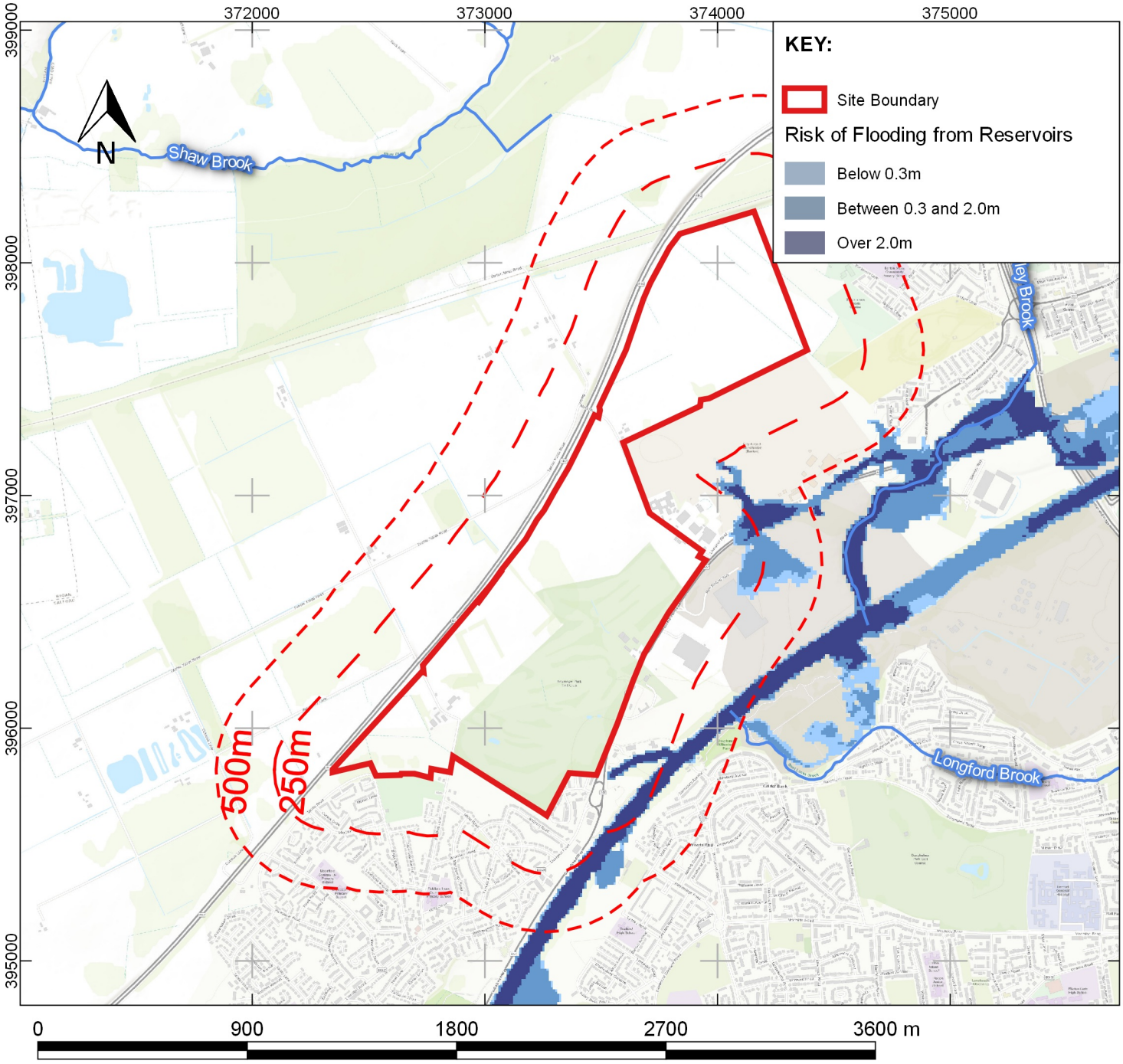

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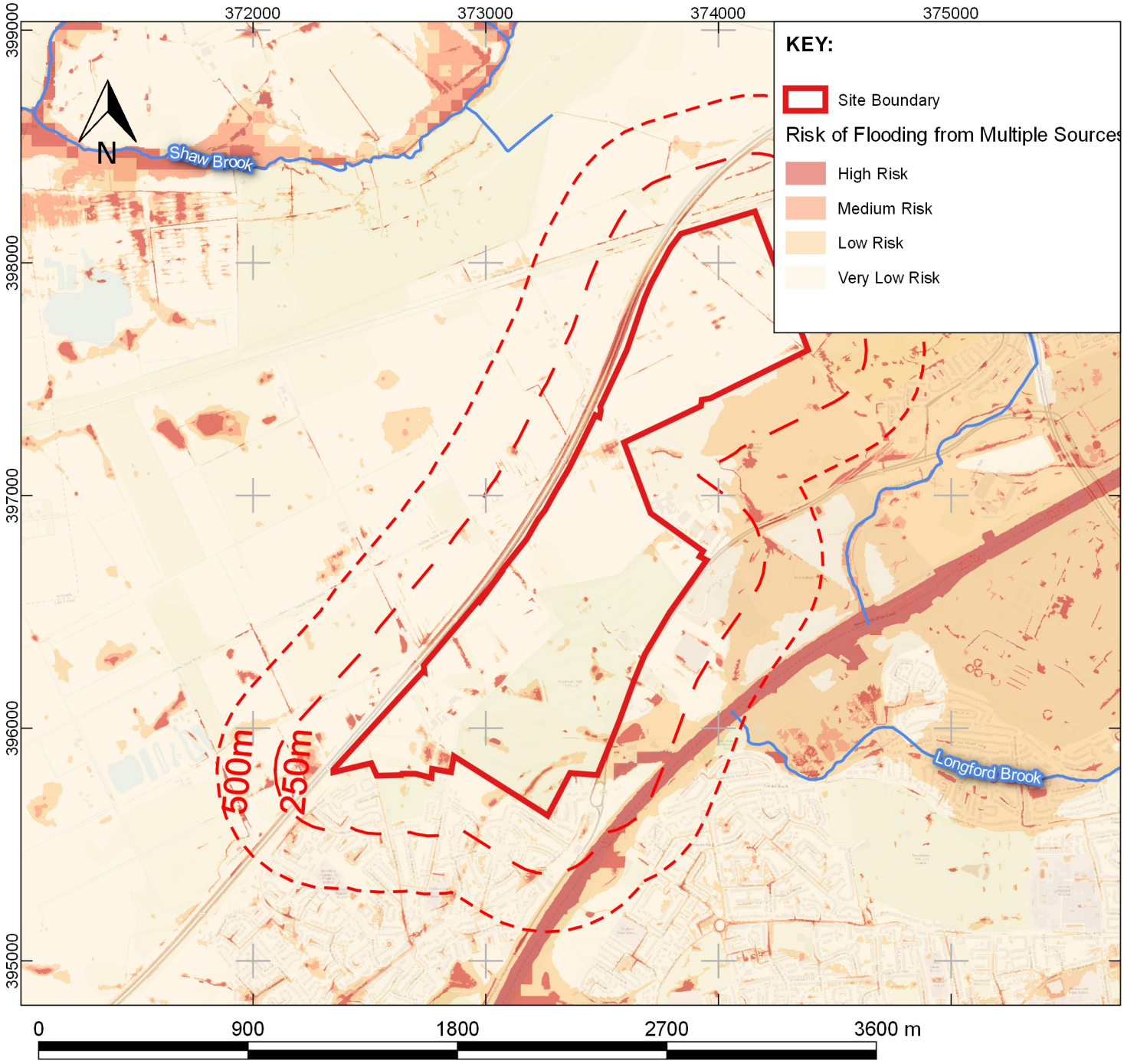

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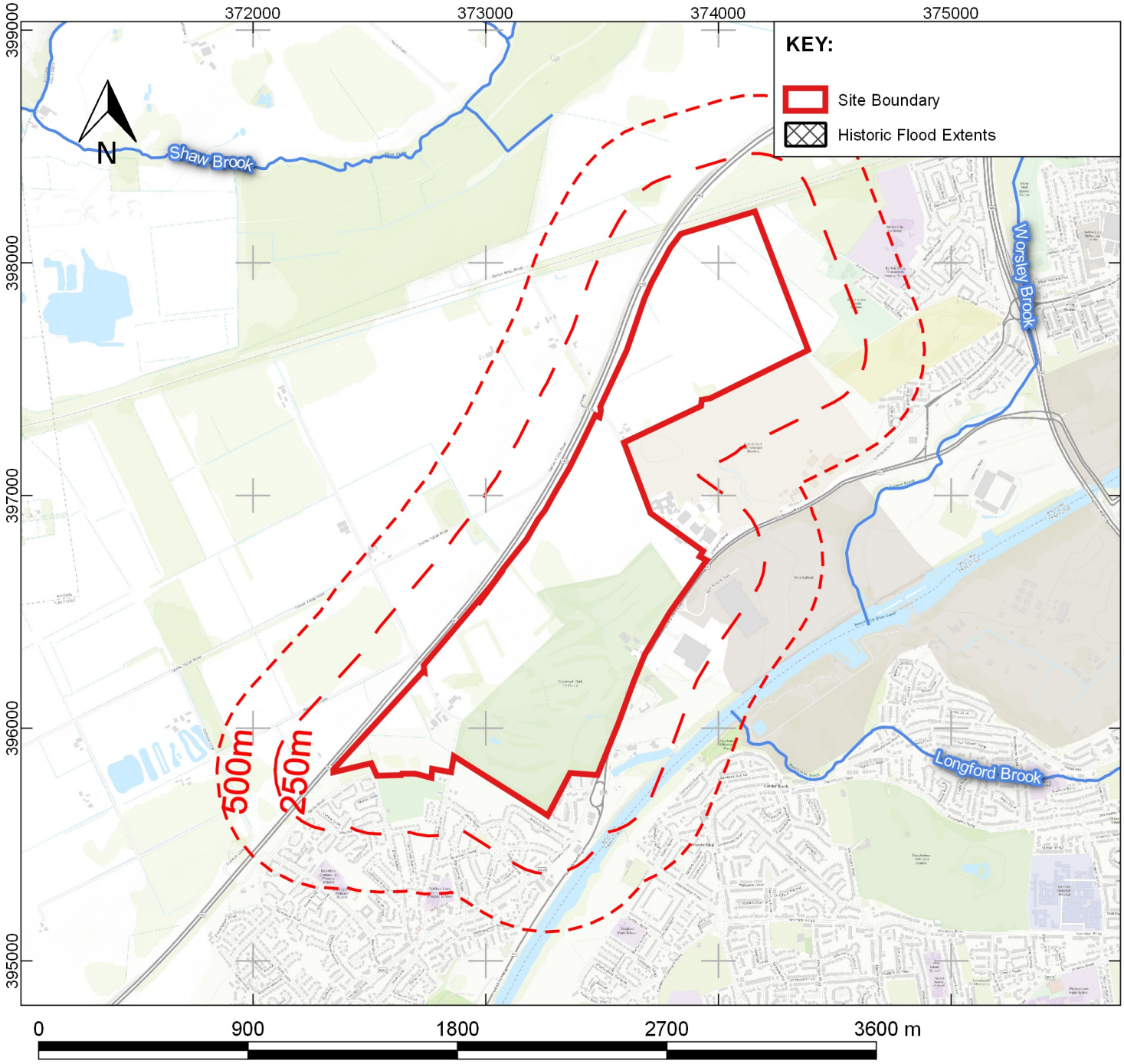

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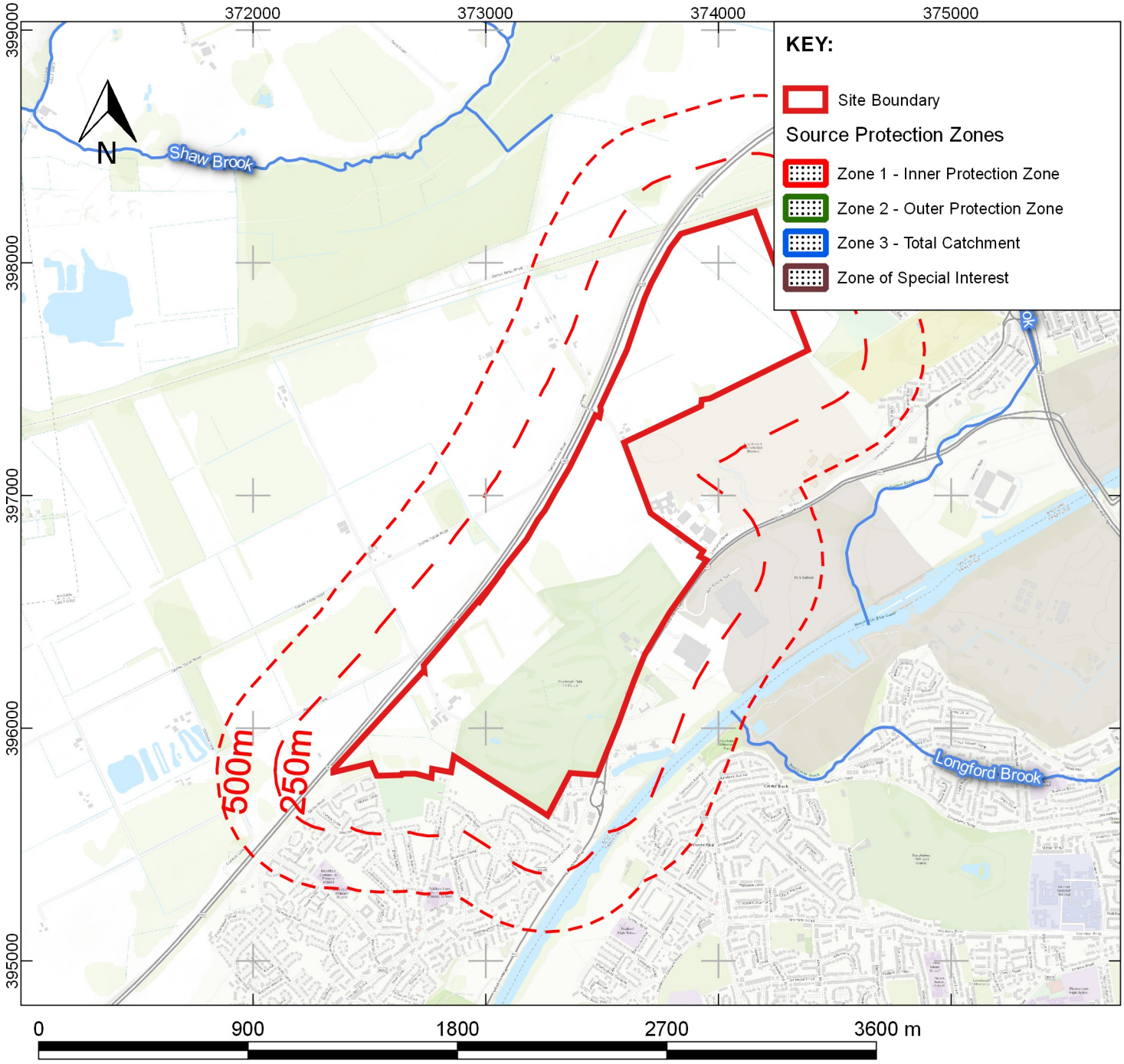
ENVIRONMENT AGENCY SOURCE PROTECTION ZONES



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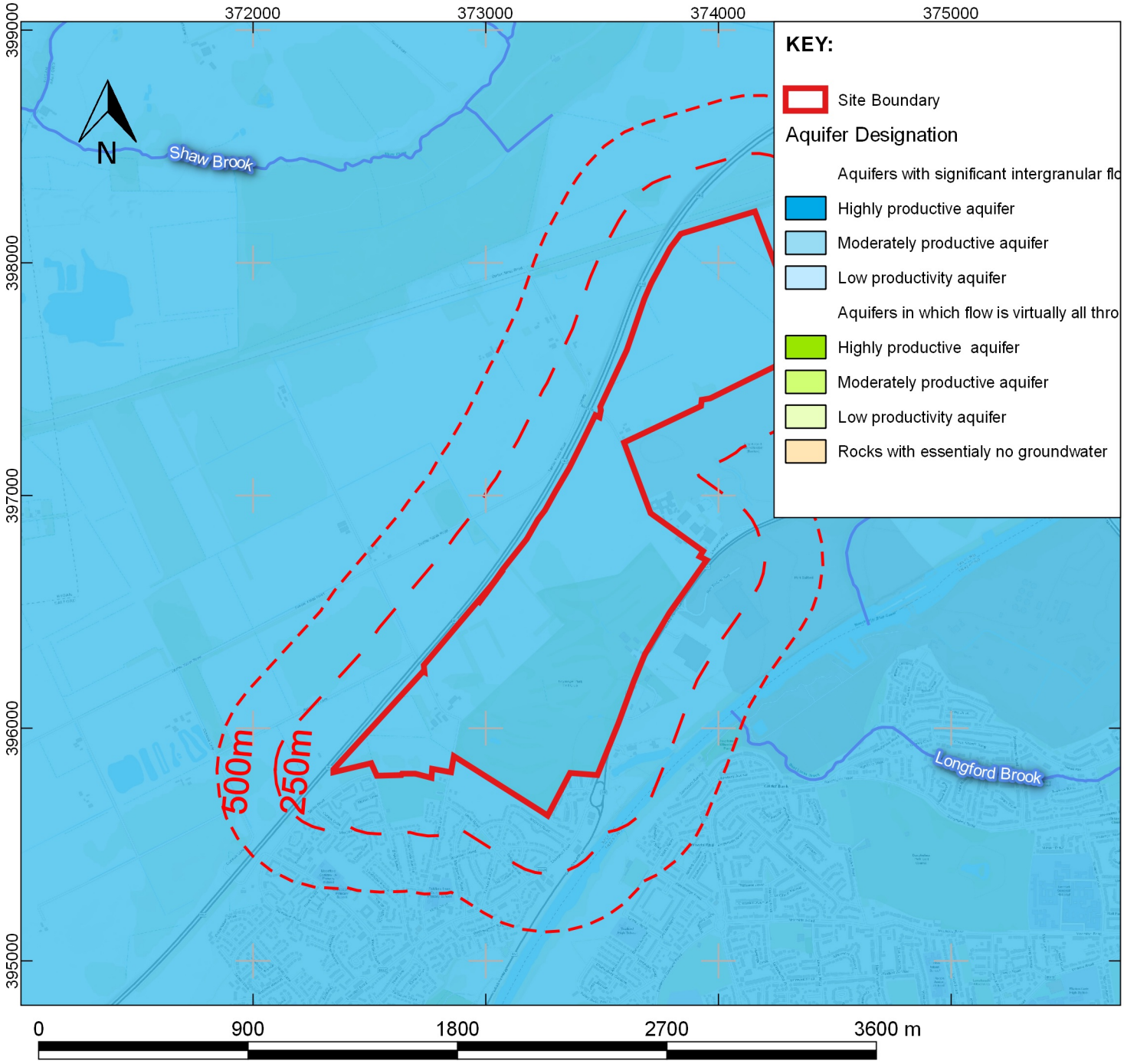
Special interest (Zone 4) - A fourth zone SPZ4 or 'Zone of Special Interest' was previously defined for some sources. SPZ4 usually represented a surface water catchment which drains into the aquifer feeding the groundwater supply (i.e. catchment draining to a disappearing stream).

ENVIRONMENT AGENCY 1:625,000 SCALE AQUIFER DESIGNATION

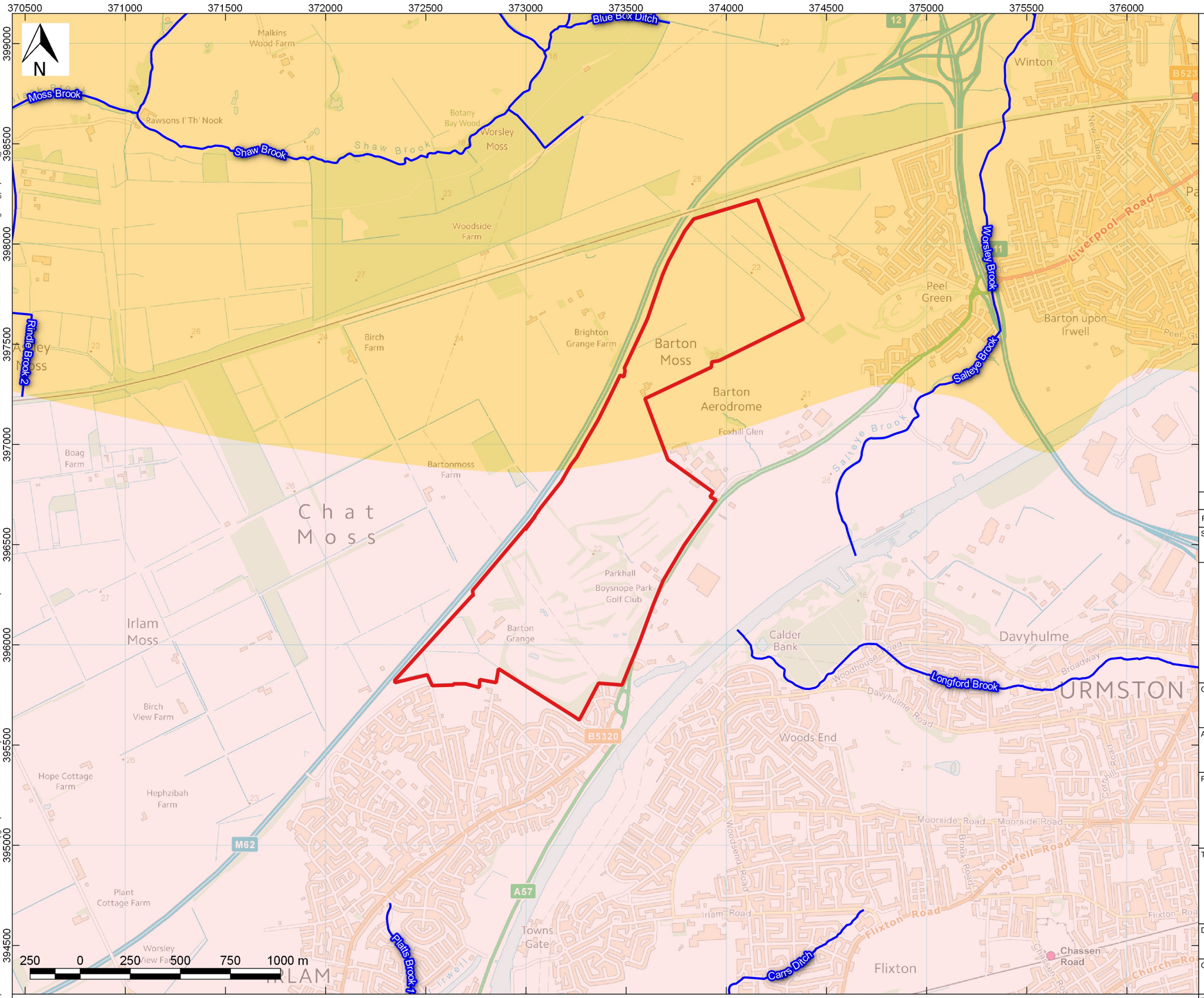


The hydrogeological map indicates aquifer potential in generalised terms using a threefold division of geological formations:

1. those in which intergranular flow in the saturated zone is dominant
2. those in which flow is controlled by fissures or discontinuities
3. less permeable formations including aquifers concealed at depth beneath covering layers

Highly productive aquifers are distinguished from those that are only of local importance or have no significant groundwater. Within each of these classes the strata are grouped together according to age or lithology.

The 1:625 000 scale data may be used as a guide to the aquifers at a regional or national level, but should not be relied on for local information.



KEY:

- Site Boundary

BGS Bedrock

- Chester Formation - Sandstone
- Wilmslow Sandstone Formation - Sandstone

REV	DATE	DRW	DESCRIPTION	CHK	APP
A	15/03/19	CM	FIRST ISSUE	MQ	CP

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Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PEEL INVESTMENTS (NORTH) LIMITED

ARCHITECT: -

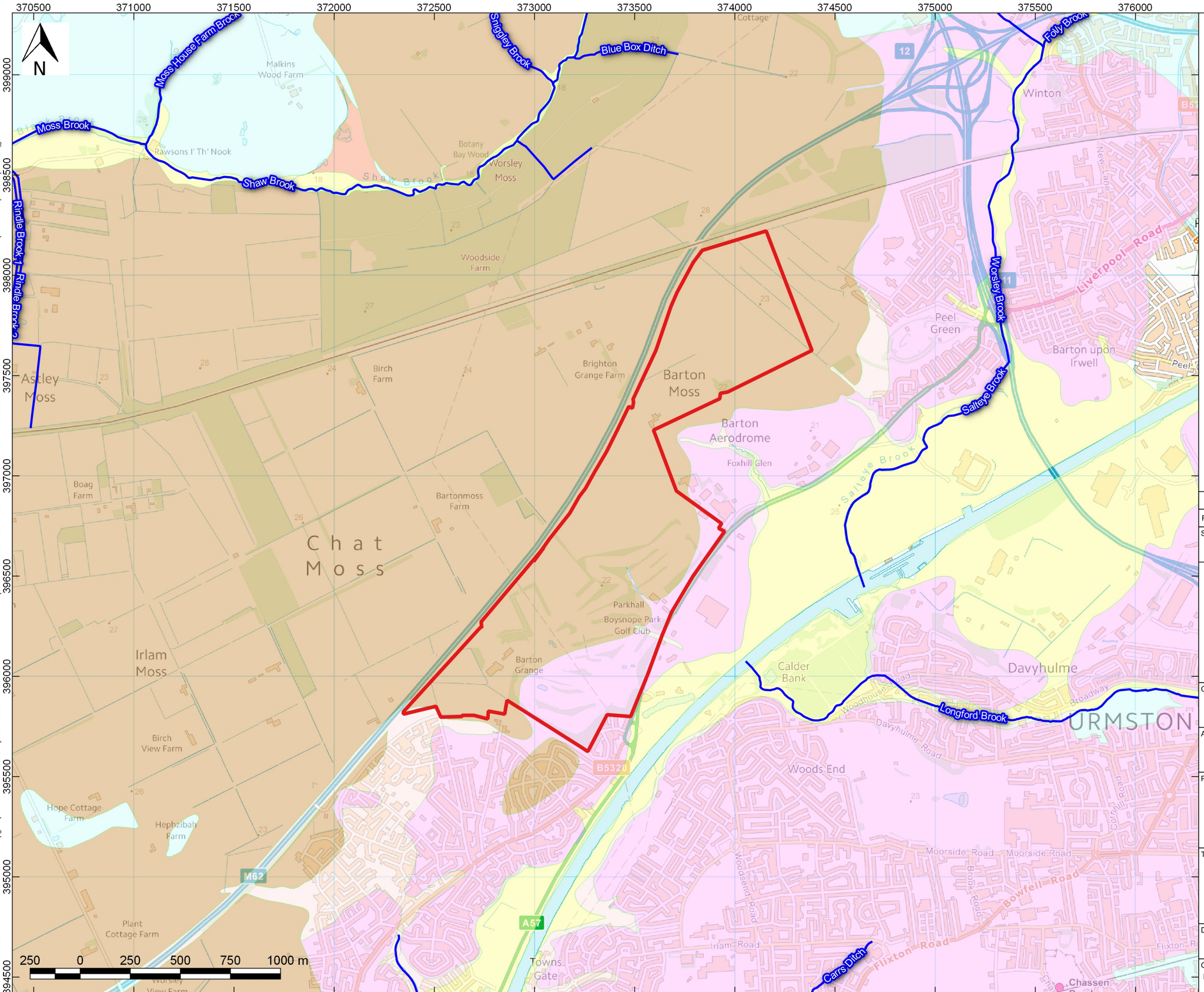
PROJECT: GM ALLOCATION 33 - PORT SALFORD EXTENSION

TITLE: BRITISH GEOLOGICAL SURVEY 1:50,000 BEDROCK GEOLOGY

DRAWN:	CHECKED:	APPROVED:
QGIS FILE: Port Salford - bedrock geology option 2.qgs	SCALE @A3: 1:18,000	DATE: 15/03/19

PROJECT No:	DRAWING No:	REV:
70032760	Port Salford - bedrock geology option 2	A

Created by: UKCLM008 - 2019-03-15 18:29:10 - \\uk.wspgroup.com\central data\Projects\700327xx\700327760 - GMSF Peel Reps\02 issue\20190214 - Issue 6\Revise 6\Revised\New GM Allocation 33 - Port Salford Extension\Port Salford - bedrock geology option 2.qgs



KEY:

- Site Boundary

BGS Superficial

- Peat - Peat
- Glaciofluvial Sheet Deposits, Devensian - Sand and Gravel
- Alluvium - Clay, Silt, Sand and Gravel
- Till, Devensian - Diamicton
- Glaciolacustrine Deposits, Devensian - Clay and Silt
- Alluvial Fan Deposits - Sand and Gravel

REV	DATE	DRW	DESCRIPTION	CHK	APP
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Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT: PEEL INVESTMENTS (NORTH) LIMITED

ARCHITECT: -

PROJECT: GM ALLOCATION 33 - PORT SALFORD EXTENSION

TITLE: BRITISH GEOLOGICAL SURVEY 1:50,000 SUPERFICIAL DEPOSITS

DRAWN:	CHECKED:	APPROVED:
QGIS FILE: Port Salford - superficial deposits option 2.qgs	SCALE @A3: 1:18,000	DATE: 15/03/19

PROJECT No:	DRAWING No:	REV:
70032760	Port Salford - superficial deposits option 2	A

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Appendix C

INDICATIVE SUDS PLAN

Total Site Area	163.26 hectares	403.42 acres
Employment Buildings (B2/B8)	51.47 hectares	127.19 acres
Highways, Service Yards and Car Parking	46.74 hectares	115.50 acres
Ancillary Development	1.6 hectares	3.95 acres
M62 Link Road	4.79 hectares	11.83 acres
Methane Extraction Compound	0.64 hectares	1.58 acres
Green and Blue Infrastructure	58.02 hectares	143.37 acres

AREA SCHEDULE

EMPLOYMENT FLOORSPACE (B2/B8)

Unit A	113,000 sqm	1,216,322 sqft
Unit B	71,750 sqm	772,311 sqft
Unit C	71,750 sqm	772,311 sqft
Unit D	33,800 sqm	363,820 sqft
Unit E	33,800 sqm	363,820 sqft
Unit F	32,250 sqm	347,136 sqft
Unit G	54,600 sqm	587,709 sqft
Unit H	48,100 sqm	517,744 sqft
Unit I	23,900 sqm	257,257 sqft
Unit J	31,750 sqm	341,754 sqft
Total	**514,700 sqm**	**5,540,184 sqft**

ANCILLARY FLOORSPACE

Units K	1,600 sqm	17,222 sqft
Total	**1,600 sqm**	**17,222 sqft**

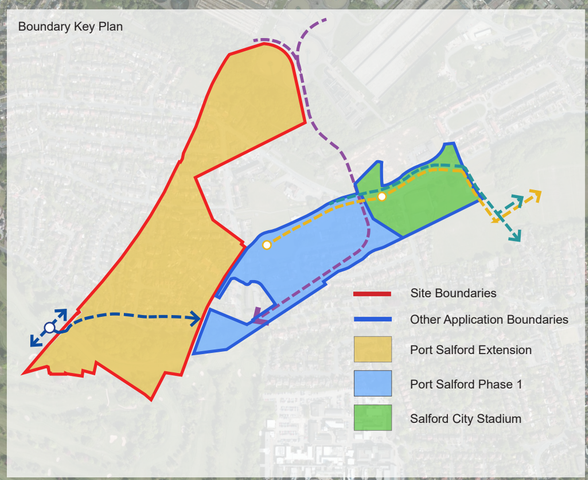
OVERALL TOTAL	**516,300 sqm**	**5,557,406 sqft**

Attenuation Feature
Attenuation Feature
Potential Outfall
Potential Outfall
Swale / Ditch
Attenuation Feature
Swale / Ditch
Potential Outfall
Attenuation Feature
Swale / Ditch
Attenuation Feature
Attenuation Feature
Potential Outfall
Swale / Ditch
Attenuation Feature
Potential Outfall
Attenuation Feature

Liverpool to Manchester Railway
M60 Motorway
PEEL GREEN
Peel Green Cemetery
CHAT MOSS
Unit A
Unit B
Unit C
Unit D
Unit E
Unit F
Unit G
Unit H
Unit I
Unit J
Units K
Runway
City Airport
Airport Buildings
Heliport
Foxhill Glen
A57 Liverpool Road
Salford City Stadium
Port Salford Phase 1
Port Salford Extension
Port Salford Extension
M62 Motorway
Manchester Ship Canal
Leisure/ Community Building
Rhenus Logistics
Irlam FC
IRLAM
A57 Liverpool Road

HIGH LEVEL INDICATIVE SUDS DEATURES

Boundary Key Plan



Key

- Site Boundary
- Other Boundaries: Port Salford Phase 1 & Salford City Stadium
- Approved Rail Connection
- Western Gateway Infrastructure Scheme (WG15)
- Safeguarded Route for Proposed Metrolink Extension (subject to approval)
- Existing Woodland and Vegetation
- Existing Settlement
- Existing Overhead Line and Easement
- Existing Main Bus Route
- Proposed Vehicle Access
- Proposed Red Diesel Vehicle Access
- Proposed Red Diesel Route
- Proposed Building
- Proposed Primary Road
- Proposed Service Yard/Car Parking
- Methane Extraction Compound
- Potential Gateway Feature
- Proposed Green Space
- Proposed Tree Planting
- Proposed Woodland Structure Planting
- Potential SUDS Attenuation, Swales and Waterbodies
- Proposed Key Footpath Cycle Route
- Existing Public Right of Way

1. Access into site from new M62 - A57 Link Road
2. Red Diesel Route connecting to Port Salford Phase 1
3. Landscaped private estate road with boulevard tree planting and footpath cycleway
4. Parking area
5. Public Right of Way with 3m wide footpath cycle route
6. Landscape buffer, planted with native woodland structure planting
7. Attenuation and swales as SUDS
8. Methane extraction compound
9. A57 Liverpool Road Improvements
10. A57 Footpath Cycle Links
11. Potential M62 - A57 Link Road
12. Proposed Pedestrian Access
13. Proposed ancillary development comprising petrol filling station, drive through and pub/restaurant
14. Replacement ponds at a ratio of 2:1
15. Footpath cycleway connection between A57, Irlam and Chat Moss
16. Public Right of Way to be diverted

Scale Bar

0 100 200 500m

Rev	Description	Drawn	Approved	Date
B	Land use breakdown amended and area schedule added	NKH	NKH	15/03/19
A	Amended site boundary	SO	NKH	14/03/19

THE ENVIRONMENT PARTNERSHIP
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project: GM Allocation 33 Port Salford Extension

Title: Composite Masterplan

Drawing Number: IN6746.01.003B

Drawn	Checked	Approved	Scale	Date
EL	NKH	NKH	See scale bar	13/03/2019

8 First Street
Manchester
M15 4RP

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