Hull Royal Infirmary Masterplan Part 2

2.5.2 Relevant Local Plan Policy

The following Local Plan policies are likely to be relevant to the HRI masterplan:

Housing Allocation, Policy 3

The housing requirement for Hull is a minimum of 9,920 (net) new homes during the period 2016 to 2032 (620 dwellings per year).

On the Housing Allocation sites associated with the area of study, Allocation ref. 164 (5 hectares) is allocated for 610no. dwellings, and Allocation ref. 450 (0.73 hectares) is allocated for 82no. dwellings. No additional development brief is provided for these allocations.

Hospital, Policy 13

Development to create, expand or alter health facilities, including at Hull Royal Infirmary, will be supported where they do not conflict with other key planning objectives.

Open Space, Policy 42

Schemes that increase open space provision, particularly in order to rectify identified deficits, will be supported.

The open spaces associated with the area of study are Ref. 75 (0.31 hectares) - Amenity Green Space south of Hull Royal Infirmary; and Ref. 86 (4.21 hectares) - Railway triangle east of the MKM Stadium. The railway triangle is also highlighted as a natural / semi-natural green space, a Green Network site, and likely a Local Wildlife Site.

Relevant Supplementary Planning Documents

Adopted SPDs which may be relevant to the masterplan include:

- SPD 3 - Environmental Quality
- SPD 4 - Living with Water
- SPD 7 - Residential Design
- SPD 10 - Trees
- SPD 11 - Protecting existing and providing new open space
- SPD 12 - Ecology and Biodiversity
- SPD 14 - Healthy Places Healthy People

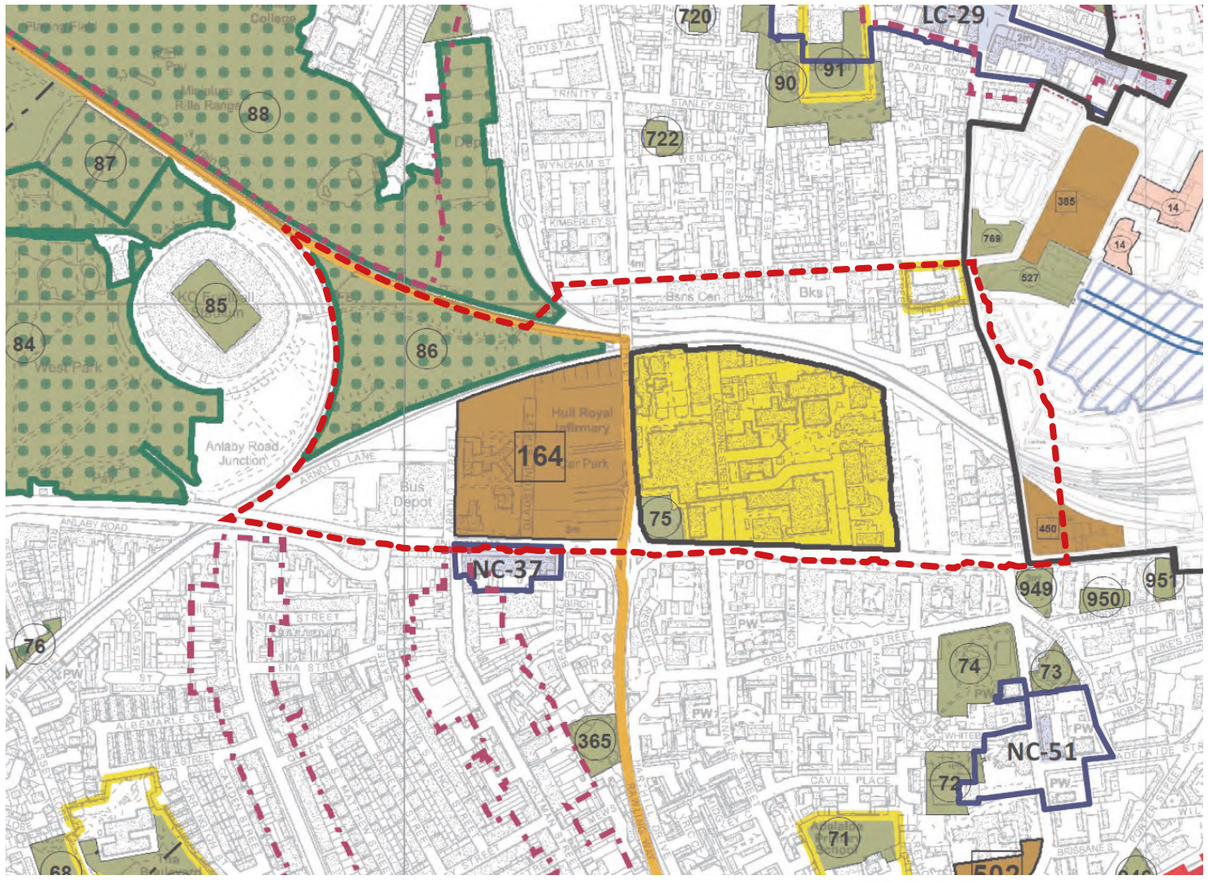

Figure 2.13: Extract from the Hull Local Plan 2016 - 2032 Policies Map, with site red line overlaid

2.6 Development & Existing Uses

2.6.1 Development Context

A three-storey extension to the HRI existing ward tower block is in construction, and will form a new front entrance to the hospital from Anlaby Road. Along with associated landscaping, this is due to be completed in 2022.

The Allam Diabetes Centre adjacent to Anlaby Road and the Women & Children's Hospital was opened to patients in January 2022.

A new three-storey Intensive Care Unit was constructed adjacent to the existing Emergency Department at HRI, and was completed in December 2021.

A number of modular clinical accommodation blocks have also been constructed across the hospital site in recent years.

Figure 2.14: Visual of the new hospital entrance extension, designed by Race Cottam Architects.

Figure 2.15: Site photograph of the Allam Diabetes Centre, designed by ACA.

2.6.2 Site Ownership

The area of study covers land with varied ownership, as shown in the diagram adjacent.

A large portion of the land within the study area is owned either by the City Council or by one of the NHS Hospital Trusts.

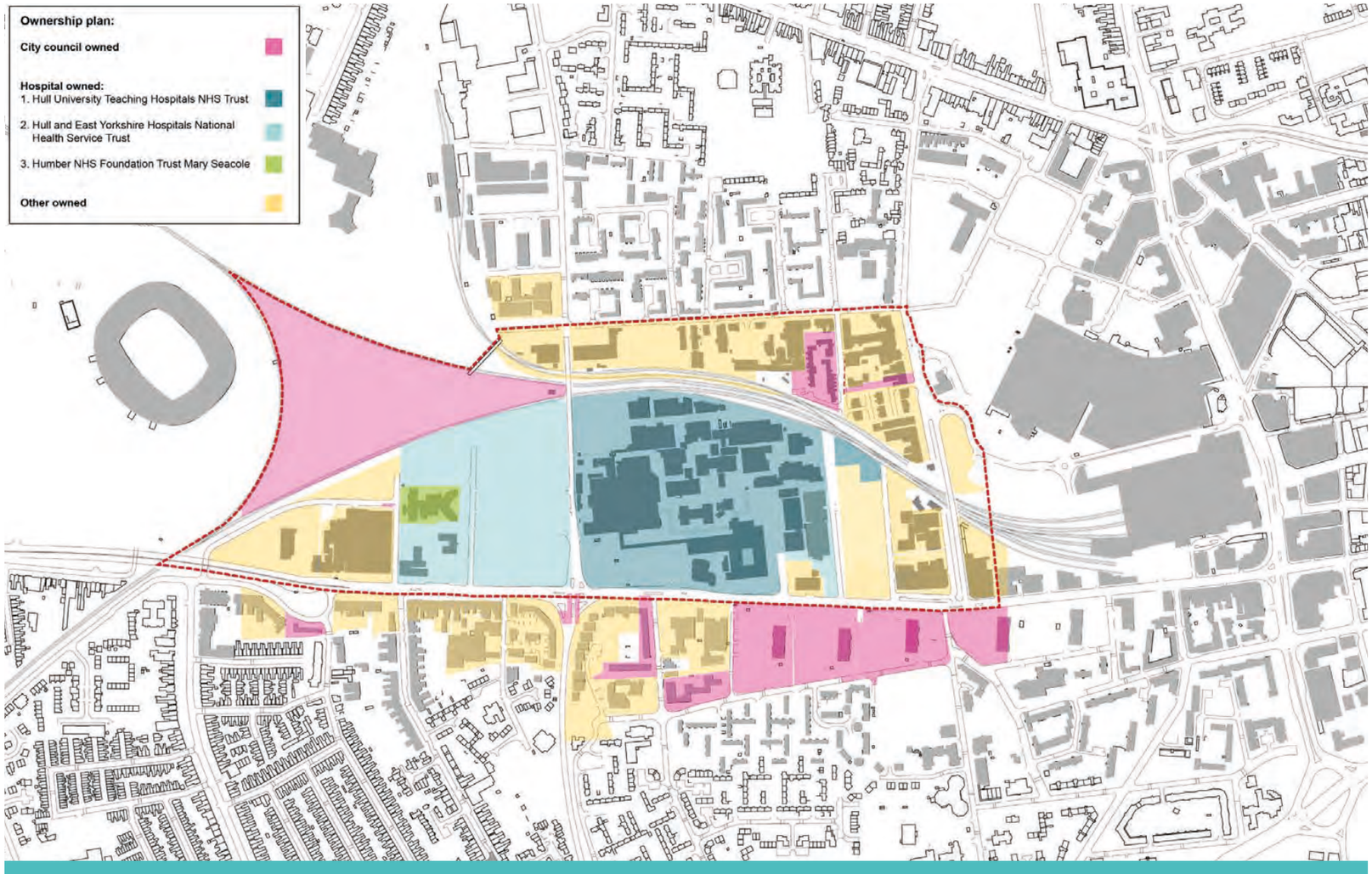

Figure 2.16: Site ownership plan

2.6.3 Existing Building Uses

Building uses tend to be grouped across the area in clusters, such as NHS healthcare use, commercial, residential and mixed use. Zones grouped by building use are shown in the adjacent diagram.

Figure 2.17: Site relationship to wider city centre and existing zones of use

Figure 2.18: Existing Building Uses in and around the site

2.6.4 Age of the Estate

The Hull Royal Infirmary encompasses a range of building ages, with the initial hospital development constructed in the 1960s. This means that a number of the key hospital buildings are over 30 years old.

01	North Block East	48	Retail Units
02	North Block West	50	Multi-storey Extension
03	South Block East	51	Day Surgery Unit
04	South Block West	55	VIE 1 Compound
08	Boiler House	56	Tulley Building
09	Admin/Resources	58	Interim Sub Station
10	Estates Offices/Stores/ Capital Development	60	VIE 2 Compound
		61	Utilities Building
11	Meter Room/Lamp Store	63	Porters Facility
12	Public Health Lab Annexe	64	Allam Diabetes Centre
13	Alderson House	65	Temporary Office Accommodation 2
14	Inflammable Stores		
15	Medical Gas Stores	66	Eye Hospital
16	Services Intake Building	67	Women & Children's Hospital
17	Workshops	71	Bereavement Service
18	Pathology Department	72	Neuro-Physiology & Liaison Psychiatry
19	RMO's Quarters		
27	RTEC Centre	73	Medical Gas Store (W&C)
28	RMO's Plant Room	74	Medical Gas Store (Argyle St)
29	Oil Tanks	75	Empty Cylinder Store
30	Therapies Centre	82	Catering, Store & Offices
31	Facilities	83	YAS Cabin
32	Craven Building (Maxillofacial)	84	Hull Renal Unit
33	Water Storage	85	Clinical Skills & Dermatology
34	HV Switchroom	87	Ambulatory Care Unit/ Occupational Therapy/ MDU
35	ERMEC/ HYMS		
37	Generator House	88	Ward 500
38	Cycle Shed	89	De-Con Equipment Store
40	MRI Unit	90	Generator House
44	Orthopaedic Unit	91	The Anlaby Suite
45	Generator House/Sub Station	92	Ward 36
46	The Wilson Building	93	Trolley Wash
47	H.S. Brocklehurst Building		

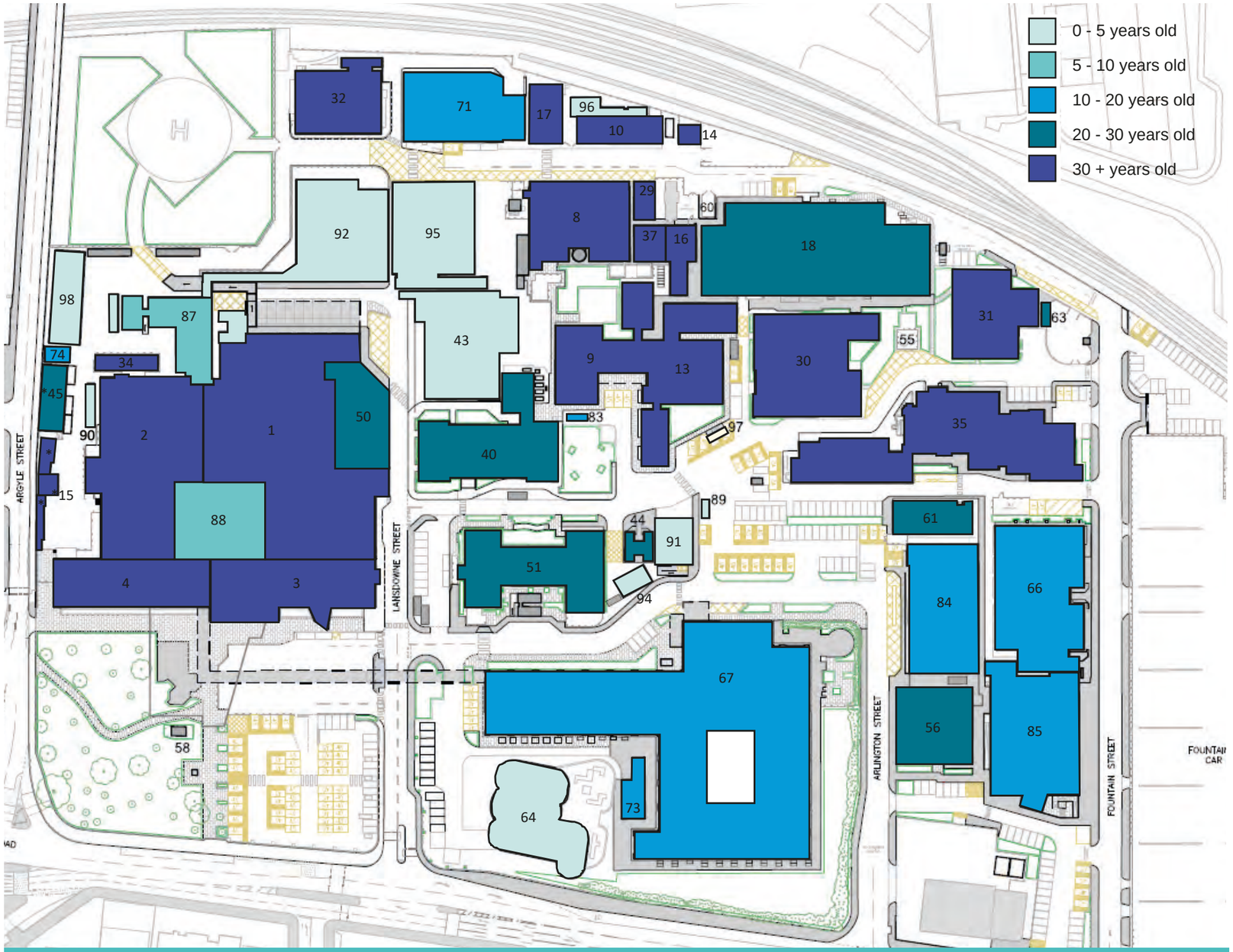

Figure 2.19: Plan of HRI Site showing building ages

2.6.5 Existing Massing

The adjacent diagram and photographs show the variety of building height and massing within and adjacent to the area of study.

1 Low and medium density residential and mixed use buildings along Anlaby Road

2 High-rise hospital ward tower and a range of building heights within the HRI site

3 High-rise residential buildings to the south of Anlaby Road, closer to Hull City Centre

Figure 2.20: Diagram showing estimated existing building storeys for the wider site area

2.6.6 Site Clearance & Demolition

A number of hospital buildings are to be demolished and the services within them relocated elsewhere on site where possible. The adjacent diagram shows which existing hospital buildings are to be retained and which will be demolished to make way for new construction, improved circulation and public realm.

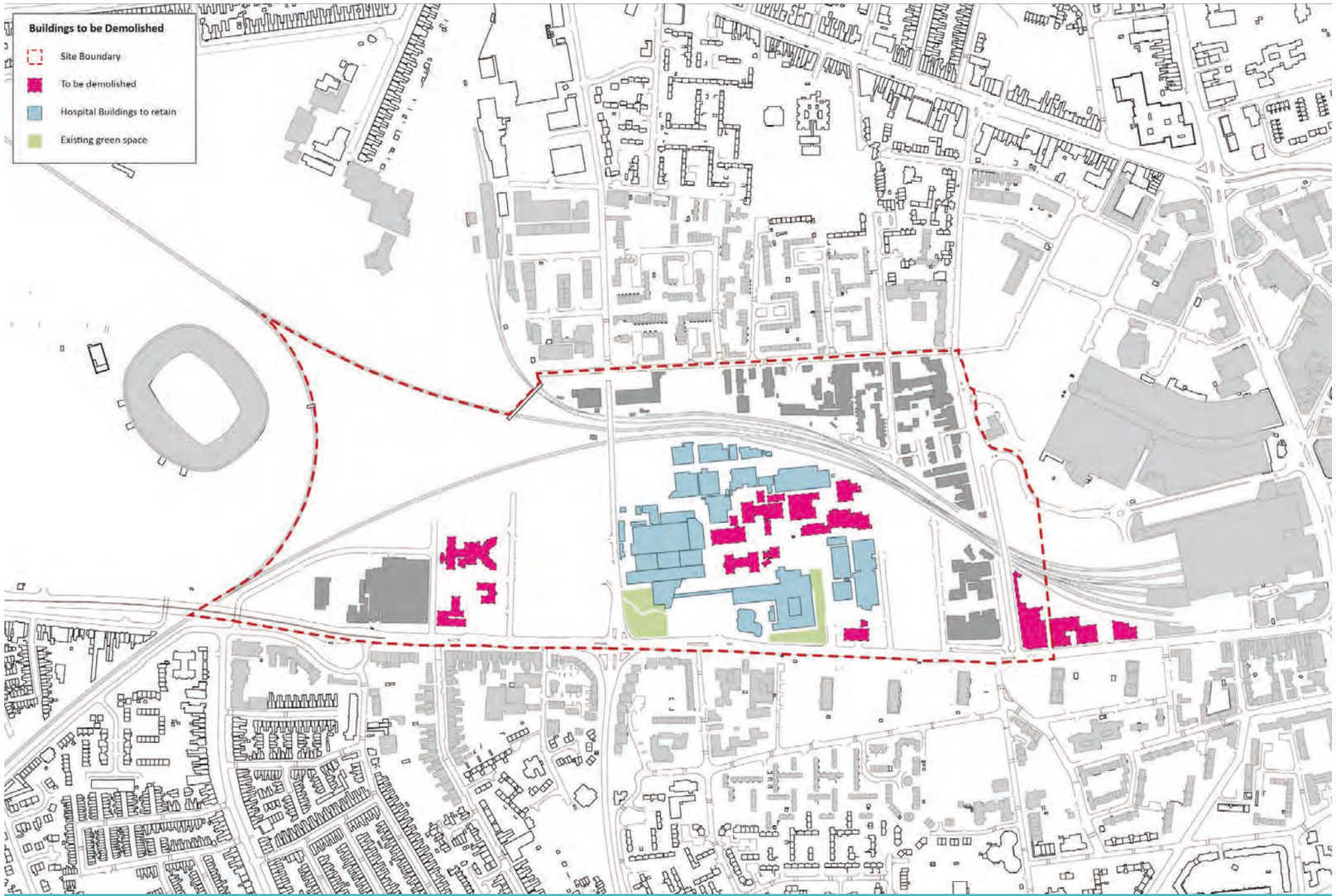

Figure 2.21: Existing active travel routes & facilities

2.7 Flooding

2.7.1 Overview of City Flood Risk

Hull City Council's Strategic Flood Risk Assessment (2016), prepared inline with the National Planning Policy Framework (NPPF) and accompanying Planning Practice Guidance (PPG), provides guidance in relation to site-specific flood risk issues and informs elements of the Local Plan Process, such as the progression of site allocations.

The vast majority of the city of Hull is located within Flood Zone 3- the zone where risk of flooding is highest. Most of the city is defended from flood risk through a variety of flood alleviation structures, including engineered walls, embankments, storage lagoons and pumping. This limits the probability of flood risk to much of the city, however in the case of a breach or overtop of existing defences, safe access and evacuation are key tools for mitigating risk. This includes requirements for a 'place of safety' set above the design flood level, integral to new developments.

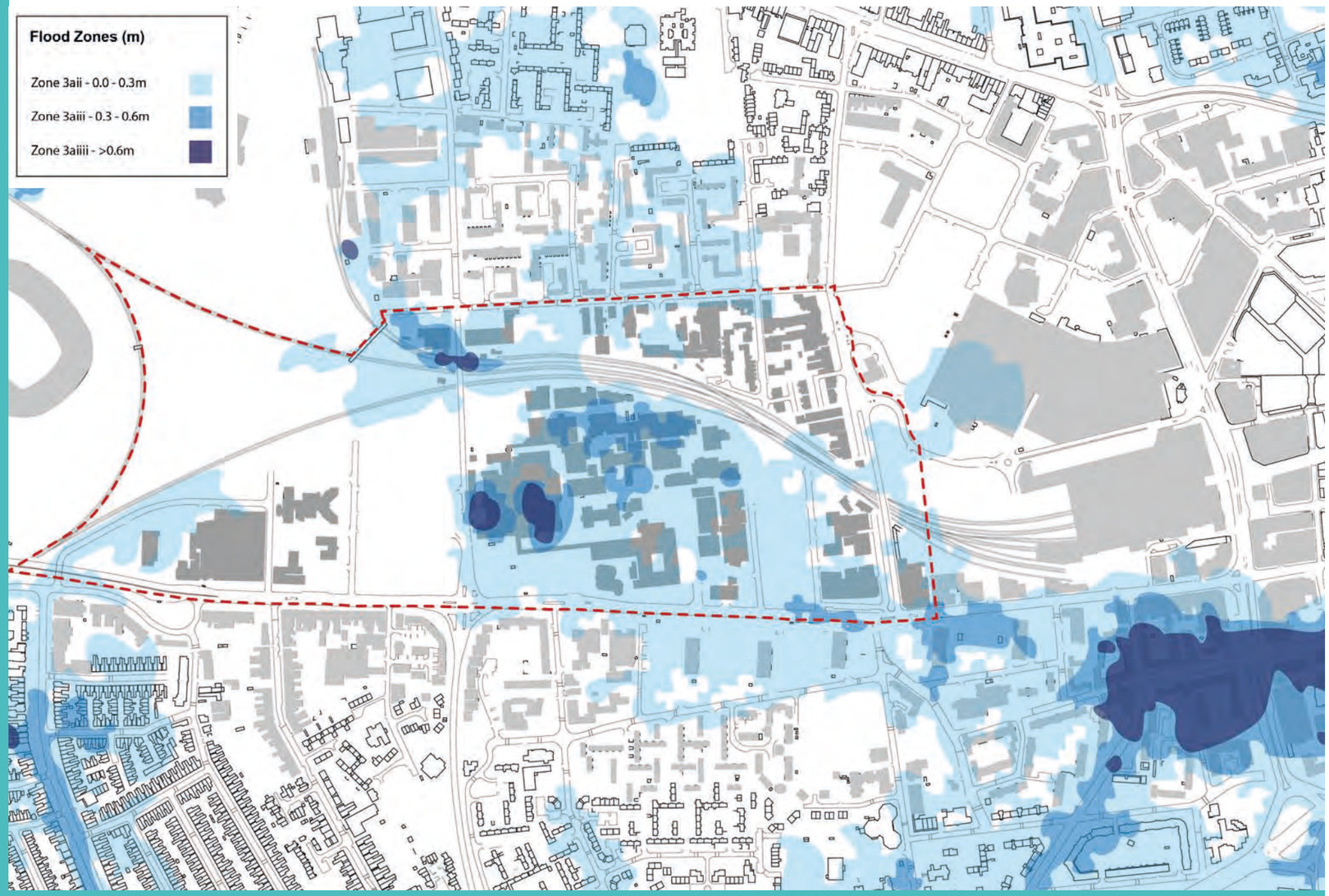

Figure 2.22: Flood Risk Map for HRI and surrounding area (data from Hull City Council My Hull Maps)

2.7.2 Overview of Site Flood Risk

Hull Royal Infirmary is predominantly located in an area where the majority of land is between 600 - 900mm of flood risk, with smaller parts of 900 - 1200mm, and some small sections exceeding 1200mm. This places the HRI in one of the highest flood risk areas within Hull, therefore flood risk issues, mitigation and resilience should be key focuses for any future development on the site.

Further development on the HRI site should not only ensure that it meets the recommendations set out in the Strategic Floor Risk Assessment for Hull, but that it forms part of a cohesive approach to flood alleviation across the site. A holistic approach utilising various Sustainable Urban Drainage Systems (SUDS), water attenuation and engineering solutions is needed to limit flood risk across the site as a whole, and create a resilient healthcare campus for the HRI.

2.7.3 Fluvial Flood Risk

The Environment Agency's Flood Map shows the site to be wholly located within Flood Zone 3, defined as land having a greater than 1 in 100 year annual probability of flooding from rivers or 1 in 200 year annual probability of flooding from the sea. Based on the location of the site, the main source of flooding is considered to be tidal flooding from the Humber.

The flood map also shows the site to be in an area benefitting from flood defences, which indicates that there is a level of protection to the site, however, there is still a high risk of flooding if the defences are overtopped or breached.

As such, in accordance with the National Planning Policy Framework (NPPF), a site-specific flood risk assessment and Sequential Test will need to be undertaken to support any forthcoming Planning Application. The Hull City Council Strategic Flood Risk Assessment (SFRA) acknowledges the limited availability of land in Flood Zones 1 and 2 and has therefore produced more refined flood zone maps, dividing Flood Zone 3 into four sub-zones to aid with the Sequential Test.

The split is based on design flood depths for present day climate change, assuming current defence levels, from the following flood sources:

- Overtopping of flood defences (1% fluvial, 0.5% tidal)
- Breaching of defences (1% fluvial, 0.5% tidal)
- Surface Water (1% event)

Flood depth bands used are:
- FZ3ai (low): No flooding in the design event but still within Flood Zone 3a
- FZ3aii (medium 1): 0.0 - 0.3m
- FZ3aiii (medium 2): 0.3 - 0.6m
- FZ3iv (high): >0.6m

Using Hull City Council's mapping service, the site is shown to be predominantly located in Flood Zones 3ai and 3aii (low to medium risk). However, there are some areas in the centre of the site that fall within 3aiii and 3aiv (medium to high risk). The Environment Agency acknowledge within their consultation response that the location of the Hull Royal Infirmary is fixed and therefore cannot be relocated to an alternative site. However, given the varying levels of risk within the site , the Sequential Test should be applied to the Masterplan layout with the aim to locate "more vulnerable" developments in the lower risk areas.

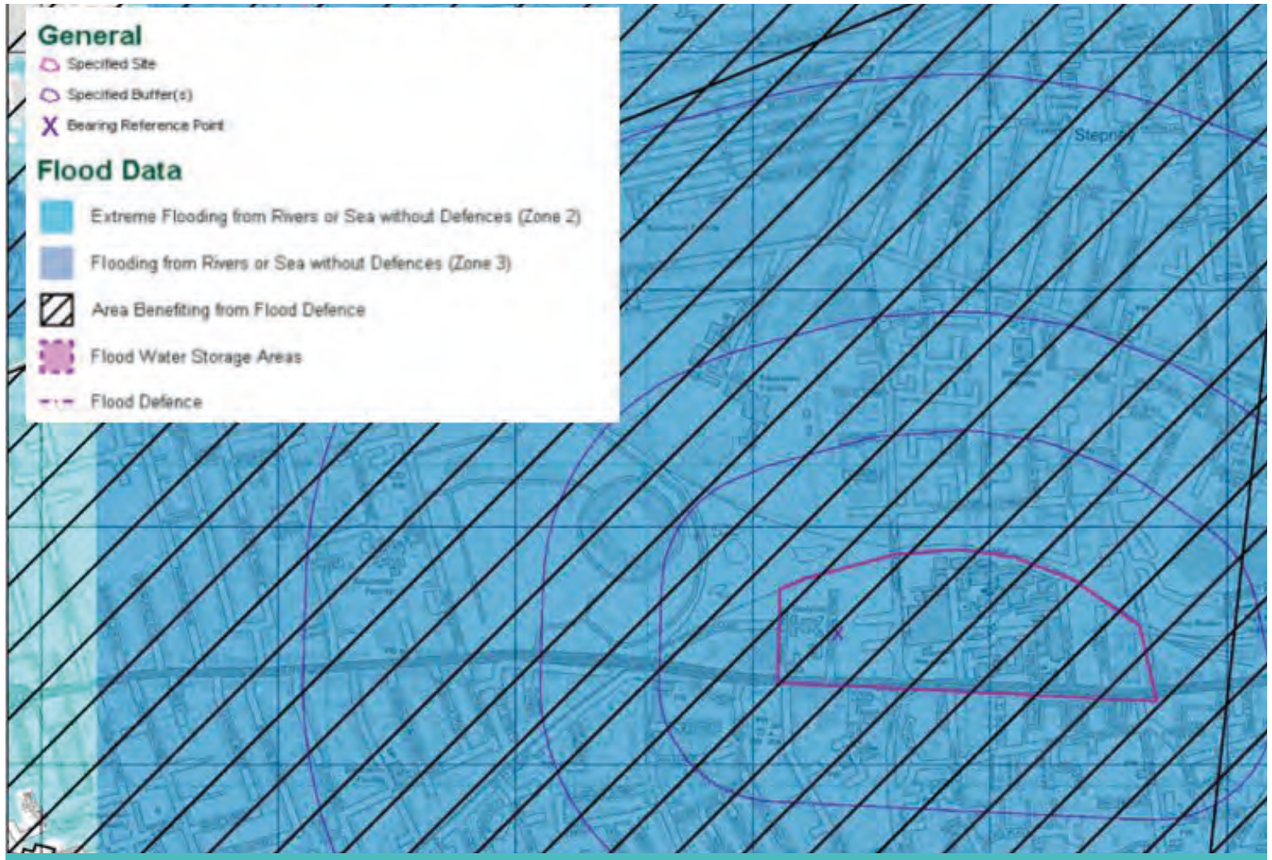

Figure 2.23: Environment Agency Flood map for Planning (Envirocheck)

Figure 2.24: Extract of Flood Map from Hull City Council online Mapping Service

2.7.4 Mitigation Requirements

In accordance with Hull City Council's Standing Advice and as supported by the Environment Agency, specific mitigation measures should be applied to the proposed development based on the anticipated depth of flooding shown on Figure 13 – "Flood Zones for Exception Test" contained within the Hull Strategic Flood Risk Assessment (SFRA).

The map indicates that to the west of Argle Street, the flood depths predominantly range from 0.0 to 0.3m to 0.3 to 0.6m, whereas to the east flood depths are predominantly in the region of 0.6 -0.9m.

In the event that the finished floor levels cannot be raised to the recommended levels stated in the table above, then flood resilience measures should be incorporated up to the predicted flood depths shown in Figure 13. If this is also not possible then all sleeping and habitable accommodation should be moved to upper floors, above potential flood depths. This is supported by the Environment Agency's initial draft consultation, which agreed to the proposal of under croft parking, receptions and waiting areas as feasible uses on the ground floor.

However, the introduction of new buildings on previously undeveloped or flat areas of land will reduce the area in which water can be stored during a flood event, subsequently increasing the potential risk of flooding to the existing buildings that are to be retained. In order to try and minimise this risk the masterplan should aim to provide flood storage compensation. This could be in the form of creating flood storage areas within the amenity space and/or designing buildings to allow the free flow of water underneath i.e., through voids or under crofts.

Figure 2.25: Extract from Figure 13 Flood Zones from Exception test taken from Hull SFRA

Flood Depth (m)	Mitigation Note	Design Considerations
0.0 – 0.3	7	• FFLs to be raised minimum 300mm above average site levels or adjacent road frontage levels, whichever is higher • Additional 300mm of flood resilience measures to be applied above FFLs • Development must incorporate a place of safety above 5mAOD (based on SFRA Figure 15)
0.3 – 0.6	6	• FFLs to be raised minimum 600mm above average site levels or adjacent road frontage levels, whichever is higher • Additional 300mm of flood resilience measures to be applied above FFLs • Development must incorporate a place of safety above 5mAOD (based on SFRA Figure 15)
>0.6m	Developer Advice Note	• FFLs to be raised above predicted flood depth shown in SFRA Figure 13 • Alternatively, a combination of raised FFLs and flood resilience measures should be incorporated up to the level of the predicted flood depths shown in Figure 13 • Development must incorporate a place of safety above 5mAOD (based on SFRA Figure 15)

Figure 2.26: Recommended design considerations taken from the Standing Advice document

2.7.5 Surface Water and Secondary Flood Sources

The Environment Agency's surface water flood map shows the majority of the site to at very low to low risk of surface water flooding, with the central areas indicated as having medium to high risk.

All other sources of flood risk including groundwater, sewer and infrastructure failure are indicated to have a low risk to the site.

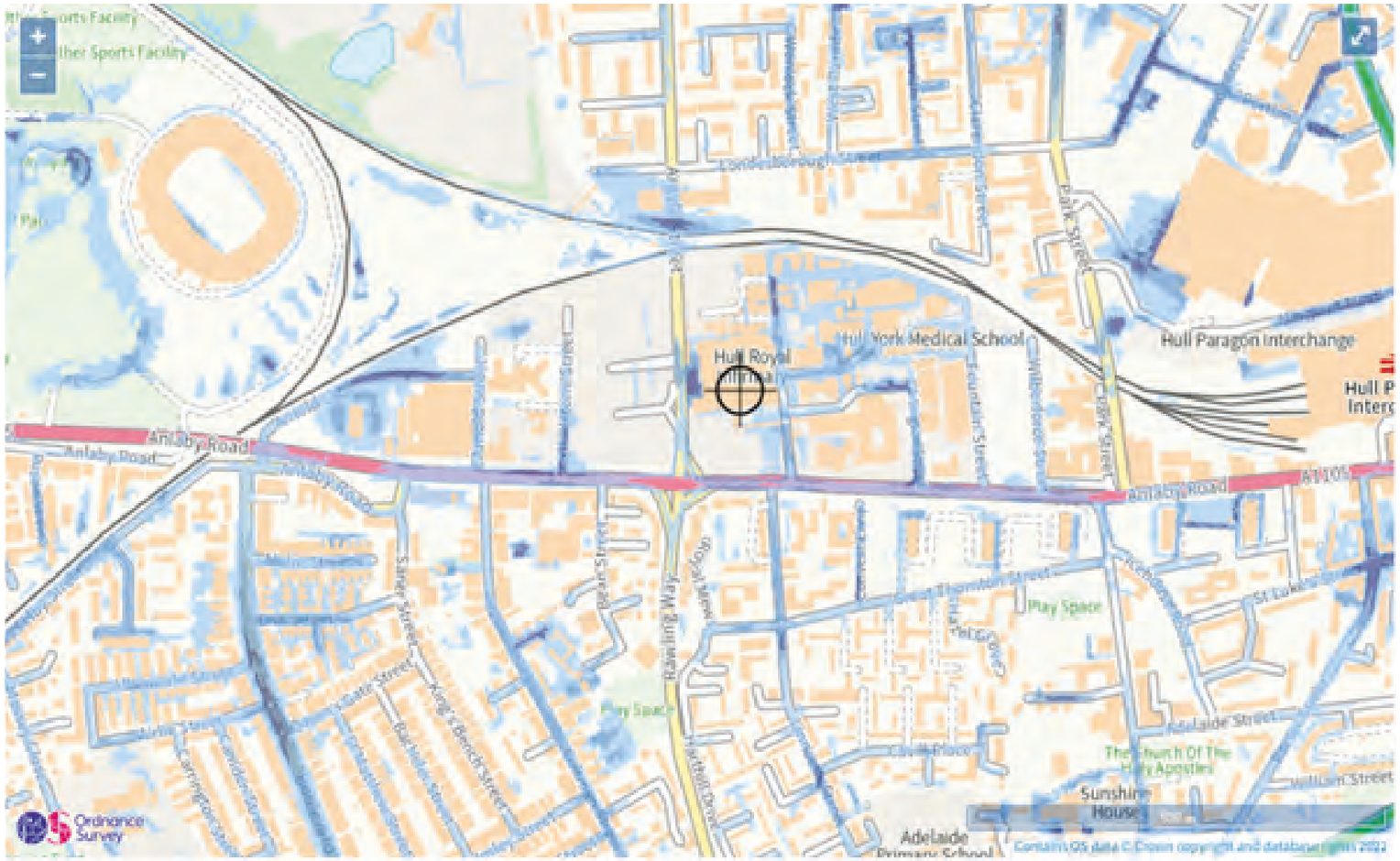

Figure 2.27: Extent of Flooding from Ground water

2.7.6 Foul Water Drainage

A review of Yorkshire Water sewer records indicate that existing foul water flows are likely to discharge into the nearby public combined sewers running through the site. Based on indicative invert levels, a gravity connection is considered to be achievable for the new buildings within the proposed masterplan. Consultation with Yorkshire Water should be undertaken to confirm discharge rates and outfall locations.

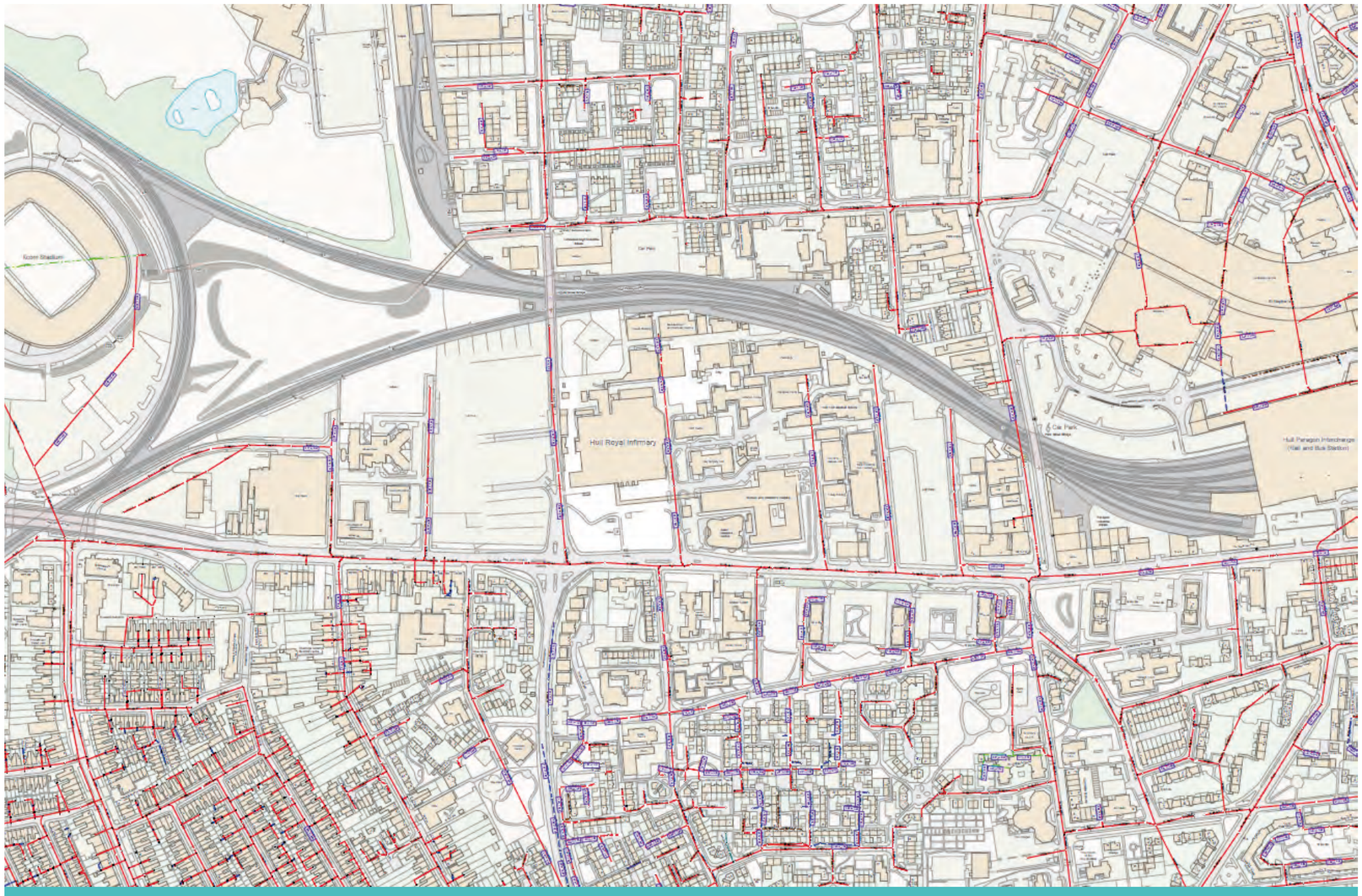

Figure 2.28: Sewer Map Extract

2.8 Environmental Conditions

2.8.1 Site Climate and Sun Path

As detailed proposals are developed and brought forward, further studies exploring site conditions and climate will be crucial in delivering a design which responds to its context whilst being resiliant to future changes such as those associated with climate change.

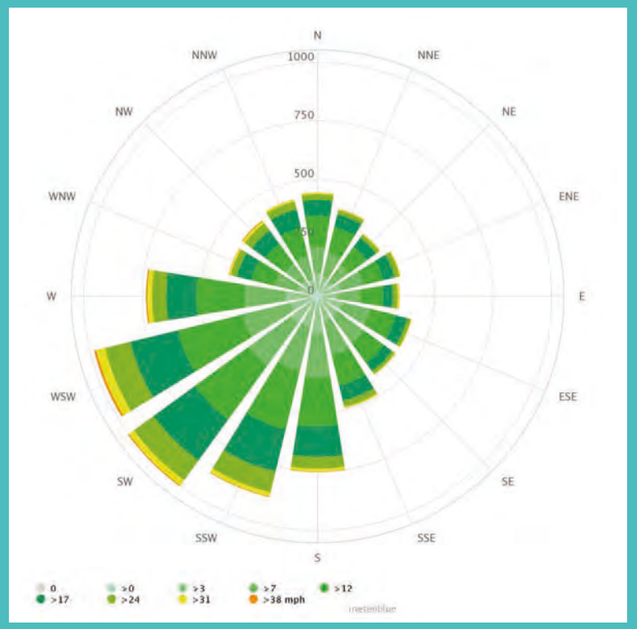

Figure 2.29: Wind Rose for Hull, (© MeteoBlue data & diagram)

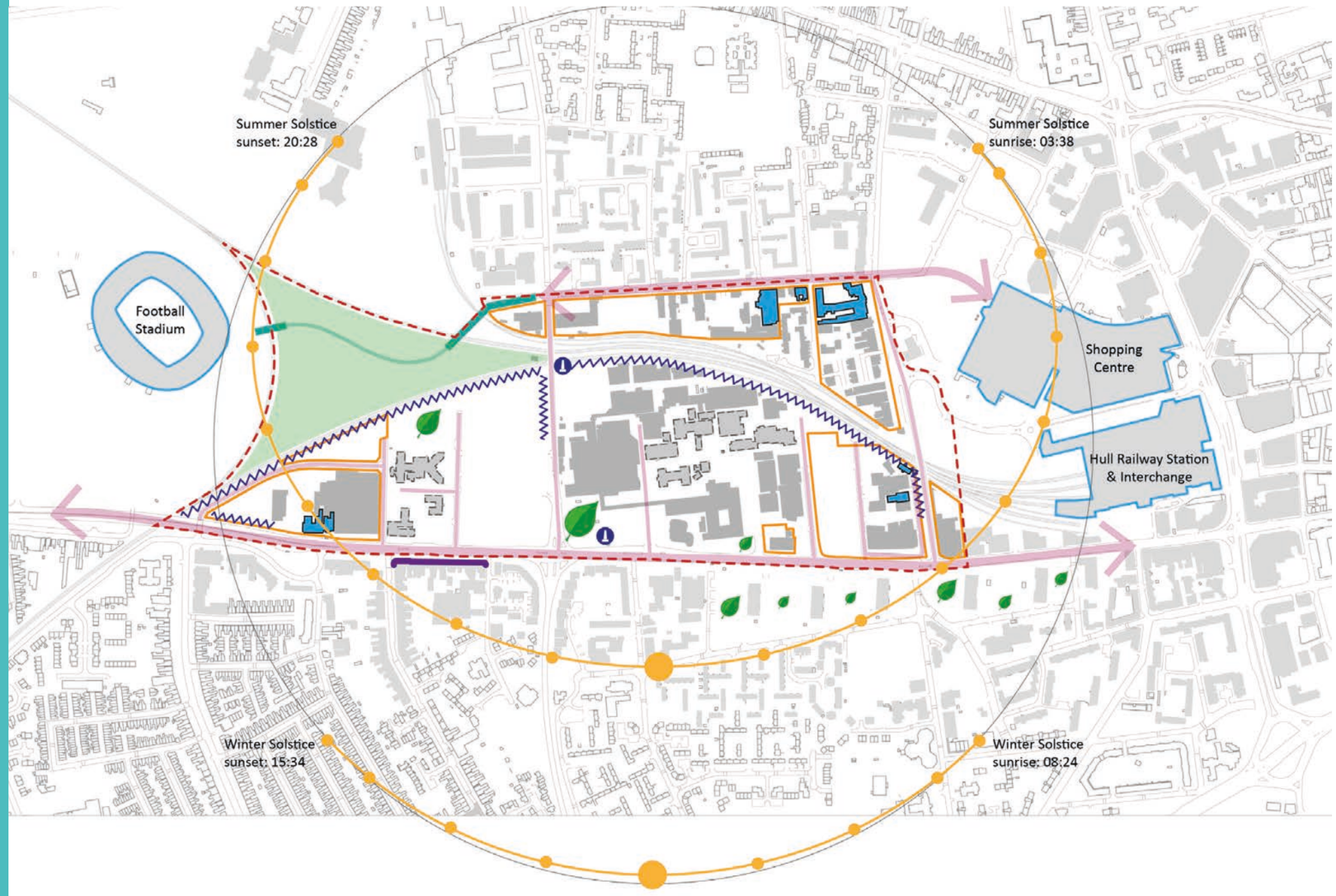

Figure 2.30: Existing Constraints and Opportunities Plan

All development proposals should be cognisant of the sun path (through the day and at different times of the year) and overshadowing from existing structures and potential future development.

As detailed proposals are developed and brought forward, further sun path and overshadowing studies will be critical to demonstrate that proposed buildings and public spaces receive appropriate amounts of sunlight and daylight. It will also be important to consider solar shading and ensure proposed buildings are designed to avoid overheating. Retrofit opportunities to reduce overheating in existing buildings should also be explored.

The prevailing south-westerly wind is an important factor and will need to be considered in future stages to create sheltered areas of public realm and avoid the creation of wind corridors. Future development on the site should be designed to avoid wind tunnel issues.

2.8.2 UXO Risk

Hull was one of the most bombed cities during the Second World War, with only London and Coventry targeted more. Between 1939 and 1945, Hull suffered 82 air raids, and it is estimated that 1213 high explosives, 101 anti-personnel devices and 70 incendiary explosives are still buried. In addition, former airfields and military sites were located nearby.

Therefore, a preliminary risk assessment of the site has been made using Zetica UXO. The historic maps show that the site is within a HIGH UXO risk area, and within 2.8km from a Luftwaffe identified target area.Therefore, it is required that a detailed UXO risk assessment is undertaken prior to any ground works being carried out in the site. Dependant on the outcome of the detailed risk assessment, a risk mitigation strategy may be required to ensure all works are carried out safely.

2.8.3 Radon Risk

As can be seen from the risk map on the right, Hull is in a very low Radon risk area with maximum radon potential under 1%. These assumptions are to be validated at the next stages during the site investigation.

2.8.4 Ground Gas

Due to the presence of made ground in this brownfield site, there is a potential risk for the generation of ground gases and accumulation of these gases within buildings. Under adverse circumstances, gases such as methane and carbon dioxide can build up to hazardous concentrations within confined spaces, giving rise to a potential risk of asphyxiation or explosion. Therefore, gas monitoring will be required to be undertaken in the site to determine the levels of methane, CO2, oxygen and other gases which can be generated by the made ground or backfilled materials. The site investigation will have to install a minimum of 3 wells and at least 3 monitoring visits in 6 months to assess the concentration of ground gases, before providing a ground gas characterisation that will determine any ground gas protection measures required beneath the new building slabs.

2.8.5 Coal Mining

The site of the proposed development is not within a coal mining reporting area.

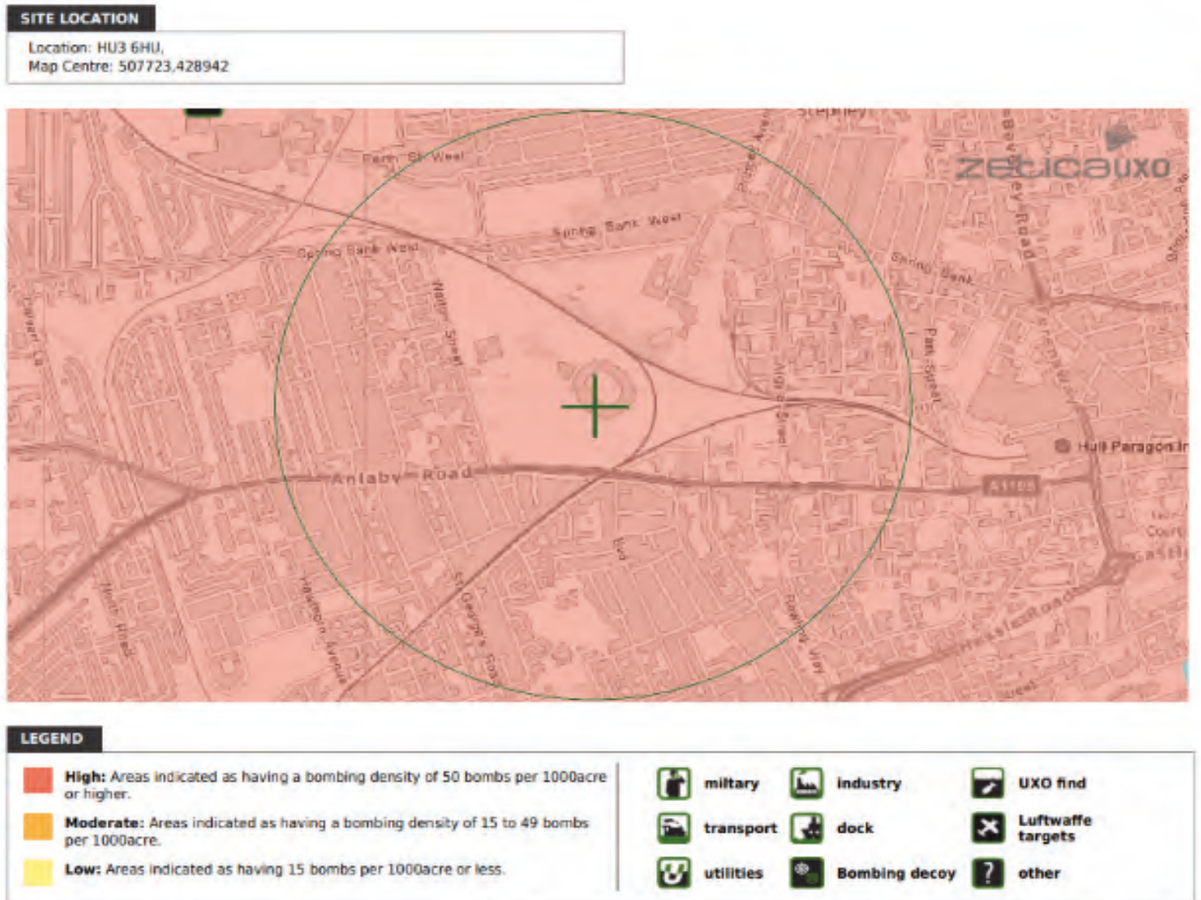

Figure 2.31: Zetica Risk Assessment of Site indicating High Risk Zone

Figure 2.32: Radon Concentrations in the UK showing low radon potential in Hull

2.8.6 Historic Borehole Records

Over the years the historic records show that a number of site investigations have been carried out both, within the site boundary and within close proximity.

The figure on the right summarises the site investigation results for the boreholes adjacent to the site under consideration. As can be seen, all boreholes show similar findings, with a varying depth of made ground, underlain by very soft clay, which turns to stiff clay at around 8m below ground level. The water table was found to vary, between 3m to 5m below ground.

With this in mind, it is likely that any new development will likely be founded on piles in order to transmit building loads to competent strata. Due to the presence of clay, it will be important to investigate the shrinkage potential of this soil, and to understand the susceptibility of the clay to heave, as it may result in the substructure requiring heave protection.
The NHBC building standards state that where soil swelling may be expected to occur, such as in clay soil conditions, and where depth of made ground fill exceeds 600mm, suspended ground floor slabs are to be adopted.

Therefore, it is recommended that further ground investigations are carried out in the targeted sites for the new development to validate the findings of the historic logs and identify any variations in the soil composition or water table that may have occurred over time, aswell as identifying any and contamination or ground gas presence since the last recorded investigation is dated 2000.

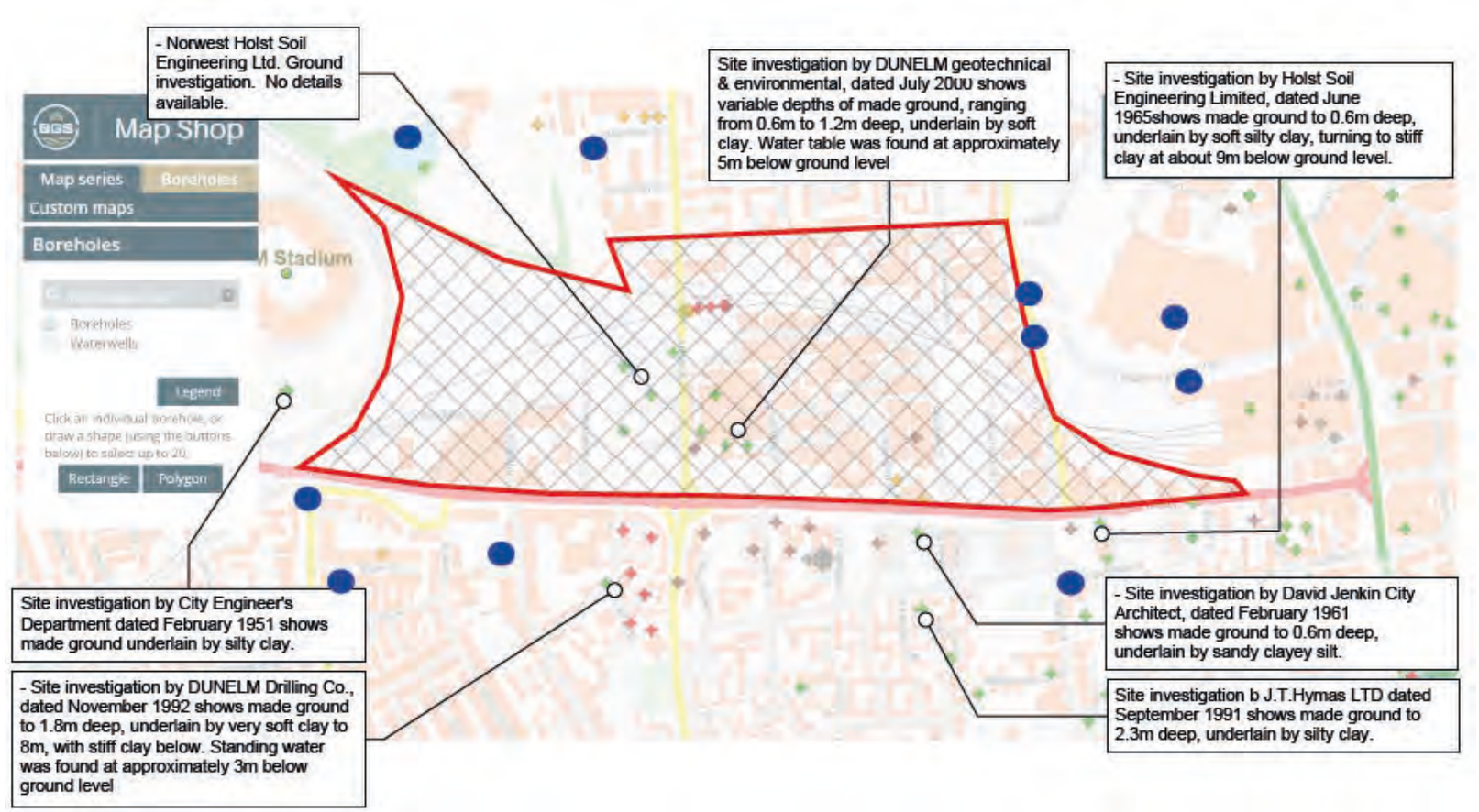

Figure 2.33: Summary of Historical Borehole Information