



Wirral Waters

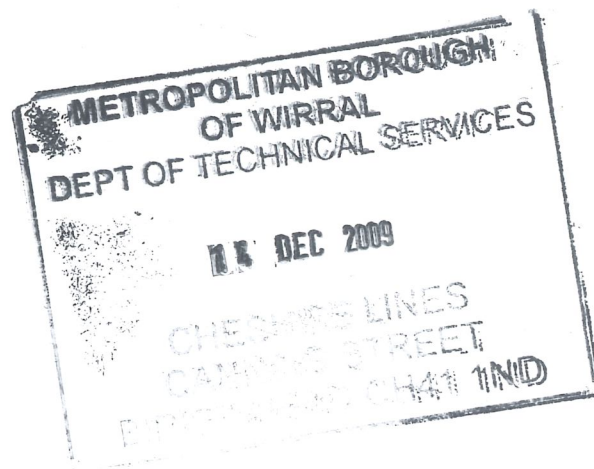
Strategic Regeneration Framework

Guiding Principles: 16. Flood Risk & Drainage

11 December 2009

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09/06509



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Introduction and Summary

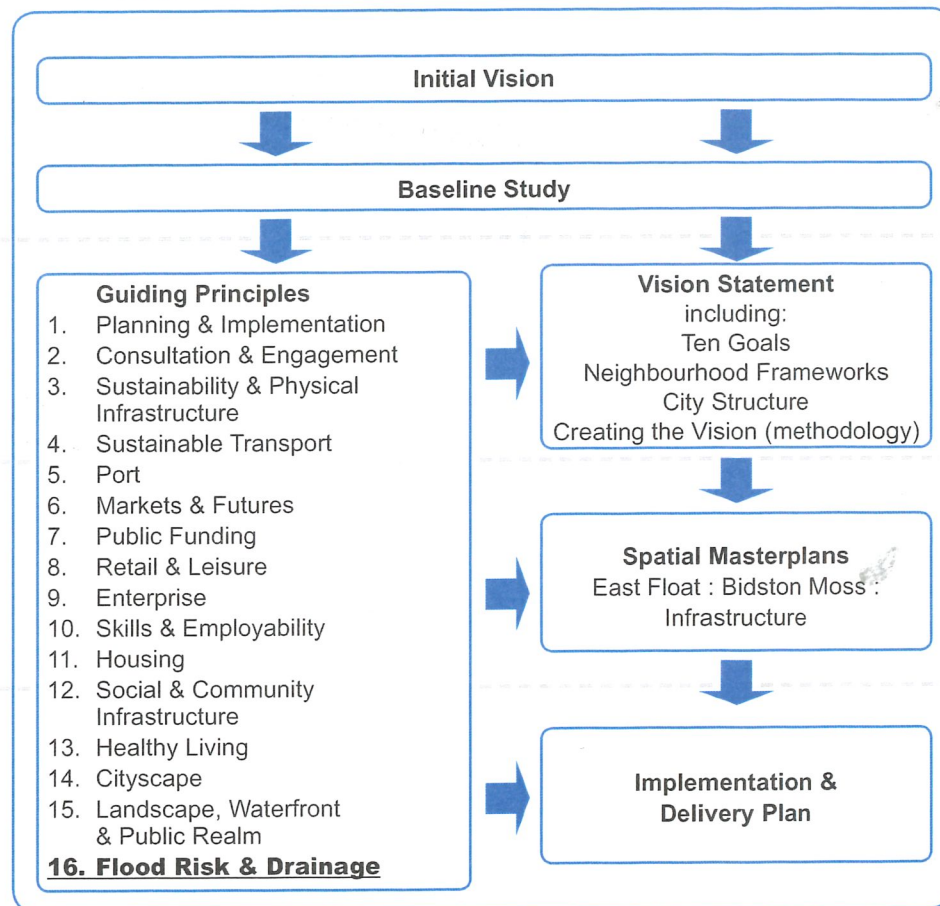
Strategic Regeneration Framework

- 1.1 The vision for Wirral Waters is to create a new city waterfront focussing upon the transformation of Birkenhead and Wallasey Docks and their surrounding neighbourhoods. East Float is to be the principle focus for significant investment, delivering a new residential, commercial, cultural and leisure destination. Delivery of the vision starts immediately and will be continued over a 30+ year timescale.
- 1.2 Wirral Waters is being brought forward through a Strategic Regeneration Framework (SRF). This includes five key stages. Following the Initial Vision (Stage 1) and Baseline Study (Stage 2), a Vision Statement has been produced for Stage 3, which refreshes and expands the Initial Vision through the production of Ten Goals and a series of Spatial Frameworks across 15 neighbourhoods.
- 1.3 The Vision Statement demonstrates how Wirral Waters will act as a catalyst to the sustainable regeneration and growth of Inner Wirral and the wider City Region. It will guide and inform the future evolution of spatial masterplans and the project implementation process.

KEY STAGES

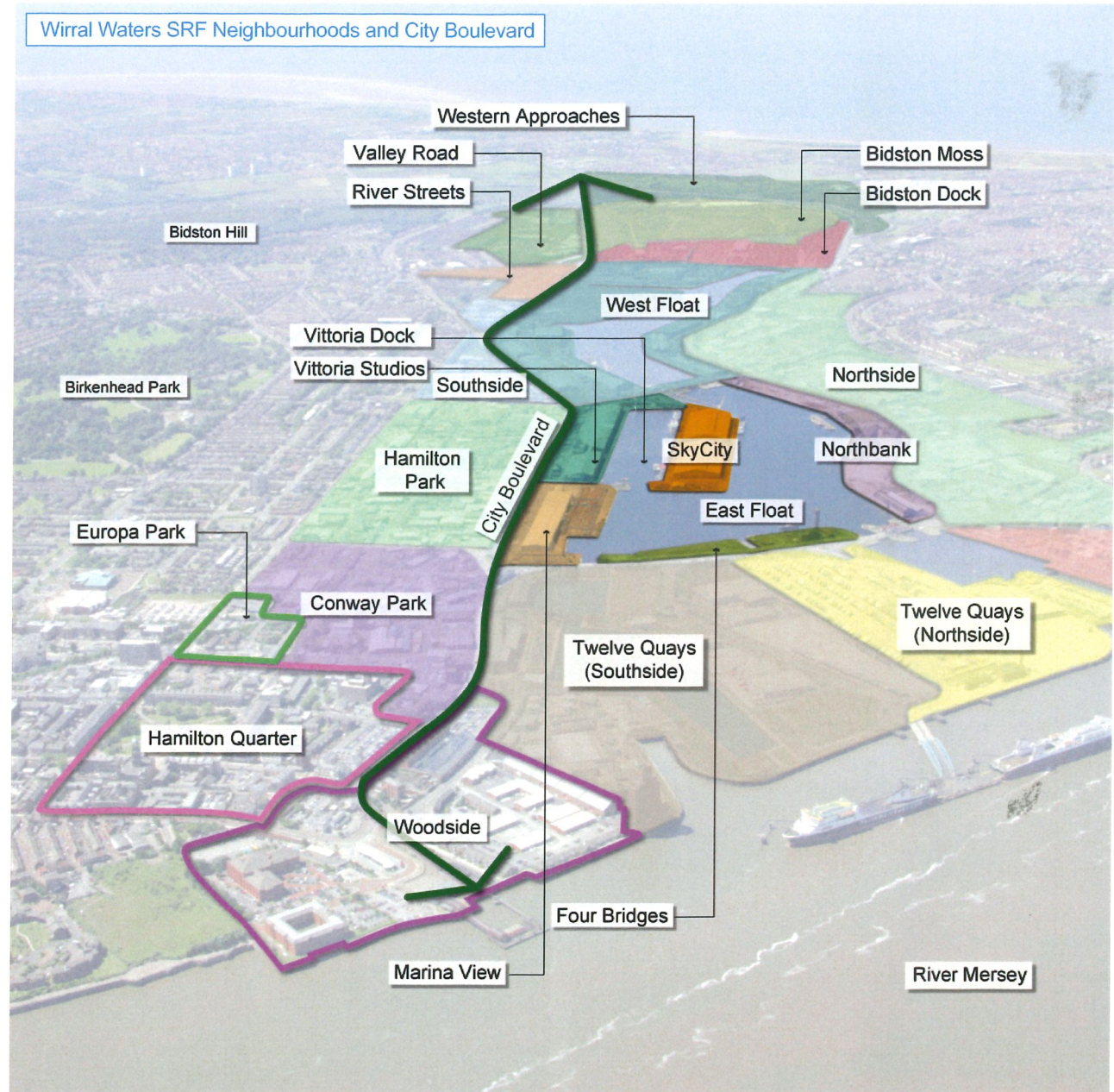


STRATEGIC REGENERATION FRAMEWORK STRUCTURE



Guiding Principles

- 1.4 Alongside the Vision Statement, a number of documents have been produced that set out the 'Guiding Principles' of the project. These are the working embodiment of how Wirral Waters will deliver the Vision. Each Guiding Principles Document is owned by one of the Working Groups established between partners to inform, guide, shape and crucially, realise, the project.
- 1.5 It is intended that each Guiding Principles document can be read and understood in isolation. Further information relating to Wirral Waters can be ascertained by reference to the Vision Statement or other Guiding Principles documents, or indeed other aspects of the SRF such as the Baseline Study or individual project proposals. All such information is available on the Wirral Waters website:
<http://www.peelwaters.co.uk/wirralwaters.html>
- 1.6 Each Guiding Principles document is a snapshot in time and whilst they are intended to be timeless, the implementation process will evolve and be shaped by them. Wirral Waters will also be shaped by and need to respond to external factors, such as economic conditions and climate change, so it is important that the Guiding Principles are maintained and reviewed as and when necessary.
- 1.7 Each Guiding Principles document will be taken forward and delivered through individual masterplans and proposals brought forward within the SRF area, and through partnership working between Peel Holdings, Wirral Council and other key stakeholders such as the Homes and Communities Agency, the North West Regional Development Agency, Merseytravel and a range of other local, regional and national groups.



Document Structure

1.8 For simplicity, each of the Guiding Principles documents is structured in a similar manner, as follows:

- Section 1 introduces the document;
- Section 2 outlines the key issues and, where applicable, the options and opportunities available for addressing the issues;
- Section 3 sets out the overall Guiding Principles;
- Section 4 provides recommendations and next steps;
- Section 5 establishes requirements for monitoring and review.

Consultation

1.9 This document has been published in advance of the submission of the East Float planning application. The Wirral Waters proposals have been the subject of considerable consultation since 2006 to date, as set out within Guiding Principles (2) Consultation and Engagement. It is therefore hoped that these Guiding Principles reflect the aspirations of a wide range of consultees, both community groups and other interested stakeholders, locally, regionally and nationally.

1.10 Comments are nonetheless welcomed and can be made in a number of different ways:

- By email to enquiries@wirralwaters.co.uk
- By completing the form on the website <http://www.peelwaters.co.uk/wirralwaters.html>
- By letter to Peel Holdings, Peel Dome, The Trafford Centre, Manchester, M17 8PL

OUR TEN GOALS

1	Celebrating the past, shaping places for the future	<ol style="list-style-type: none"> 1. Revealing the contrasting identities of the 'Wallasey Pools', and the northern and southern riverbanks 2. 'Completing' and responding to the Laird Town gridiron 3. Restoring the Great Floats as a 'seam' of waterside activity 4. Creating a City Boulevard
2	Creating an internationally recognisable city waterfront	<ol style="list-style-type: none"> 1. Creating signature skylines, buildings and structures 2. Creating city approaches and arrival points 3. Creating a world class waters edge 4. Responding to cultural and environmental assets
3	Creating places of distinction, destinations and market concepts for the 21st century	<ol style="list-style-type: none"> 1. Creating a critical mass of investment centred upon East Float and Bidston Dock capable of triggering the wider regeneration of the adjacent 'partnership' neighbourhoods and beyond 2. Defining East Float as a new city waterfront 3. Defining Bidston Dock as a new destination in the heart of the Wirral Peninsula 4. Creating opportunities for new ways of living, working, learning and playing within a lush parkland and waterside setting – all right in the heart of the City Region
4	Creating a dynamic, prosperous Inner Wirral at the heart of the City Region	<ol style="list-style-type: none"> 1. Shaping clear roles for 'partnership' neighbourhoods joining 'catalysts' neighbourhoods to Wallasey, Birkenhead and the River Mersey waterfront 2. Supporting adjacent regeneration proposals and initiatives through partnership working, joined up thinking and actions 3. Defining West Float and 12 Quays as long term operation port facilities 4. Working in partnership with skills and training agencies
5	Creating world class connections, and access for all	<ol style="list-style-type: none"> 1. Working with partners to promote and deliver a 21st century international, national and regional rail, port, and public transport system 2. Placing people at the heart of high density walkable neighbourhoods with a choice of public transport connections 3. Creating a legible 'City Structure' with safe, easily understood, attractive and animated streets, city parks and public realm
6	Sharing prosperity, health and well-being	<ol style="list-style-type: none"> 1. Supporting existing and creating new community 'hubs' and networks 2. Defining City Boulevard as a neighbourhood 'seam', a structural community, landscape, wildlife and recreational resource 3. Encourage healthy living and active lifestyles
7	Creating an exemplar regional environmental resource	<ol style="list-style-type: none"> 1. Defining Bidston as a pivotal destination at the heart of a Wirral 'Windows on the Waterfront' parkland 2. Placing Bidston and East Float at the heart of a 21st Century waste, water and energy infrastructure network 3. Bringing about transformational change in environmental quality by working with partners in 'greening the city' through long term investment in green and blue infrastructure
8	Securing long term success, starting today	<ol style="list-style-type: none"> 1. Bringing forward 'Early Win' projects and events 2. Creating a critical mass of projects to build confidence 3. Raising the quality and profile of developments to set high quality benchmarks for others to follow
9	Engage & inspire	<ol style="list-style-type: none"> 1. Creating an international profile for Wirral Waters to attract new markets and growth sectors 2. Engaging with local communities and interest groups to explore how Wirral Waters may influence established projects and networks 3. Building confidence and leading by example through our long term vision and investments
10	A robust delivery framework	<ol style="list-style-type: none"> 1. Setting in place a shared programme of action that allows all partners and communities to play a role in realising the Vision 2. Ensure that the benefits and critical mass of the 'catalysts' neighbourhoods trigger and shape change across the 'partnership' neighbourhoods and Liverpool City Region

RELEVANCE OF GUIDING PRINCIPLES

medium
medium
medium
minor
minor
minor
major
minor
minor
major

Summary: Guiding Principles for Flood Risk and Drainage

- 1.11 The Guiding Principles for Flood Risk and Drainage establish strategic principles for the delivery of sustainable development that is protected against flood risk and contributes to sustainable drainage.
- 1.12 Wirral Waters is being brought forward by Peel Holdings. The approach to flood risk and drainage is being developed in partnership with Wirral Council and other organisations, including the Environment Agency. Implementation and delivery will require a partnership approach and rests with the Strategic Delivery Working Group.
- 1.13 An analysis of the Flood Risk Constraints and Opportunities has been undertaken for Wirral Waters. These Guiding Principles build upon that initial analysis, to underpin the Stage 3 Framework and provide a basis for more detailed analysis work through Stage 4 Masterplanning.
- 1.14 The approach is informed by Planning Policy Statement 25 (PPS25) which sets out Government policy on development and flood risk. PPS25 aims to ensure that flood risk is taken into account during all stages of the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is proposed, PPS25 also aims to ensure that it does not increase flood risk to others.
- 1.15 The Wirral Strategic Flood Risk Assessment (SFRA) considers flood issues across the Wirral Waters area. It reconfirms that most of the area is within Flood Zone 1, with some areas within Zones 2 and 3.
- 1.16 Project specific Flood Risk Assessments will be brought forward as appropriate, and will assess potential impacts and mitigation. The sequential approach may be necessary as part of this.
- 1.17 The key issues for Wirral Waters to address will be the management of the dock system, achieving an integrated approach the drainage and SUDS, and managing the potential impacts caused by sea level rises towards the end of the projects design life.



Environment Agency information

- 2.1 The Environment Agency's (EA) internet Flood Zone Map is presented in Figure 2, whilst a 1:10,000 scale Flood Zones map received from the EA is presented with EA correspondence in Appendix 1. The Flood Zones Maps confirm that the majority of the Strategic Regeneration Framework area lies within Flood Zone 1, with the centre of the Site, which corresponds with the central dock channel, and a small area of land principally on the eastern, western and southern fringe of the development located in Flood Zones 2 and 3. The Flood Zones Map also confirms that there are no flood defences recognised by the EA in the Site.
- 2.2 The EA has confirmed that it holds no record of the Site having flooded in the past, but stressed that the absence of recorded information does not mean that the Site has never flooded. The EA has a standard approach across the North West, which requires that all finished floor levels should be set a minimum of 600mm 'freeboard' above the modelled tidal levels.

Wirral Council information

- 2.3 Wirral Metropolitan Borough Council (WMBC) confirmed that it does not have any records of flooding in the Site. WMBC provided further information on the culverts and wastewater treatment facilities located near to the Site which is set out in greater detail in Section 3, The Great Culvert and Site Drainage.
- 2.4 The Council has recently produced its Strategic Flood Risk Assessment (SFRA). It identifies a potential fluvial flood risk to Wirral Waters, but questions the veracity of this and suggests that further analysis is needed. Subject to

resolving this issue, the SFRA confirms that Wirral Waters is an appropriate development. The SFRA recommends careful consideration of climate change impacts. It suggests that the progress of the project, in particular any required design mitigation, should be kept under review, informed by any new guidance issued by Government, especially related to sea level rise projections. A plan extracted from the SFRA, contained at Figure 2, shows the new flood risk categories across the Wirral Waters area.

Mersey Docks and Harbour Company information

- 2.5 The Mersey Docks and Harbour Company (MDHC) has confirmed that water in the docks is maintained at 10m above chart datum, corresponding to 5.07m AOD. The water level is maintained using the Alfred Dock gates, located immediately east of the study area and the use of four pumps; the dock gates comprise double gates allowing for access in high and low tides. The top of each gate is at a level of 6.57m AOD although the pintle (hinge) is slightly lower at 5.56m AOD.
- 2.6 The highest astronomical tide for the Mersey is 5.47m AOD; however, meteorological conditions will further affect this level. For tides greater than 5.07m AOD the Alfred Dock gates can be opened by positive differential pressure from the River Mersey, although the gates would only be partially opened restricting the rate of inflow. The dock area is protected by the two Albert Dock gates and the Albert East Float Passage Gate under a bascule bridge on Tower Road (Four Bridges Road).
- 2.7 The MDHC has confirmed that there is no compulsory set back distance from the dock walls as this will be function of

loading on quay walls, although restrictions would not apply to buildings with piled foundations.

United Utilities

- 2.8 United Utilities (UU) do not have any record of flooding of the sewer system in the vicinity of the Site. UU also provided information regarding the Great Culvert; which is examined in more detail below.

The Great Culvert and Site Drainage

- 2.9 The EA, WMBC and UU were consulted about drainage systems in the Site. UU have confirmed that drainage to the south of the docks system is serviced by the Great Culvert, which runs from the EA's Bidston Control House near the intersection of Wallasey Bridge Road and Beaufort Road in the west to the Shore Road Wastewater Treatment Works (WTW) near Morpeth Dock in the east.
- 2.10 The River Birkett enters the Great Culvert at the EA's Bidston Control House whilst the UU network, both pumped and gravity, connects to the Great Culvert in the vicinity of Corporation Road. The culverted River Birket is diverted to the West Float at this point from an installation maintained by the EA. The Great Culvert flow, then comprising combined sewerage, is pumped to the wastewater treatment works near the Morpeth Dock before discharging treated effluent and screened stormwater to the adjacent dock at low water springmark, and consequently the River Mersey. The River Birket is classified as a Main River although UU have confirmed that the Great Culvert itself is designated in public records as a private sewer.

- 2.11 The EA has confirmed that, according to the Morpeth Dock Pumping Station and River Birket Risk Assessment and Flood Study, in addition to sewerage from the Birkenhead area, the Great Culvert also receives discharge from the Fender Valley sewer.
- 2.12 The Morpeth Dock Pumping Station, once operated by the EA to pump flows from the River Birket to the River Mersey during high tide, is located near the Shore Road WTW but has become redundant with recent upgrades. The EA have investigated the risk of decommissioning this Pumping Station in the Morpeth Dock Pumping Station and River Birket Risk Assessment and Flood Study. A further Water Treatment Plant collecting flows from the north side of the Site within the Wallasey catchment is located on Scottsfield Road, north of Alfred Dock; both are operated by United Utilities.
- 2.13 WMBC have described a number of recent upgrades that have been completed to reduce the volume of water being treated at the Shore Road WTW and subsequently being discharged to the River Mersey. These include a new pumping station being installed at the corner of Buccleigh Street and Beaufort Road and a Diversion Chamber on the River Birket being constructed by the EA to pump base flows directly to the West Float. During storm events, high flows of the River Birket are able to overflow into the Great Culvert to the WTW at Shore Road to reduce the risk of fluvial flooding.
- 2.14 Wastewater from the Scottsfield Road WTW, located north of the Alfred Dock, is also pumped beneath Alfred and Morpeth Docks to the Shore Road WTP.

PPS25 and the Sequential Test

- 2.15 The PPS25 sequential test requires developers and local authorities to seek opportunities to relocate existing development to areas at lower probability of flooding. Development within Flood Zones 2 and 3 for (varying categories of) vulnerable development will be subject to the sequential test.
- 2.16 In accordance with the sequential approach, land uses considered 'more vulnerable' such as residential should be placed in the lower risk areas whilst land uses considered to be 'less vulnerable' such as commercial and retail may be placed in the higher risk areas as guided by the SFRA. PPS25, Annex D Table D.2 and D.3 set out the requirements and are presented below.

PPS25, Annex D: Table D.2: Flood Risk Vulnerability Classification

Vulnerability Classification	Description
Essential Infrastructure	<ul style="list-style-type: none"> Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk, and strategic utility infrastructure, including electricity generating power stations and grid and primary substations.
Highly Vulnerable	<ul style="list-style-type: none"> Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding. Emergency dispersal points. Basement dwellings. Caravans, mobile homes and park homes intended for permanent residential use. Installations requiring hazardous substances consent.
More Vulnerable	<ul style="list-style-type: none"> Hospitals. Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels. Non-residential uses for health services, nurseries and educational establishments. Landfill and sites used for waste management facilities for hazardous waste.²⁰ Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	<ul style="list-style-type: none"> Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in 'more vulnerable'; and assembly and leisure. Land and buildings used for agriculture and forestry. Waste treatment (except landfill and hazardous waste facilities). Minerals working and processing (except for sand and gravel working). Water treatment plants. Sewage treatment plants (if adequate pollution control measures are in place).
Water - compatible Development	<ul style="list-style-type: none"> Flood control infrastructure. Water transmission infrastructure and pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel workings. Docks, marinas and wharves. Navigation facilities. MOD defence installations. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

PPS25, Annex D Table D.3: Flood Risk Vulnerability and Flood Zone 'Compatibility

Flood Risk Vulnerability classification (see Table D2 PPS25 Annex D)	Essential Infrastructure	Essential Infrastructure	Highly Vulnerable	Highly Vulnerable	Highly Vulnerable
Flood Zone (see Table D.1 PPS25 Annex D)	Zone 1	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓
	Zone 3a	Exception Test required	✓	x	Exception Test required
	Zone 3b 'Functional Floodplain'	Exception Test required	✓	x	x

Topographical Surveys

- 2.17 Topographical surveys will be undertaken for the Wirral Waters area. These may confirm or provide different findings to the assumed site levels in both the EA's defined flood risk maps and/or the emerging SFRA.
- 2.18 The topographical survey undertaken for the Northbank East site confirmed that the site was in fact entirely within flood risk zone 1 rather than being mostly within zone 1 and partly within zones 2 and 3. The sequential test was therefore not required on the Northbank East site. Further consultation will continue with the EA and WMBC, informed by topographical surveys and the findings of the SFRA, as the masterplanning process evolves for Wirral Waters. This will to ensure agreement over:
- determining flood risk zones;
 - the scope of information required to support proposed developments;
 - required finished floor levels; and
 - the approach to mitigation (including SUDS).

Flood Risk

Tidal Flood Risk

- 2.19 The closest watercourse to the Site is the River Mersey, which flows in a northerly direction approximately 400m east of the Site. The Mersey, which has the second highest tidal range in the UK, is tidally influenced at this location, with fluvial flows around 1% of tidal flows, as such the EA have not modelled fluvial flows on the Mersey and flood risk shall be assessed based on its tidal characteristics.
- 2.20 As shown in Appendix 1, the EA's 1:10,000 scale Flood Zones map, the majority of the Site is located within Flood Zone 1, with small areas located within Flood Zones 2 and 3. The Flood Map suggests that the south bank of the Docks is more flood prone than the north including an area slightly further inland near the intersection of Corporation Road and Vittoria Street.
- 2.21 Extreme tidal flood levels, based on the Wirral ABD (Areas Benefitting from Defences) Report of 2008, are as follows
- 6.26m for the 1 in 200 year flood event; and
 - 6.51m for the 1 in 1000 year flood event.

2.22 Additionally, the EA has advised that an allowance for the potential effects of climate change must be taken into account, in line with PPS25. In the Flood Risk Assessment undertaken for the Northbank East planning application, this was calculated as 1.02m from 2010 to 2110. This includes 0.87m for sea level rise and a 0.15m allowance for greater storminess.

2.23 The requirements under PPS25 to account for a freeboard above the climate change level will influence the Masterplanning and detailed design of the Site.

Fluvial Flood Risk

2.24 The north of the Wirral Peninsula is drained by the River Fender, Arrowe Brook and Greasby Brook which drain into the River Birket. The River Birket, classified by the EA as Main River, flows east through an open channel until it reaches EA's Bidston Control House, where it enters the Great Culvert and is subsequently discharged into the West Float.

2.25 Fluvial flood risk may be effectively be discounted for the majority of the Site located east of the Great Culvert but requires further analysis as recommended by the SFRA.

Groundwater Flood Risk

- 2.26 A Phase 1 Environmental Investigation has been carried out, which identifies that the Birkenhead Dock area is underlain by made ground, surficial deposits of alluvium and glacial till and bunter sandstone at depth. The EA classify the Made Ground and surficial deposits as a Non Aquifer and the Sandstone as a Major Aquifer.
- 2.27 Given the non aquifer classification and likely impermeable nature of the underlying geology, groundwater flooding is not considered to pose a significant threat to the Site. However, the groundwater regime is expected to be tidally influenced, with the groundwater level expected to fluctuate with the tide, this will be considered further through Flood Risk Assessments.
- 2.28 Intrusive investigations will be undertaken at the appropriate stage to confirm groundwater levels and hence any associated constraints to development.

Surface Water Runoff

2.29 Sewer records received for the SRF area indicate that much of the southern Site drains north and east into the Great Culvert, whilst the northern Site drains south and east towards Dock Road and ultimately to the Scottsfield WTW. It is considered likely that, given the history of development in the Site, private sewer records may not be recorded or maintained.

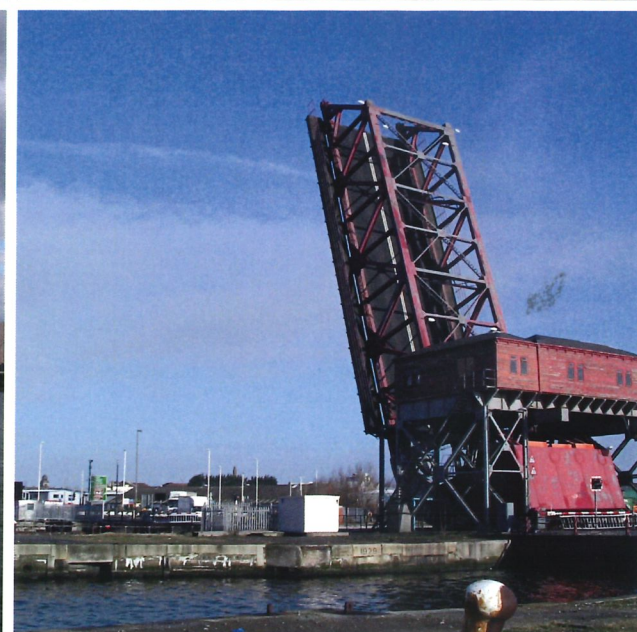
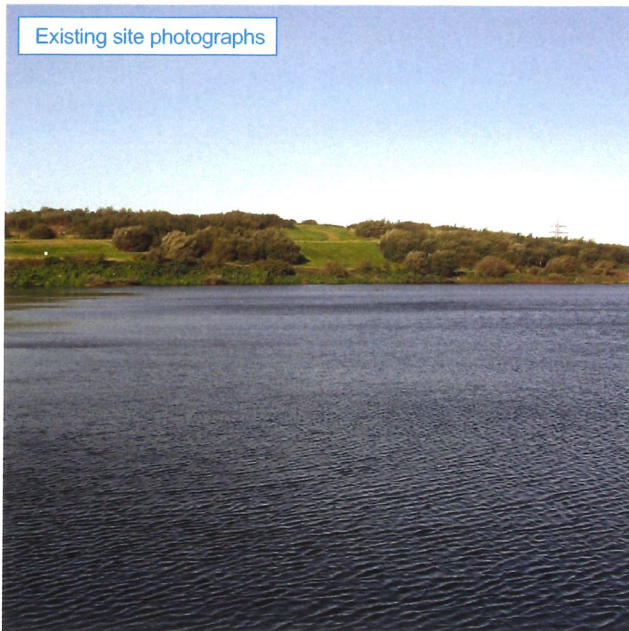
2.30 As a minimum, the EA will require that post development surface water runoff rates do not exceed the current rate, including an allowance for climate change. To maintain the existing discharge rate, the EA has stated that evidence of the current discharge rate must be provided, and any substantial changes to the discharge regime must be accounted for. As this Site is likely to be used for a mixture of land uses including residential, a 30% increase in rainfall intensity must be applied to account for climate change. This requirement will ensure that the development does not increase flood risk elsewhere.

2.31 To reduce surface water runoff and allow for a 30% increase in rainfall intensities throughout the lifetime of the development, as specified in PPS25, Sustainable Urban Drainage Systems (SUDS) are likely to be required. The use of SuDS may be restricted by groundwater levels and potential ground contamination originating from historical land uses. Additionally, as shown in Figure 3, the Site lies within an area identified as a Groundwater Source Protection Zone, which would limit the use of infiltration techniques if contamination is present on site.

2.32 The EA aspires to restrict the rate of discharge from new developments to the green field runoff rate for any given storm event and specifies that the drainage system should be designed to control runoff for up to the 1 in 100 year rainfall event. United Utilities (UU) have stated that, without details of flow rate and point of connection to the public sewer, the impact of any development is difficult to predict. UU should be consulted with regards to discharge requirements and capacities of the public sewer when more details of the development proposals are available.

Summary of Issues

2.33 The EA records and the SFRA have identified areas of tidal flood risk predominantly to the south of the Birkenhead Docks area, whilst the potential for some



- fluvial flood risk is identified to the west of the area. Topographical surveys will be required as proposals are brought forward to accurately determine the extent of the floodzones. Alternatively, LIDAR data could be obtained to confirm the areas that would be at risk of flooding over the lifetime of the development. The flood depths can then be quantified and appropriate land uses considered, ensuring that vulnerable development is at the lowest risk of flooding in line with the PPS25 sequential approach.
- 2.34 The EA requires that finished floor levels should have a freeboard above the 200 year tidal flood level. PPS25 requires that an allowance for sea level rise due to climate change is also made. Climate change will be calculated using a methodology acceptable to the Environment Agency and is guided by the SFRA.
- 2.35 Mitigation measures may be required to maximise the development potential; these could include raised ground levels, the strengthening of lock gates, and/or the taking of a managed adaptive approach.
- 2.36 For those sites identified as being at risk of tidal flooding there is no requirement under PPS25 for flood compensation storage if ground levels are raised, as tidal flood risk is influenced by gravitational effects rather than volumes. However, development identified as at risk of fluvial flooding may require compensatory flood storage if any ground levels are raised.
- 2.37 The design life of buildings will be a key consideration for tidal flooding given that climate change predictions towards the end of a projected design life may affect the required finished floor level at construction.
- 2.38 If defences are strengthened, the issue of breach and residual risk may need to be addressed. Areas behind flood defences can be at particular risk due to the risk of the defences being over-topped or breached, resulting in the rapid onset of fast-flowing and deep water flooding with little or no warning.
- 2.39 Flood resilience and flood resistance should be encouraged in building design, such as through the use of kitemark flood resilience products, to ensure that any residual risk is minimised.
- 2.40 In the event of the realisation, or exceedance of calculated climate change scenario, the issue of safe access and egress in the event of an extreme flood will need to be addressed over the lifetime of development within the Site. Safe refuge areas and flood management plans may be required.
- 2.41 An opportunity exists to open up the culverted River Birket and restore the natural floodplain through construction of a semi-natural river channel along the culverted section of the River Birket, between the Great Culvert and point of discharge into the West Float. This would create an opportunity for an amenity space with potentially significant environmental and ecological value, as well as increasing the financial value of the surrounding land. Opening up the culverted River Birket would effectively allow for an increase in watercourse capacity and reduction of fluvial flood risk, by allowing flooding to be controlled in areas remote from vulnerable buildings.
- 2.42 The Great Culvert is the primary surface water sewer for the south of the Site, and its ownership, capacity and status need to be clearly defined prior to development in the vicinity, or discharge to of stormwater/foul water. The 'Morpeth Dock Pumping Station and River Birket Risk Assessment and Flood Study' may help confirm the role of the Great Culvert in drainage of the Site.
- 2.43 Surface water from the new development could potentially be drained by infiltration into the ground, into the dock, and/or to the local sewerage network. In relation to the sewerage network, it is likely that discharge will need to be reduced to the existing or greenfield rates, requiring the use of SUDS; further work will be necessary to confirm the proposed methods of drainage, including consultation with the statutory authorities.
- 2.44 The MDHC has confirmed that there is no compulsory set back distance from the dock walls as this will be function of loading on quay walls, although restrictions would not apply to buildings with piled foundations. It will be necessary to consult the MDHC once the development proposals have been further developed.



Flood Risk

- 3.1 The Guiding Principles for Flood Risk and Drainage underpinning the Wirral Waters Vision and Development Framework is based on the best information and analysis available, and upon consultation with key parties including Wirral Council, the Environment Agency and United Utilities.
- 3.2 This information confirms that the majority of the SRF area is outside on Zones 2 and 3 and is therefore less likely to be constrained by flood risk or drainage issues. The general appropriateness of the location for major development is therefore considered to be acceptable in flood risk terms.
- 3.3 There will be a need for the Masterplanning work on Wirral Waters to take full account of the flood risk issues and respond to the levels issues highlighted by this report, particularly in respect of climate change, freeboard, design life, mitigation and management.
- 3.4 The design process for different types of uses within different parts of the development will need to mitigate and manage potential risks where required. Detailed Flood Risk Assessments (FRAs) will be undertaken, incorporating sequential testing where required.
- 3.5 Additionally, Peel and Wirral Council will continue to consult with the Environment Agency on Wirral Waters, to ensure that information is shared early, accurately and consistently.

Drainage

- 3.6 A site wide surface water collection system was initially considered, which would discharge to a centralised storage and attenuation location. The centralised storage would act as the collection point for a rainwater harvesting system. However, the size, layout of the development and the phasing of the various sites would make this impractical to achieve. Therefore, it is proposed that each Masterplan Neighbourhood or Quarter provide its own surface water storage and attenuation, linked between sites by a series of overflows which would provide the optimum flexibility and efficiency.
- 3.7 Large public realm areas will be drained using a permeable paving solution and drain to the below ground rainwater harvesting tanks. Car parks and access roads would be drained to a separate system of drainage which would pass through a spirit interceptor, prior to connecting to drain. This surface water would not be collected for rainwater harvesting.
- 3.8 In order to minimise the surface water drainage infrastructure required, the intention is drain into the Birkenhead Dock system, wherever possible, in accordance with PPG5 (ensuring uncontaminated water), passing runoff through an interceptor prior to discharge. This would need to be agreed with the Environment Agency and MDHC.
- 3.9 The Drainage aspects will feed into the Masterplanning process and further consultation will be required.

Water Supply and Recycling

- 3.10 The overall approach to water supply and recycling are contained within the Sustainability and Physical Infrastructure Strategy document. This includes principles to be further explored for building water conservation and recycling (internal and external), rainwater harvesting and grey water recycling.

Further Analysis

- 3.11 It is acknowledged that further analysis needs to be undertaken, to better understand the operation of the dock system and flood risk implication, design issues and potential mitigation.
- 3.12 This work will progress through the masterplanning process in consultation with the Council and the EA.

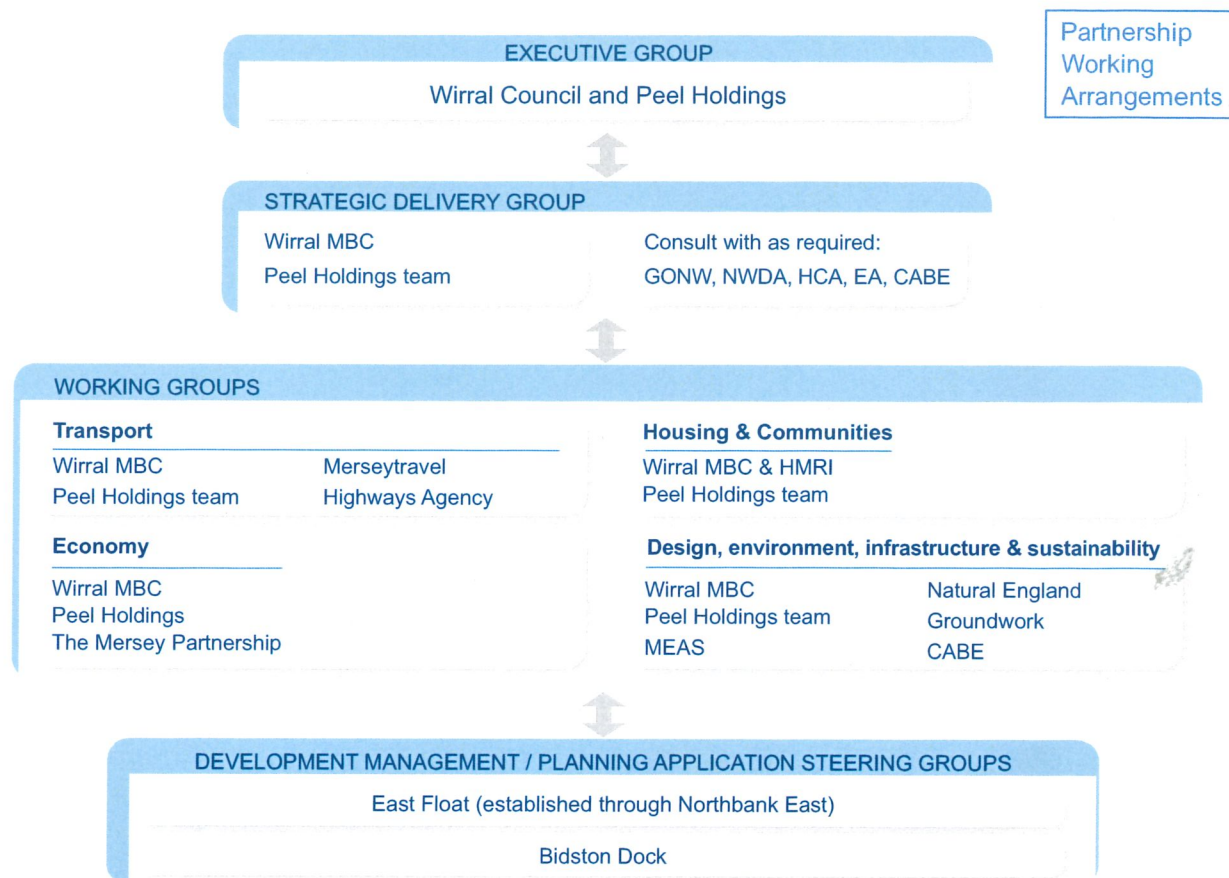
Aerial view of Birkenhead Docks System



Recommendations & Next Steps

4.1 The recommendations and next steps are as follows:

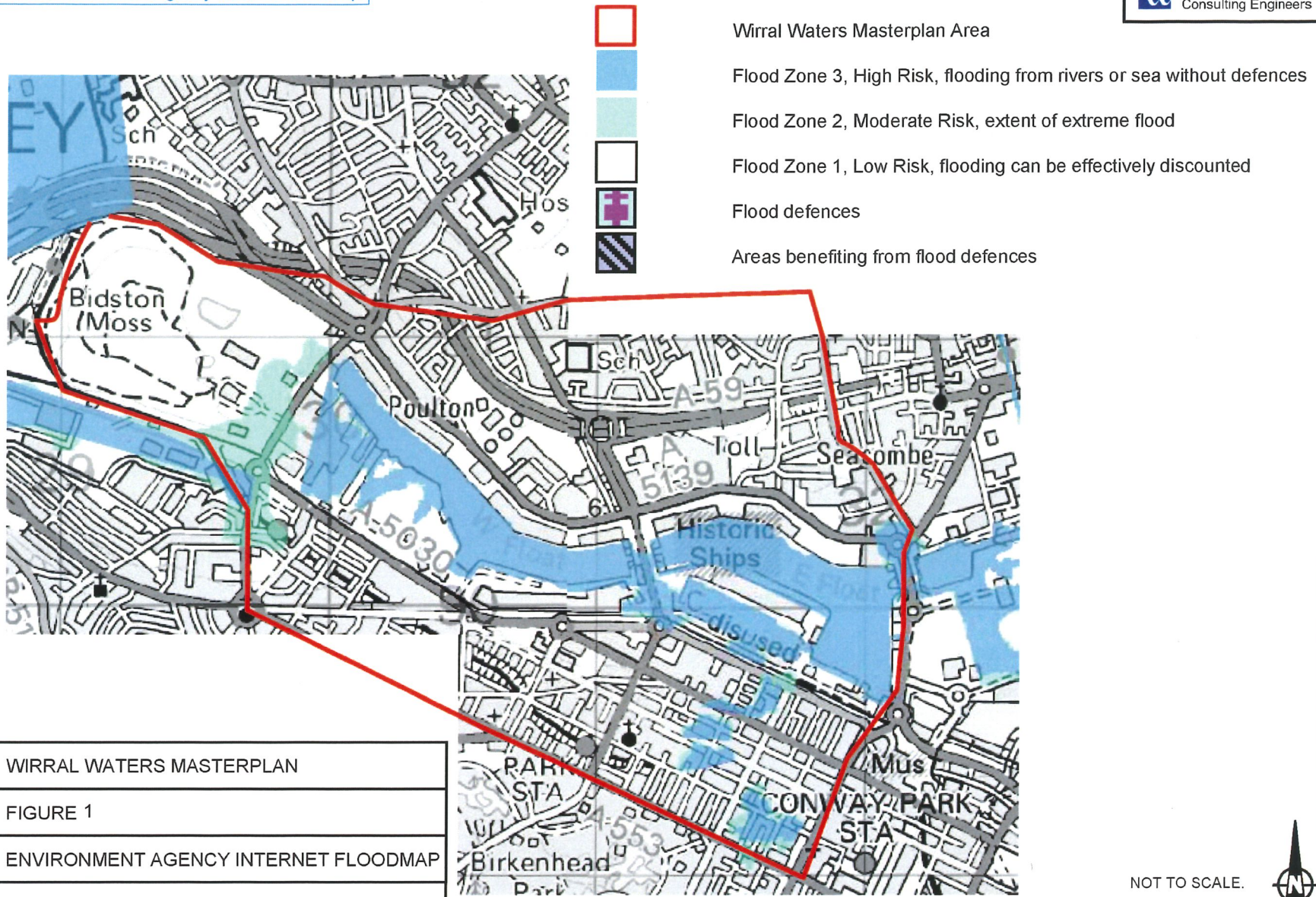
- Publication of the Framework, including the Guiding Principles for Flood Risk and Drainage, as an overarching basis for taking forward Wirral Waters.
- Develop the approach to drainage and associated water supply/recycling proposals to meet best practice in sustainable drainage; and
- Further explore the role and operation of the dock system, to further understand flood risk issues, water management and associated design mitigation issues;
- Undertake detailed FRAs where required in accordance with best practice set out in PPS25.



5.1 The Guiding Principles will be monitored and reviewed as follows:

- Strategic Delivery Group (SDG) to monitor and identify the need to review the Guiding Principles, in response to changes in flood risk/drainage policy (for example arising due to climate change), spatial planning policy (e.g. ensuring the flood risk/drainage aspects of the LDF and RSS are consistent with the SRF) or technology/best practice.
- Further consultation with the EA, to share further analysis and project FRA's; and
- Identify a working mechanism for future consultation, assessment and design/mitigation provision (as appropriate) on Wirral Waters.

FIGURE 1: Environment Agency Internet Floodmap

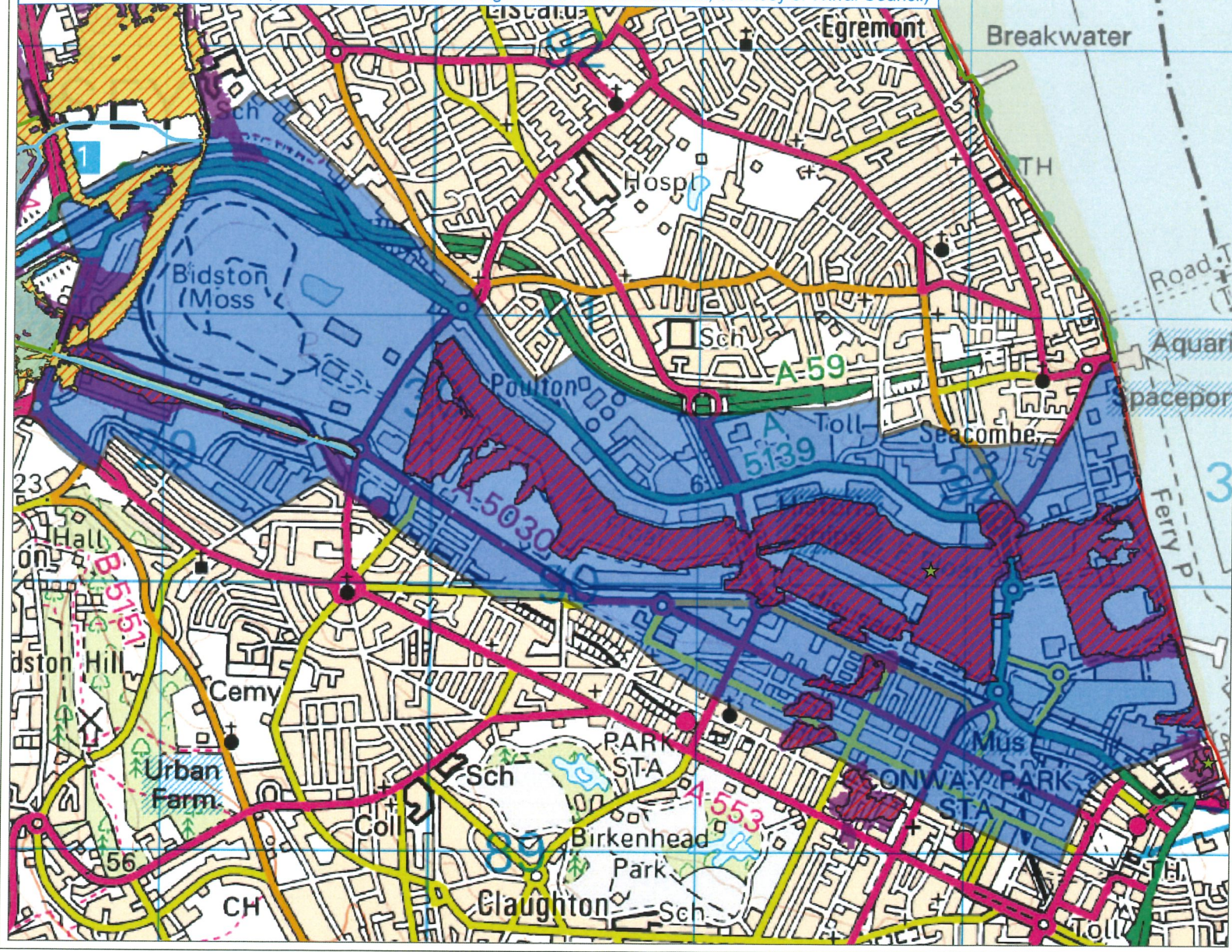


Project Title:	WIRRAL WATERS MASTERPLAN
	FIGURE 1
Title:	ENVIRONMENT AGENCY INTERNET FLOODMAP
Date:	APRIL 2008










NOT TO SCALE.



FIGURE 2: Character Area 2 (extracted from Wirral Strategic Flood Risk Assessment, courtesy of Wirral Council)

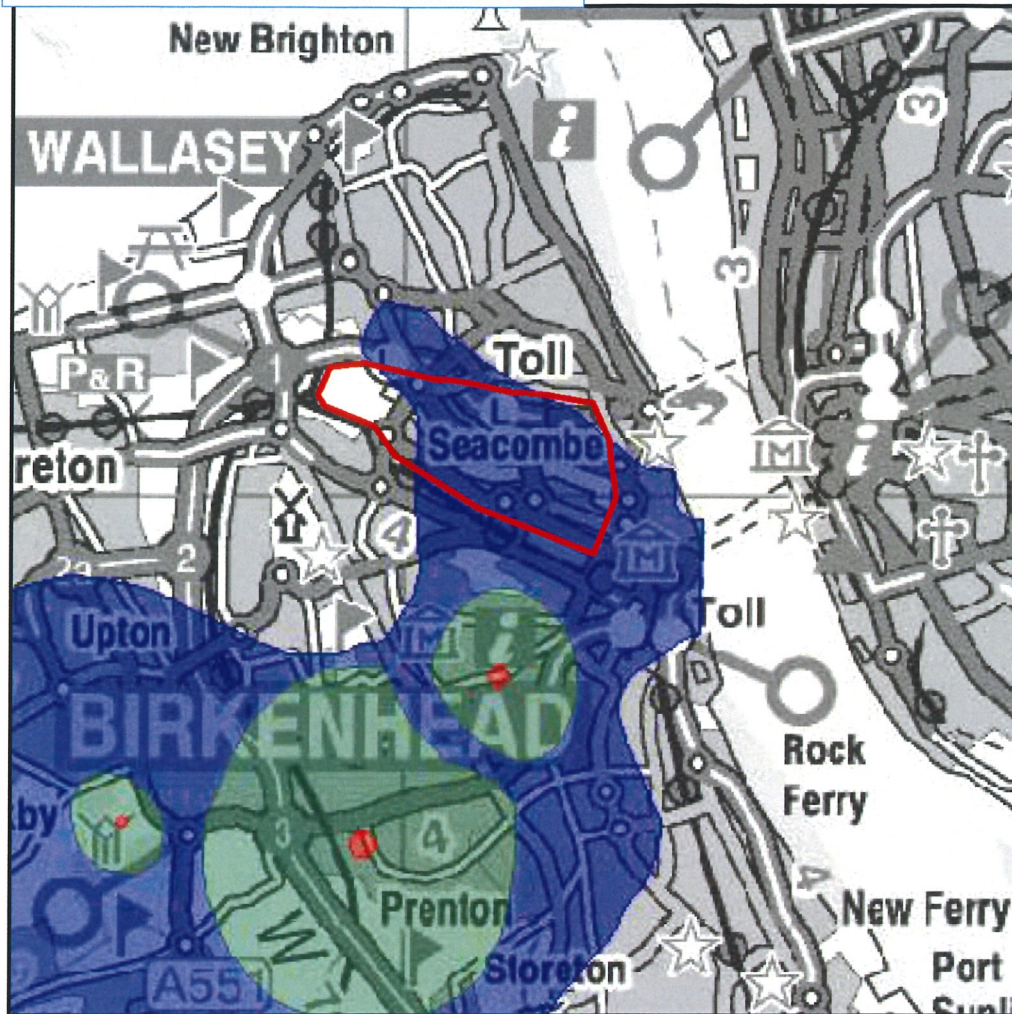


Key

-  Wirral SFRA Boundary
-  Main Watercourses
-  Coastal and River Defences
-  Flood Zone 2
-  Flood Zone 3a
-  Flood Zone 3b (Functional Floodplain)
-  Areas Benefitting from Defences
-  Character Areas (2) Wirral Waters
-  Development Locations

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FIGURE 3: EA Groundwater Source Protection Zones



NOT TO SCALE.



Waterman Civils
Consulting Engineers

-  Wirral Waters Masterplan Area
-  Borehole
-  Inner Protection Zone
-  Outer Protection Zone
-  Total Catchment
-  Special Interest

Project Title: WIRRAL WATERS MASTERPLAN

FIGURE 3

Title: EA GROUNDWATER SOURCE PROTECTION ZONES

Date: APRIL 2008

Appendix 1

Burton, Daniel

From: Pearson, Nick [Nicholas.pearson@environment-agency.gov.uk]
Sent: 12 May 2008 10:20
To: Burton, Daniel
Subject: Extreme Sea Level Estimates - Wirral Tidal ABD
Attachments: Licence.doc

Hi Daniel,

The Extreme Tidal Values for Seacombe Promenade (nearest reference to Wirral Waterfront Development - S3_4) are as follows -

100yr return period (mAOD) - 6.15mAOD
200yr return period (mAOD) - 6.26mAOD
1000yr return period (mAOD) - 6.51mAOD

These are taken from the Wirral Tidal ABD investigation and may be taken as approved. I've added the levels to the previous licence agreement (our ref SO20311) and confirm no cost for solely these levels on the basis that previous levels provided have been superseded.

If you require the model report, please confirm this in your reply and I'll forward to our External Relations dept.

Regards,
Nick

Flood Risk Mapping and Data Management

Environment Agency
South Area
North West Region
Nicholas.Pearson@environment-agency.gov.uk
t - (+44) 01925 543482

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creating a better place



Kelly Lavelle
Waterman Group
Pickfords Wharf
Clink Street
London
SE1 9DG

Your Ref : N/A
Our Ref : SO20311

Date: 3 July 2007

Dear Ms Lavelle

Flood Information Request: Wirral Waterfront.

Thank you for your email dated 26 June 2007, please find listed below the response regarding the above site.

Part of the site lies inside an area where the chance of flooding in any one year is considered to be 1% (1 in 100) or greater from rivers and 0.5% (1 in 200) or greater from the sea. This is based on current Flood Maps which are purely indicative and do not take into account any defences or blockages within watercourses.

We have no record of flooding at this location, but the absence of recorded flooding does not mean that the property has never been flooded, nor that flooding may not occur in the future. Based on the information currently available to the Environment Agency, we consider the risk of flooding at this location to be SIGNIFICANT.

At the entrance of Great Culvert (Model Node 3580, NGR 329596 390270) the levels, taken from Morpeth Dock Pumping Station and River Birket study are as follows: -

1% Fluvial AEP - 4.47mAOD
- 1% Fluvial + 20% Climate Change 4.66mAOD
0.1% Fluvial AEP - 4.94mAOD
0.5% Tidal AEP - 3.80mAOD

These levels were produced by using HYDRO-1D software.

Morpeth Pumping Station is currently being decommissioned by the Environment Agency. The entrance to Great Culvert is cleared when necessary by one of our Operations Delivery teams.

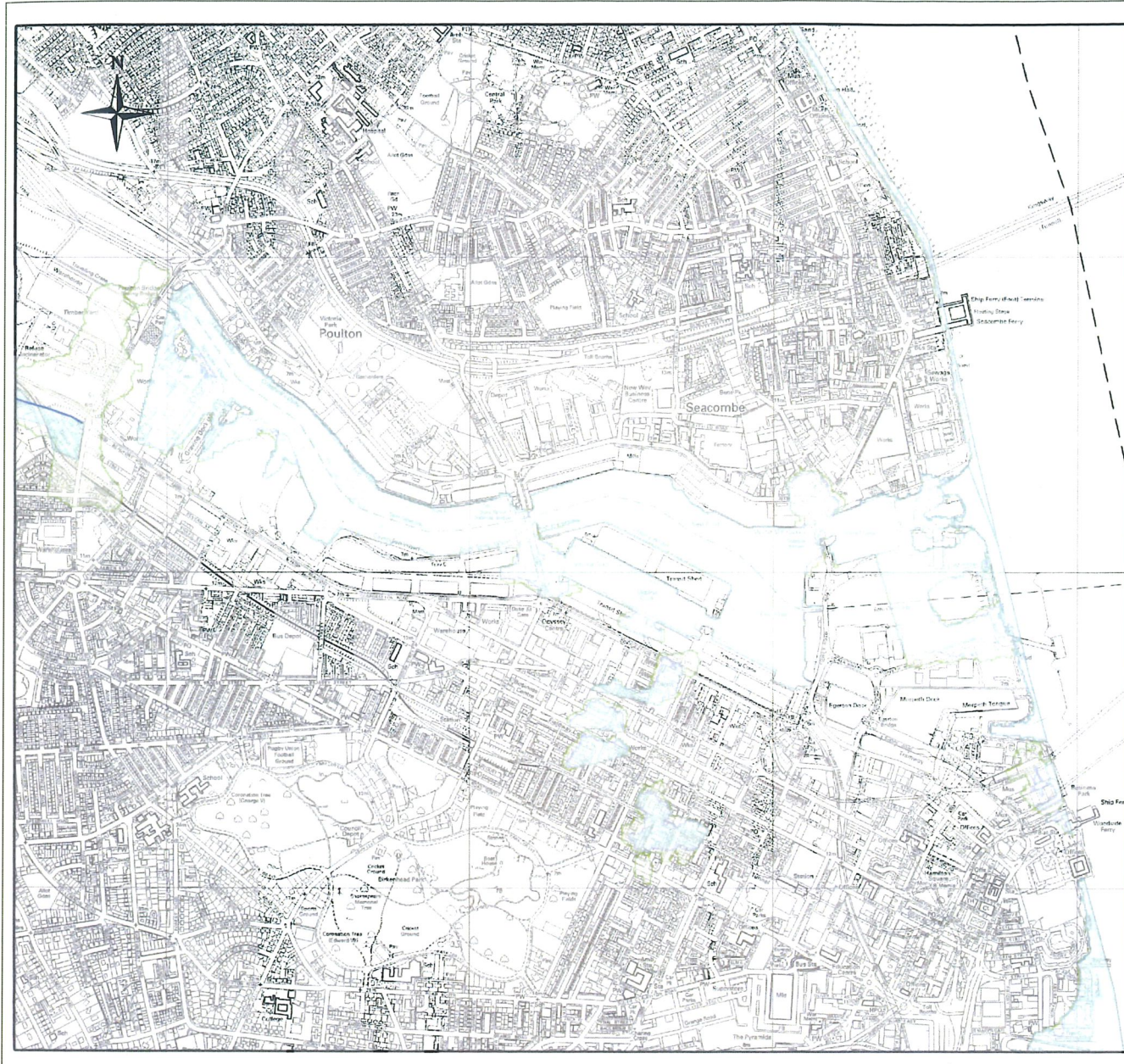
This data is sent as a response to your data request. However, we wish to draw your attention to the responsibilities of the Developer under Planning Policy

Statement 25 (PPS25) in demonstrating that the proposed development is consistent with the policies in this PPS.

Should you have any queries regarding the information provided, don't hesitate to contact myself on the number below.

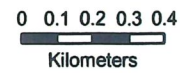
Yours sincerely

Katie McAlinden
External Relations Assistant
01925 543345



 Flood Zone 3

 Flood Zone 2



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Notes

 Environment Agency
North West Region - South Area
 Appleton House, 430 Birchwood Boulevard, Birchwood
 Warrington, Cheshire, WA3 7WD

**Flood Risk Mapping
 and Data Management**

SO20311

Flood Zones plan

Produced	
Checked	
Approved	

MAP REFERENCE NO.