

Appendix 10.3

Water Framework Directive Assessment for
Application 5



Far East Consortium Ltd (FEC)

RED BANK AND DANTZIC STREET MASTERPLAN

Water Framework Directive Assessment for
Application 5: Plots NT02-04 (Full Application)



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RED BANK AND DANTZIC STREET MASTERPLAN

Water Framework Directive Assessment for Application 5:
Plots NT02-04 (Full Application)

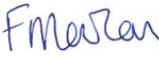
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1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1. This Water Framework Directive assessment (WFDa) has been prepared in order to assess if Application 5: Plots NT02-04 (Full application) of Red Bank and Dantzic Street Masterplan, hereafter referred to as 'Application 5', is WFD compliant. Each activity associated with Application 5 will be assessed against the biological, physico-chemical and hydromorphological quality elements that comprise the WFD.
- 1.1.2. The purpose of this WFD assessment is to evaluate the potential operational impacts arising due to Application 5 on the River Irk (Wince to Irwell) (GB112069061131) and Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB112069061131) surface water WFD water bodies and the Manchester and Cheshire East Permo-Triassic Sandstone Aquifers (GB41201G101100) WFD groundwater body. The potential construction impacts are also evaluated due to the potential effects they may have upon the status of WFD quality elements.
- 1.1.3. The Proposed Development refers to both Application 4 (Outline application) and 5 (Full application) together.
- 1.1.4. Application 5 is part of the New Town Neighbourhood, specifically land designated for the development plots NT02, NT03 and NT04. The application boundary for Application 5 is here in referred to as the 'Site'.
- 1.1.5. Application 5 will include a new outfall, discharging into the River Irk, new site drainage, demolition of existing brownfield ground works, and limited works within the floodplain (such as small areas of built development and associated infrastructure).

1.2 STUDY AREA

- 1.2.1. The Study Area has been defined as Application 5 and a buffer of 0.5 km for the surface water assessment and a buffer of 1 km for the groundwater assessment.
- 1.2.2. The Study Area has been determined based on professional judgement and experience. The Study Area has been presented to the Environment Agency in the WFD Screening and Scoping presentation.
- 1.2.3. The Study Area is located north of Manchester City Centre between Victoria Station, NOMA and the Northern Quarter in the south-west, and Queens Park and the intermediate ring road (Queens Road) to the north-east. Application 5 is located at National Grid reference (NGR) SJ 84675 99484. Application 5 is located in the Lower Irk Valley, with the River Irk running adjacent to the Application Boundary. At present, the area is occupied by commercial and industrial units to the south-west and an area of dense woodland to the north-east.
- 1.2.4. The River Irk and River Irwell are the only two watercourses that lie within 1 km of Application 5. These watercourses form the Irk (Wince to Irwell) (GB 112069061131¹) and Irwell/ Manchester Ship

¹ environment.data.gov.uk. (2023). Irk (Wince to Irwell) | Catchment Data Explorer | Catchment Data Explorer. [online] Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB112069061131> [Accessed March 2023].

Canal (Irk to confluence with Upper Mersey) (GB 112069061131²) WFD water body, in the Roch Irwell and Croal Irwell operational catchments, respectively.

1.2.5. The Study Area and the Proposed Development are provided in **Appendix A**.

1.3 APPLICATION 5

1.3.1. Application 5 includes, but is not limited to, residential dwellings, commercial/retail uses, cafes, restaurants, community uses, employment uses

1.3.2. Application 5 is made up of the following activities which are described in more detailed below:

- Proposed Infrastructure works to occur within the floodplain comprising new drainage and its outfall.
- Residential led mixed use development of mid to high rise buildings comprising plots NT02-04 and associated infrastructure;
- New site drainage proposed for new infrastructure works;
- A new outfall proposed for the new drainage of plots NT02-04;
- Dantzic Street improvement works;
- Demolition of existing ground works;
- Temporary construction areas; and
- Temporary construction tracks.

INFRASTRUCTURE IN THE FLOODPLAIN

1.3.3. This activity refers to any development, any associated landscaping and infrastructure located within the flood extents of the River Irk, as identified within the flood modelling exercises for Application 4 and Application 5, which are currently subject to EA approval. The main works within the flood plain are the new drainage and outfall, and the improvement works to Dantzic Street with a small area along the frontage of the plots. This activity also includes any building foundations and pilings proposed into the bedrock aquifer (work locations currently unknown).

1.3.4. A Detailed Quantitative Risk Assessment (DQRA) and Piling Risk Assessment (if required) will be undertaken to prevent and mitigate potential contamination of groundwater.

SITE DRAINAGE

1.3.5. New surface water drainage is to be provided as part of the Housing Infrastructure Fund (HIF) works package (Application 2) and Application 5. A new adoptable surface water carrier drain will be installed in Dalton Street and Dantzic Street for NT02-04 (Application 5) and RB16 & 17 (within Application 4) which discharges to the River Irk via a proposed new headwall located to the west of Plot RB16. The installation of this outfall is detailed separately below.

1.3.6. No infiltration drainage works are proposed. The drainage strategy has been designed to not capture groundwater (impermeable).

² environment.data.gov.uk. (2023). Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey) | Catchment Data Explorer | Catchment Data Explorer. [online] Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB112069061452>. [Accessed March 2023]

NEW OUTFALL

- 1.3.7. Plots NT02-NT04 and RB16 & 17 will discharge into the River Irk via a new outfall located to the west of Plot RB16. This outfall will not be provided as part of the HIF proposals and will therefore need to be designed, detailed, and approved by the EA as part of the design development of the plots.
- 1.3.8. The new outfall should be set at a level of 300mm above the 1 in 30 year river level. The 1 in 30 year river level has been taken from the FEC Baseline plus NT02 to NT04 model and is 30.460mAOD. The currently proposed outfall level is 27.227mAOD. This level is the same invert level as the outfall which is being provided for the neighbouring Victoria Riverside.

WIDENING OF DANTZIC STREET

- 1.3.9. The widening of Dantzic Street is to occur by plots NT02-04 and RB16 & 17 and the proposed improvement works will include tree planting, resurfacing, narrowing the carriageway and widened footpaths, and new cycle lanes.

DEMOLITION AND GROUND WORKS

- 1.3.10. Application 5 is located in a brownfield site; demolition of existing buildings and ground cover will be required. Necessary hoardings, protective gantries and asbestos surveys will be implemented prior to demolition. Demolition will be carried out in compliance with relevant legislation.

TEMPORARY CONSTRUCTION AREAS

- 1.3.11. It is proposed to utilise the compound area to offload, store and handle materials for the proposed works. The temporary compound and material storage will be located outside of the floodplain.

TEMPORARY ACCESS TRACKS

- 1.3.12. Construction traffic will access plots NT02-04 via the A6010 Queens Road and Collyhurst Road.

1.4 CONSULTATION

- 1.4.1. Details of consultation between the Environment Agency (EA) and WSP are presented in Table 1-1.

Table 1-1 - Record of Consultation with the Environment Agency

Date	Consultation Type
16/02/2023	Meeting – WFD Screening and Scoping presentation delivered to the EA.
22/02/2023	Email correspondence – A revised WFD Screening and Scoping presentation was issued to the EA incorporating the comments discussed in the meeting (16/02/2023).
01/03/2023	Email correspondence – Red Bank flood outlines for WFD issued to the EA to establish definition of ‘infrastructure within the floodplain’
03/03/2023	Email correspondence – Confirmation from the EA on the screening and scoping conclusion previously issued. It was requested that quantity and dynamics of flow was scoped in for infrastructure within the floodplain. Furthermore, the mitigation measures for the River Irk water body were provided, along with a restoration plan completed in 2018.

1.5 BACKGROUND TO THE WFD

- 1.5.1. An impact assessment of any works/modifications to water bodies in the UK is required under Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 2017 Regulations) (SI 2017/407)³ and The Groundwater (Water Framework Directive) (England) Direction 2016⁴. Compliance with the WFD legislation is required for permitting of Application 5.
- 1.5.2. The WFD assessment should also comply with relevant CEN/ISO Standards, as stated within Annex V of the WFD legislation. Relevant standards are listed within Section 2 (Methodology).
- 1.5.3. The primary aim of the WFD is to improve/maintain the Ecological Status/Potential of all water bodies and to prevent deterioration in status of the water bodies and their associated WFD quality elements. Ecological Status/Potential is determined by a suite of biological, physico-chemical and hydromorphological quality elements. This WFD assessment aims to establish the baseline conditions, evaluate potential impacts of Application 5, and assess compliance against WFD objectives.
- 1.5.4. The overarching objective of the WFD is for surface water bodies in England and Wales to attain overall 'Good Ecological Status' (GES) or 'Good Ecological Potential' (GEP). GES refers to situations where the ecological characteristics show only a slight deviation from natural/near natural conditions. In such a situation, the biological, chemical, physico-chemical and hydromorphological conditions are associated with limited or no human pressure. Artificial and heavily modified water bodies have a target to achieve GEP, which recognises their important uses, whilst ensuring the quality elements are protected as far as possible.
- 1.5.5. The WFD sets several objectives including:
 - Prevent deterioration in status for water bodies;
 - Aim to achieve good biological and good surface water chemical status in water bodies. For those water bodies that did not achieve GES by 2021, alternative objectives have been set by the EA where water bodies have been allocated a target date for compliance of either 2027. The target date set for each water body takes into consideration measures that are practicably achievable for achieving GES or GEP;
 - For water bodies that are designated as artificial or heavily modified, the objective is to achieve GEP. Those artificial/heavily modified water bodies that did not achieve GEP by 2021 need to achieve compliance by 2027;
 - Where it is considered either technically infeasible or disproportionately expensive to achieve GES or GEP by 2027, alternative objectives have been set for the water body, such as a target to achieve Moderate status;
 - Comply with objectives and standards for protected areas, where relevant; and,
 - Reduce pollution from priority substances and cease discharges, emissions, and losses of priority hazardous substances.

³ HM Government. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations. Available online: <https://www.legislation.gov.uk/uksi/2017/407/contents/made> [Accessed March 2023].

⁴ HM Government. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations. Available online: <https://www.legislation.gov.uk/uksi/2017/407/contents/made> [Accessed March 2023]

- 1.5.6. Where a new modification, change in activity or change to a structure on a water body is proposed, a WFD assessment needs to consider whether the proposed alteration will cause deterioration in the Ecological Status or Potential of any water body. For heavily modified/artificial water bodies, proposed new modifications, or changes to activities or structures, may also result in WFD mitigation measures or actions, set to help a water body achieve GES/GEP, being ineffective. This could result in the water body failing to meet GES/GEP. Where a WFD assessment concludes that deterioration or failure to achieve GES/GEP may occur, an Article 4.7 assessment will be required, which makes provision for deterioration of status provided that certain stringent conditions are met.

2 METHODOLOGY

2.1 DATA COLLECTION

DESK STUDY

A desk-based study was carried out to inform the WFD assessment, reviewing the existing information of the Study Area to develop a baseline for the catchments, watercourses, and surrounding areas. The following data sources were used for the desk study:

- Contemporary OS maps⁵;
- Geology and soil maps⁶;
- Current aerial photography⁷;
- WFD status and objectives from Catchment Data Explorer⁸;
- Environment Agency ecology data⁹;
- Historical maps¹⁰;
- Nature on the Map for designated areas, habitats and species, and landscape data;¹¹
- Hydrological data¹²;
- Water quality data¹³;
- Soil data¹⁴; and
- Historic photographs¹⁵.

2.2 FIELD SURVEY

GEOMORPHOLOGY / HYDROMORPHOLOGY WALKOVER SURVEY

- 2.2.1. A site walkover was conducted in September 2022. It was observed that a high degree of channel modification was present. Brick walls are present on either side of the riverbank throughout the Site. Several artificial features were identified along the watercourse, including a weir and footbridge, both upstream of Application 5.

RIVER CONDITION ASSESSMENT

- 2.2.2. To inform the Biodiversity Net Gain (BNG) assessment for HIF infrastructure and flood alleviation works (Application 3) a Modular River Physical (MoRPh) survey of the River Irk was conducted in

5 Ordnance Survey. (2023). Available online: <https://osmaps.ordnancesurvey.co.uk/> [Accessed March 2023]

6 British Geological Survey (BGS) (2023). Geology Map of Great Britain. Available at: https://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.123059587.943109761.1641291272-753517031.1544537759 [Accessed March 2023]

7 Google Earth (2023). Google Earth. [online] Google.com. Available at: <https://earth.google.com/web/>. [Accessed March 2023]

8 Environment Agency Catchment Data Explorer (2023) Catchment Data Explorer. Available at: England | Catchment Data Explorer [Accessed March 2023].

9 environment.data.gov.uk. (2023). EA Ecology & Fish Data Explorer. [online] Available at: <https://environment.data.gov.uk/ecology/explorer/>. [Accessed March 2023]

10 National Library of Scotland (2023) Old Maps Viewer. Available at: <https://maps.nls.uk/> [Accessed March 2023]

11 MAGIC. (2023). Magic Map Application. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed March 2023]

12 National River Flow Archive. (2023). <https://nrfa.ceh.ac.uk/data/station/info/69043>. [online] Available at: <https://nrfa.ceh.ac.uk/data/station/info/69043>. [Accessed March 2023]

13 Environment Agency (2023) Water Quality Archive. Available at: <https://environment.data.gov.uk/water-quality/view/landing> [Accessed March 2023]

14 Cranfield Soil and Agrifood Institute (2023). Soilscales. [online] Available at: <https://www.landis.org.uk/soilscales/> [Accessed March 2023]

15 www.geograph.org.uk. (2018). Geograph:: River Irwell, Manchester and Salford © David Dixon. [online] Available at: <https://www.geograph.org.uk/photo/2372877> [Accessed March 2023].

January 2021. This forms part of a River Conditions Assessment which was carried out to calculate post-intervention river biodiversity unit change. These elements are combined within the online information system 'Cartographer' providing a final condition score for the River Irk which is inputted to the Biodiversity Metric 3.0¹⁶.

2.2.3. The final river condition score was classified as 'Poor', with the following baseline indicators needing improvement both upstream and downstream of the River Irk:

- Bank top managed ground cover;
- Bank face reinforcement;
- Bank face artificial bank profile extent;
- Channel bed siltation; and
- Artificial features in the channel bed.

2.3 HYDRAULIC MODELLING

2.3.1. A hydraulic flood model has been built to understand the baseline and proposed flood extents and levels within the Study Area. Details of this model and the results can be found in the accompanying Flood Risk Assessment¹⁷.

2.4 AQUATIC ECOLOGY SURVEYS

Fish Surveys

2.4.1. Extended Phase 1 Habitat Surveys and UKHab Condition Assessment were undertaken initially by TEP on the 22nd and 29th March 2021 and updated on 25th May 2022. Aquatic ecology surveys were undertaken by ARUP and RSK in 2021 which included detailed fish surveys to establish baseline conditions for fish populations along the River Irk.

ENVIRONMENT AGENCY RECORDS

2.4.2. Fish survey data for the Aquatic ecology baseline section (section 4.3 to 4.4) were obtained from the Environment Agency's National Fish Survey Population Database (NFPD)¹⁸.

2.4.3. The EA's BIOSYS database was searched for macrophyte data for the River Irk (Wince to Irwell) (Roch Irk Medlock catchment) and River Irwell (Manchester Ship Canal) (Croal Irwell catchment) water body¹⁹.

2.4.4. Water quality data was downloaded from the EA Water Quality Archive¹³.

¹⁶ cartographer.io. (2023). Loading - Cartographer. [online] Available at: <https://mrstraining.cartographer.io/login?go=%252F> [Accessed Mar 2023].

¹⁷ WSP (2023) Red Bank and Dantzic Street Master Plan: Flood Risk Assessment

¹⁸ Environment Agency (2021b). The National Fish Populations Database; TraC Fish Counts for all Species for all Estuaries and all years. Available at: <https://data.gov.uk/dataset/41308817-191b-459d-aa39-788f74c76623/trac-fish-counts-for-all-species-for-all-estuaries-and-all-years> [Accessed March 2023]

¹⁹ Environment Agency (2023). BIOSYS database; benthic marine species. Available at: <https://environment.data.gov.uk/portalstg/home/item.html?id=cf1bb55e9a5f4916aea8eb9df752506e> [Accessed March, 2023]

2.5 WFD ASSESSMENT PROCESS

- 2.5.1. The assessment methodology used here is based on guidance provided by the Planning Inspectorate Advice Note 18: The Water Framework Directive²⁰. This guidance outlines a three-stage process to WFD assessment: screening, scoping, and impact assessment.

STAGE 1: SCREENING

- 2.5.2. Screening is required to identify the WFD water bodies which have the potential to be impacted by Application 5. Screening is also required to identify activities which have the potential to result in deterioration of a water body or fail to comply with the objectives of that water body. Screening also serves to identify those proposed activities (e.g., proposed construction methods) that are required to be taken through to scoping, and those activities that are unlikely to result in the deterioration of the water body.

STAGE 2: SCOPING

- 2.5.3. Scoping is required to identify risks to receptors from a project's activities, based on the relevant water bodies and their water quality elements (including information on status, objectives, and the parameters for each water body). Potential risks to hydromorphology, biology (habitats and fish), water quality, WFD protected areas and invasive non-native species should be assessed. The scoping stage identifies which elements need to be carried forward to Stage 3.

STAGE 3: IMPACT ASSESSMENT

- 2.5.4. Where assessment has been considered necessary at scoping stage, an impact assessment is carried out for each receptor identified as being at risk in terms of potential deterioration or non-compliance with its specific objectives as set out in the River Basin Management Plan as a result of the project. Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, the project will need to be assessed in the context of Article 4(7) of the WFD.
- 2.5.5. Whilst the assessment of potential construction impacts is not required as part of a WFD assessment, these impacts may have detrimental impacts on the WFD quality elements and construction periods may sometimes be of long duration (i.e., several years). Thus, construction impacts are considered, along with mitigation to reduce or eliminate potential impacts on the water body and WFD quality elements.

2.6 LIMITATIONS AND ASSUMPTIONS

- 2.6.1. Observation records during the site visit are a snapshot of the River Irk and are not fully representative of the condition of the river. In addition, the right bank of the river channel within the Study Area was inaccessible due to safety or physical barriers. The site walkover did not include the River Irwell. Therefore, some assumptions have been made on the bank and bed conditions in these locations, using desk study. There was no access into the watercourse and therefore no in-channel recordings were completed. Data was recorded from the banks only.

20 HM Government (2017). The Planning Inspectorate Guidance Note 18: Water Framework Directive. Available online: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf [Accessed March 2023].

- 2.6.2. This environmental assessment is based on the current layout design as shown on the planning application drawings, proposed surface water drainage strategy and Flood Risk Assessment. As the application is in hybrid form (part full and part outline) much of Application 5 is a set of development parameters. If there are any changes to these elements of the design further modelling or assessment may be required.
- 2.6.3. River condition assessment survey and aquatic ecology surveys were completed in January 2021 and therefore, may not be representative of the physical, ecological, and chemical quality/ state of the River Irk and Irwell at present. However, it is unlikely that the River condition of the Irk and Irwell would have changed materially from the River condition assessment as the river is heavily modified.
- 2.6.4. This assessment has relied upon the accuracy and level of detail of the documented data sources reviewed as part of the desktop assessment and walkover site visits. The assessment has been informed by information sourced from statutory authorities including the EA and utility providers and as such to some extent is dependent on the accuracy of this information.

3 WFD SCREENING AND SCOPING

3.1 STAGE 1: WFD SCREENING

- 3.1.1. The purpose of the WFD screening stage is to identify the extent to which Application 5 may affect WFD water bodies that lie within the zone of influence of the Study Area.

SCREENING OF SURFACE WATER BODIES

- 3.1.2. The Irwell (Wince to Irwell) (GB 112069061131) WFD water body, will be directly impacted by Application 5 due to a range of activities that will interact with the watercourse. Therefore, this WFD water body is screened in for further assessment.
- 3.1.3. The downstream water body is the Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061131) WFD water body. This is within the zone of influence of Application 5 and is therefore screened in for further assessment.
- 3.1.4. In addition to the River Irk (Wince to Irwell) (GB 112069061131) WFD water body and Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061131) WFD water body the following surface water bodies were considered within this screening exercise, and screened out based on being a sufficient distance from Application 5:
- Irwell (Croal to Irk) (GB112069061451) WFD water body is located 0.62 km upstream of the Application 5. There are no proposed works within this water body²¹.
 - Medlock (Lumb Brook to Irwell) (GB112069061152) WFD water body is located 2.7 km downstream from Application 5. There are no proposed works within this water body²².
 - Rochdale Canal, western section WFD water body (GB71210517) is located 0.5 km south of Application 5²³. It is hydrologically connected to the River Irk 8.5 km upstream of Application 5. There are no proposed works within this water body.

SCREENING OF GROUNDWATER BODIES

The WFD groundwater body that underlies the Study Area is the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body (GB 41201G101100)²⁴. Application 5 works are expected to intercept bedrock and therefore, this water body is screened in for further assessment.

The Overall, Quantitative, and Chemical status of the groundwater body is classified as 'Poor' (2019 Cycle 3) with an objective of achieving 'Good' Overall, Quantitative, and Chemical status by 2021.

²¹ environment.data.gov.uk. (2023). Irwell (Croal to Irk) | Catchment Data Explorer | Catchment Data Explorer. [online] Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB112069061451> [Accessed March 2023].

²² environment.data.gov.uk. (2023). Medlock (Lumb Brook to Irwell) | Catchment Data Explorer | Catchment Data Explorer. [online] Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB112069061152> [Accessed March 2023].

²³ environment.data.gov.uk. (2023). Rochdale Canal, western section | Catchment Data Explorer | Catchment Data Explorer. [online] Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB71210517> [Accessed March 2023].

²⁴ environment.data.gov.uk. (2023). Manchester and East Cheshire Permo-Triassic Sandstone Aquifers | Catchment Data Explorer | Catchment Data Explorer. [online] Available at: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB41201G101100> [Accessed March 2023].

The reasons for not achieving 'Good' status include saline intrusion (Quantitative and Chemical from natural and other pressures) and an unknown activity under investigation.

SCREENING OF ACTIVITIES

- 3.1.5. Application 5 compromises of the key activities listed below, and the screening process is presented in Table 3-1. Those activities screened in for further assessment in Table 3-1 are carried forward to Stage 2: Scoping. Those activities screened out of further assessment are not considered further.

Table 3-1 – WFD screening of activities

Activity	Screening Outcome	WFD Water Body Impacted	Justification
Site Drainage	IN	Irk (Wince to Irwell) water body Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) water body	The proposed site drainage has the potential to impact water quality and biological elements. No infiltration is proposed as part of the drainage strategy and therefore, groundwater body screened out.
Infrastructure in the floodplain	IN	Irk (Wince to Irwell) water body Manchester and East Cheshire Permo-Triassic Sandstone Aquifers groundwater body	Works to happen within the floodplain may alter flow dynamics during flood events. Building foundations and pilings are proposed to intercept bedrock.
Temporary construction compounds	OUT	N/A	Temporary works with no long term effect on surrounding environment. Temporary potential impacts controlled via a Construction Environmental Management Plan (CEMP).
Temporary access tracks	OUT	N/A	Temporary works with no long term effect on surrounding environment. Temporary potential impacts controlled via a CEMP.
New outfall	IN	Irk (Wince to Irwell) water body Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) water body	The outfall structure will permanently and directly impact upon the bank of the River Irk. In addition, the discharge from the outfall has the potential to impact upon the biological, physico-chemical and hydromorphological quality elements. Therefore, it is scoped in for further assessment. New outfall will not be designed to collect groundwater (impermeable and closed drainage system) and therefore, groundwater body screened out.
Widening of Dantzic Street	OUT	N/A	Minor alterations to ground levels and surfacing and construction impacts controlled through the CEMP.
Demolition of ground works	IN	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers groundwater body	Demolition works include excavations during the earthworks.

3.2 STAGE 2: WFD SCOPING

- 3.2.1. The WFD scoping stage defines the level of detail required for further WFD assessment. This includes identifying risks to the WFD receptors from Application 5 activities. The scoping stage assessment is presented in **Table 3-2** for the River Irk (Wince to Irwell) (GB GB112069061131) surface water WFD water body, **Table 3-3** for the Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061131) surface water WFD water body and **Table 3-4** for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body.

**Table 3-2 - WFD scoping of Application 5 activities against WFD quality elements for the River Irk (Wince to Irwell)
(GB112069061131) water body**

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
Biological quality elements				
Fish	In – potential change to water quality affecting aquatic habitat.	Out – no works within the channel to alter aquatic habitat.	In - potential to alter the aquatic habitat locally impacting fish.	Out – no change to the aquatic habitat.
Invertebrates	In – potential change to water quality affecting aquatic habitat.	Out – no works within the channel to alter aquatic habitat.	In - potential to alter the aquatic habitat locally impacting invertebrates.	Out – no change to the aquatic habitat.
Macrophytes and Phytobenthos combined	In – potential change to water quality affecting aquatic habitat.	Out – no works within the channel to alter aquatic habitat.	In - potential to impact riparian vegetation and alter the conditions for macrophytes.	Out – no change to the aquatic habitat.
Physico-chemical quality elements				
Thermal Conditions	In - potential impacts to water quality from discharge of site drainage to the River Irk.	Out- no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out – likely negligible change to shading over moving water which is unlikely to alter the temperature.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Oxygenation Conditions	In - potential impacts to water quality from discharge of site drainage to the River Irk.	OUT- no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	In - any removal of riparian vegetation has the potential to reduce oxygen levels in the watercourse.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Salinity	In - potential impacts to water quality from	OUT- no works within the channel or the riparian zone.	Out - structure will not affect water quality. Potential construction impacts controlled	Out – no works in the channel. Potential construction impacts

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
	discharge of site drainage to the River Irk.	Construction impacts controlled via the measures in the CEMP.	through the measures in the CEMP.	controlled through the measures in the CEMP.
Acidification Status	In - potential impacts to water quality from discharge of site drainage to the River Irk.	OUT- no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out - structure will not affect water quality. Potential construction impacts controlled through the measures in the CEMP.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Nutrient Conditions	In - potential impacts to water quality from discharge of site drainage to the River Irk.	OUT- no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out - structure will not affect water quality. Potential construction impacts controlled through the measures in the CEMP.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Hydromorphological quality elements				
Quantity and Dynamics of Water Flow	In – Drainage from the site added to existing network which discharges to the River Irk.	In – potential change to flood flow dynamics.	In – works to occur directly in the channel installing an additional discharge to the river.	Out – no works in the channel. Potential construction impacts controlled by measures in the CEMP.
Connection to Groundwater Bodies	Out – surface water improvements only with shallow excavations.	Out – shallow excavations.	Out – surface water changes only.	Out – no works in the channel. Potential construction impacts controlled by measures in the CEMP.
River Continuity	Out – no changes to the channel. Outfall assessed separately.	Out – no works within the channel.	In – added flows to the river may impact continuity.	Out – no works in the channel. Potential construction impacts controlled by measures in the CEMP.

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
River Depth and Width Variation	Out – no changes to the structure of the river. Outfall assessed separately.	Out – no works within the channel.	In – Outfall will be a fixed structure within the channel.	Out – no works in the channel. Potential construction impacts controlled by measures in the CEMP.
Structure and Substrate of the Riverbed	In – Potential deposition of suspended solids in runoff.	Out – no works within the channel.	In – Potential scour at outfalls.	Out – no works in the channel. Potential construction impacts controlled by measures in the CEMP.
Structure of the Riparian Zone	Out – no changes to riparian zone.	Out – no works within the riparian zone (works located c.100m from the river).	In – New structure located within the riparian zone.	Out – no works in the channel. Potential construction impacts controlled by measures in the CEMP.

Table 3-3 – WFD scoping of Application 5 activities against WFD groundwater quality elements for the River Irwell (Manchester Ship canal) (GB1120690614) water body

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
Biological quality elements				
Fish	In – Potential change to water quality affecting aquatic habitat.	Out – No works within the channel to alter aquatic habitat.	Out – Outfall is not on watercourse; therefore, will have no direct effect on the River Irwell.	Out – no change to the aquatic habitat.

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
Invertebrates	In – Potential change to water quality affecting aquatic habitat.	Out – No works within the channel to alter aquatic habitat.	Out – Outfall is not on watercourse; therefore, will have no direct effect on the River Irwell.	Out – no change to the aquatic habitat.
Macrophytes and Phytobenthos combined	In – Potential change to water quality affecting aquatic habitat.	Out – No works within the channel to alter aquatic habitat.	Out - Outfall is not on watercourse; therefore, will have no direct effect on the River Irwell.	Out – no change to the aquatic habitat.
Physico-chemical quality elements				
Thermal Conditions	In - potential impacts to water quality from discharge of site drainage to the River Irk.	Out - no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out – likely negligible change to shading over moving water which is unlikely to alter the temperature.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Oxygenation Conditions	In - potential impacts to water quality from discharge of site drainage to the River Irk.	Out - no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out – no changes to riparian vegetation.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Salinity	In - potential impacts to water quality from discharge of site drainage to the River Irk.	Out - no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out - structure will not affect water quality. Potential construction impacts controlled through the measures in the CEMP.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Acidification Status	In - potential impacts to water quality from discharge of site drainage to the River Irk.	Out - no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out - structure will not affect water quality. Potential construction impacts controlled	Out – no works in the channel. Potential construction impacts

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
			through the measures in the CEMP.	controlled through the measures in the CEMP.
Nutrient Conditions	In - potential impacts to water quality from discharge of site drainage to the River Irk.	Out - no works within the channel or the riparian zone. Construction impacts controlled via the measures in the CEMP.	Out - structure will not affect water quality. Potential construction impacts controlled through the measures in the CEMP.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Hydromorphological quality elements				
Quantity and Dynamics of Water Flow	In – Drainage from the site added to existing network which discharges to the River Irk.	Out – no works to occur within the channel.	Out – no works to occur within the channel.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP.
Connection to Groundwater Bodies	Out – no direct works to the River Irwell.	Out – no direct works to the River Irwell.	Out – no direct works to the River Irwell.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP
River Continuity	Out – no changes to the channel. Outfall assessed separately.	Out – no works within the channel.	Out – Insignificant due to the size of the River Irwell and no change to the continuity.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP
River Depth and Width Variation	Out – no changes to the structure of the river. Outfall assessed separately.	Out – no works within the channel.	Out - no change to river width or depth in the River Irwell.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP

WFD Quality Element	Site Drainage	Infrastructure in the Floodplain	New Outfall	Demolition of Groundworks
Structure and Substrate of the Riverbed	In – potential deposition of suspended solids runoff.	Out – no works within the channel.	Out – no works within the channel.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP
Structure of the Riparian Zone	Out – no changes to Riparian Zone.	Out – no works within the riparian zone (works located c.100m from the river).	Out – no works within the channel.	Out – no works in the channel. Potential construction impacts controlled through the measures in the CEMP

Table 3-4 - WFD scoping of Application 5 activities against WFD groundwater quality elements for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB 41201G101100) WFD groundwater body

WFD Water Quality Element	Infrastructure in the Floodplain	Demolition of Ground Works
Quantitative		
Quantitative	Out – no impact expected. No significant intrusive works into WFD groundwater body proposed which could require long-term dewatering.	Out – no impact expected. Shallow excavations only. No significant intrusive works into WFD groundwater body proposed which could require dewatering.
Water balance	Out – no impact expected. Foundations and pilings associated with infrastructure not expected to impact overall groundwater flow towards River Irk or water levels. No significant impact to groundwater recharge potential compared to existing hardstanding.	Out – no impact expected. Shallow excavations only. No significant impact to groundwater recharge potential or groundwater flow and water levels.

WFD Water Quality Element	Infrastructure in the Floodplain	Demolition of Ground Works
GWDTEs (Groundwater Dependent Terrestrial Ecosystems)	Out – no GWDTEs present within Study Area.	Out – no GWDTEs present within Study Area.
Dependent surface water bodies	Out – no impact expected. Foundations and pilings associated with infrastructure not expected to impact overall groundwater flow towards River Irk or water levels. No significant impact to groundwater recharge potential compared to existing hardstanding.	Out – no impact expected. Shallow excavations only. No significant intrusive works into WFD groundwater body proposed which could require dewatering.
Quantitative saline intrusion	Out – no impact expected. No significant intrusive works into WFD groundwater body proposed which could require long-term dewatering.	Out – no impact expected. Shallow excavations only. No significant intrusive works into WFD groundwater body proposed which could require dewatering.
Chemical		
Chemical	Out – no impact expected. CEMP, Remediation Strategy, and Piling Risk Assessment (if required) for foundations and pilings will mitigate the potential for pollutants to infiltrate into the aquifer.	Out – no impact expected. Shallow excavations only. No significant intrusive works into WFD groundwater body proposed which could create a pathway for pollutants to infiltrate into the aquifer. Detailed Quantitative Risk Assessment (DQRA) and Remediation Strategy to be undertaken for Application 5, which will prevent and mitigate the potential for pollutants to infiltrate into the aquifer.
Drinking water protected area	Out – no drinking water protected areas within Study Area.	Out – no drinking water protected areas within Study Area.
GWDTEs	Out – no GWDTEs present within Study Area.	Out – no GWDTEs present within Study Area.

WFD Water Quality Element	Infrastructure in the Floodplain	Demolition of Ground Works
Dependent surface water bodies	Out – no impact expected. Water quality impacts related to construction will be mitigated by pollution prevention controls outlined in the CEMP or similar document. The nature of the development (residential compared to current industrial site) may potentially have a beneficial impact on the status of the WFD groundwater body.	Out – no impact expected. Shallow excavations only. No significant intrusive works into WFD groundwater body proposed which could create a pathway for pollutants to infiltrate into the aquifer.
Saline intrusion	Out – no change to chemical status expected. No infiltration proposed as part of the proposed drainage strategy.	Out – no change to chemical status expected. No infiltration proposed as part of the proposed drainage strategy.

4 BASELINE CONDITIONS

4.1 WFD STATUS

- 4.1.1. The River Irk (Wince to Irwell) (GB 112069061131) WFD water body is located within the Proposed Development and adjacent to Application 5. This water body is located within the Roch Irk Medlock Operational Catchment. It has a hydromorphological designation of heavily modified water body (HMWB). The water body is 17.9 km in length and has a catchment area of 30 km². The water body is currently performing at 'Moderate' overall water body status; comprising 'Moderate' Ecological Status and 'Moderate' Physico-Chemical Status. The current WFD baseline status for this water body is presented in Table 4-1.
- 4.1.2. Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD water body is located 0.7 km downstream from Application 5. There are no proposed works within this water body, and it is currently performing at 'Moderate' overall water body status; comprising 'Moderate' Ecological Status and 'Moderate' Physico-Chemical Status. The current WFD baseline status for this water body is presented in Table 4-2.

Table 4-1 - Baseline data for scoped-in WFD quality elements for Irk (Wince to Irwell) (GB 112069061131) WFD water body

Parameter	Current WFD Baseline Status
Water Body ID	GB 112069061131
Water Body Name	Irk (Wince to Irwell)
Water Body Type	River
Water Body area*	30.975 km ²
Hydromorphological Designation	Heavily modified water body
Overall Ecological Status	Moderate
Current Overall Status	Moderate
Status Objective (Overall)	Good by 2027 (due to disproportionate burdens; no known technical solution is available; cause of adverse impact unknown)
Justification for not Achieving Good Status by 2015	Point and Diffuse source pollution and Physical modifications
Protected Areas	Nitrate Vulnerable Zone NVZ ID (S643)
Biological quality elements	
Overall biological quality element status objective	Good 2027 – Low confidence due to disproportionate burdens and unfavourable balance of costs and benefits

Parameter	Current WFD Baseline Status
Fish	Poor
Invertebrates	Poor
Macrophytes	Poor
Physico-chemical Quality Elements	
Acid Neutralising Capacity	High
Ammonia (Phys-Chem)	Good
Dissolved Oxygen	High
pH	High
Phosphate	Moderate
Temperature	High
Overall Physico-Chemical Quality Element Status Objective	Moderate
Specific Pollutants	High
Triclosan	High
Manganese	High
Copper	High
Iron	High
Zinc	High
Chemical	Fail
Overall chemical Quality Element Status Objective	Good by 2063 (due to disproportionate burdens; natural conditions; chemical status recover time; technical infeasibility of not knowing what technical solutions is available)
Priority Substances	Fail

Parameter	Current WFD Baseline Status
Lead and its Compounds	Good
Nickel and its Compounds	Good
Priority Hazardous Substances	Fail
Mercury and its compounds	Fail
Perfluorooctane sulphate (PFOS)	Fail
Polybrominated diphenyl ethers (PBDE)	Fail
Benzo (a) pyrene	Good

Table 4-2 - Baseline data for scoped-in WFD quality elements for Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB112069061131) WFD water body

Parameter	Current WFD Baseline Status
Water Body ID	GB 112069061452
Water Body Name	Irwell/Manchester Ship Canal
Water Body Type	River
Water Body area*	61.939 km ²
Hydromorphological Designation	Heavily modified water body
Overall Ecological Status	Moderate
Current Overall Status	Moderate
Status Objective (Overall)	Good by 2027 (due to disproportionate burdens; no known technical solution is available; cause of adverse impact unknown)
Justification for not Achieving Good Status by 2015	Point and Diffuse source pollution and Physical modifications
Protected Areas	Nitrate Vulnerable Zone NVZ ID (S638)
Biological quality elements	
Overall biological quality element status objective	Good 2027 – Low confidence due to disproportionate burdens and unfavourable balance of costs and benefits

Parameter	Current WFD Baseline Status
Fish	Poor
Invertebrates	Poor
Macrophytes	Poor
Physico-chemical Quality Elements	
Acid Neutralising Capacity	High
Ammonia (Phys-Chem)	Good
Dissolved Oxygen	High
pH	High
Phosphate	Moderate
Temperature	High
Overall Physico-Chemical Quality Element Status Objective	Moderate
Specific Pollutants	High
Triclosan	High
Manganese	High
Copper	High
Iron	High
Zinc	High
Chemical	Fail
Overall chemical Quality Element Status Objective	Good by 2063 (due to disproportionate burdens; natural conditions; chemical status recover time; technical infeasibility of not knowing what technical solutions is available)
Priority Substances	Fail

Parameter	Current WFD Baseline Status
Lead and its Compounds	Good
Nickel and its Compounds	Good
Priority Hazardous Substances	Fail
Perfluorooctane sulphate (PFOS)	Fail
Polybrominated diphenyl ethers (PBDE)	Fail
Benzo (a) pyrene	Good

4.2 CATCHMENT CHARACTERISTICS

- 4.2.1. The River Irk flows in an approximately north-east to south-west direction. It is a tributary of the River Irwell and joins the River Irwell 0.7 km downstream of Application 5, draining a catchment area of approximately 72.5 km². The River Irk is characteristic of low-moderate relief catchment, with a maximum catchment elevation of 246.80 mAOD, having partial headwaters but extensively urbanised in the lower Irk (including North Manchester). Land use in the catchment is dominated by urban areas and industrial use with smaller parcels of moorland upstream. The River Irk flows for approximately 72 km before joining the River Irwell, at NGR SJ 838989.

CATCHMENT GEOLOGY AND SOILS

- 4.2.2. The published geological map of the region indicates that Made Ground is present above the superficial deposits across the entire Study Area.
- 4.2.3. The bedrock geology underlying the superficial deposits comprises the Chester Formation (sandstone) and the Manchester Marls Formation (predominantly mudstone with sandstone and siltstone bands, as recorded in the 2022 GI borehole logs²⁵). The Chester Formation was encountered at depths between 2 and 7.65 m below ground level (mbgl) in plots NT02 and NT03. The GI (2022)²⁵ indicates that the Chester Formation overlies the Manchester Marls Formation in NT02 whilst in plot NT03, the Manchester Marls Formation was also found directly beneath the Glacial Till. In plot NT04, the bedrock beneath the Glacial Till comprises the Manchester Marls Formation encountered at depths between 6 and 10 mbgl.
- 4.2.4. Glacial Till is designated by the Environment Agency as a Secondary (undifferentiated) aquifer, which are typically low permeability aquifers that rarely support small supplies or baseflow to rivers.
- 4.2.5. The Chester Formation is designated as a Principal aquifer, which is an aquifer that regionally provides significant quantities of potable drinking water and may also support baseflow to rivers, lakes, and wetlands. The Manchester Marls Formation is designated as a Secondary B aquifer, which is a designation given to aquifers with mainly lower permeability layers that may store and yield limited amounts of groundwater. The bedrock aquifers are expected to be in hydraulic

²⁵ Arup (2022). Victoria North Infrastructure Works: Ground Investigation Interpretative Report.

connectivity with the River Irk (based on the 2022 GI25) and therefore, likely support baseflow to the river.

- 4.2.6. The published soils data map of the region¹⁴ categorises the area as Soilscape 17. This indicates slowly permeable, seasonally wet acid loamy and clayey soils.

CATCHMENT HYDROLOGY

- 4.2.7. According to the National River Flow Archive (NRFA)¹², the River Irk has two nearby gauge stations. Irk at Scotland Weir (NFRA station number: 69003) is located 0.5 km downstream of the Proposed Development. This station is located at NGR SJ 8412299179 and drains a catchment area of 72.5 km². This gauging station was decommissioned in 2001 and replaced by Collyhurst (NFRA station number: 69043), located approximately 0.2 km upstream of Application 5 at NGR SJ 84883 99720.
- 4.2.8. Catchment hydrology is reflective of an urbanised lower catchment and moorland upper catchment. Irk at Collyhurst Weir is gauged above QMED and flows in this range are consistent with those at Irk at Scotland Weir. The median low flow for the catchment is estimated at 1.948 m³/s with a Q95 estimated to be 0.916 m³/s (Q95 is defined as the flow equalled or exceeded for 95% of the flow record and is a low flow parameter). Annual average rainfall for 1941-1970 and 1961-1990 is between 1049 mm to 1026 mm. A summary of the hydrology data from NFRA is summarised in **Table 4-3**.

Table 4-3 - Catchment hydrology for the River Irk (Irk at Collyhurst Weir)

Parameter	Result
Catchment Area	72.3 km ²
Median Flow	1.948 m ³ /s
95% exceedance probability (Q95)	0.916 m ³ /s
Q70	1.169 m ³ /s
Q50	1.408 m ³ /s
Q10	3.495 m ³ /s

HISTORICAL CHANNEL CHANGE

- 4.2.9. A desk study of historic information sources pertaining to the channel planform of the River Irk was undertaken using high resolution aerial imagery from Geograph¹⁵ and historical maps accessed from the National Library of Scotland¹⁰. The study looked at the entire length of the River Irk through the Proposed Development, and 2 km upstream and downstream of the Proposed Development.
- 4.2.10. In comparison to the earliest available map of Red Bank and Dantzic Street (1848; National Library of Scotland, 2021), the surrounding landscape to the River Irk and Irwell has changed considerably. The channel remains heavily confined on either side of the riverbank, in a heavily engineered channel profile. Maps do not give a clear view of the River Irk or Irwell natural planform. Instead, mapping suggests the River Irk running through the Proposed Development and River Irwell has largely been influenced through anthropogenic change.

- 4.2.11. The 1884-1900 map of Red Bank and Dantzic Street, presents a highly industrial area, with either side of the River Irk under intense industrial usage, including a brick works, iron works and clay pit. This evidence suggests the River Irk would have undergone intense industrialisation resulting in heavily polluted runoff reaching the watercourse, limiting the biological and chemical quality of the river. The River Irk appears to be culverted in the downstream extent of the site, where the Irk joins the Irwell. It is unclear from historical mapping when the culvert was constructed. The culvert is still in place at this location, the entrance to which is 150 m downstream from Application 5. Additionally, mapping shows an embankment on the right bank of the River Irk, it is unknown to what extent the riparian zone extended away from the riverbank, however, it is clear that a wall was not in place at this time.
- 4.2.12. Between 1900-1948, the channel planform and riverbank remain the same as preceding years. Upstream, the River Irk becomes more urbanised, with industrialised land becoming decommissioned.
- 4.2.13. Between 1948-1968, the channel planform remains the same with evidence of the channel becoming more confined, comparable to contemporary engineering on the River Irk's length. Industrial usage within the Site became decommissioned resulting in the expected reduction of pollutants until rapid urbanisation occurs from 1980 onwards.
- 4.2.14. The urbanisation of Red Bank and Dantzic Street increased between 1980-2000. By 2000, all industrial waste land on the right bank of the River Irk, within the Site, had been developed for residential and commercial usage. Aerial photographs suggest that the channel remains the same to contemporary standards, with a hard engineered riverbank (wall) and culvert remaining in the same location. Mapping and photographs do not reveal when Scotland Weir was installed. A site walkover located Collyhurst Weir 150 m upstream of Application 5 but it is now known when this was constructed.

4.3 BASELINE CHARACTERISTICS OF WFD SURFACE WATER QUALITY ELEMENTS (RIVER IRK)

BIOLOGICAL QUALITY ELEMENTS

Fish

- 4.3.1. The River Irk (Wince to Irwell) (GB112069061131) WFD water body has no current data for fish quality element. A search of the EA's Ecology and Fish Data explorer returned fish data from a single catch electric fishing survey carried out in October 2018, at a monitoring location approximately 10 km downstream of Application 5 (NGR SD 91903 00725)⁹. A total of four fish species were recorded in the survey, with the majority of the catch being minnow *Phoxinus phoxinus* (Table 4-4).
- 4.3.2. A fish habitat survey was undertaken by Arup in May 2021 and a detailed fish survey was undertaken by RSK in September 2021, to establish baseline conditions for fish populations along the River Irk. Both surveys concluded that the fish species observed reflects the poor abiotic and biotic conditions of the River Irk, resulting in the absence of other less tolerant species, such as brown trout *Salmo trutta*, which ordinarily would be expected to occupy such habitats. Overall, the survey indicates that the River Irk supports a fish community with low species diversity.

Table 4-4 - Environment Agency fish survey data from the River Irk (NGR SD 91903 00725), carried out on 09/10/2018

Common Name	Latin Name	No. of Individuals
Brown / sea trout	<i>Salmo trutta</i>	31
Stone loach	<i>Barbatula barbatula</i>	10-99*
Bullhead	<i>Cottus gobio</i>	10-99*
Minnow	<i>Phoxinus</i>	100-999*

*minor species recorded on a logarithmic scale

Invertebrates

- 4.3.3. A review of WFD status in River Irk (Source to Wince) (GB112069061161) and River Irk (Wince to Irwell) (GB112069061131) shows that the invertebrates biological quality element is classified as 'Poor' status, suggesting a significantly impaired invertebrate population, with a low diversity and abundance of species.
- 4.3.4. A search of the EA's Ecology and Fish Data Explorer⁹ returned results from aquatic macroinvertebrate surveys carried out in spring and summer 2022, at an EA monitoring location located approximately 10 km upstream of Application 5 (NGR SD 87469 06025). The biological metrics calculated from these surveys are displayed in **Table 4-5**.

Table 4-5 - Environment Agency aquatic macroinvertebrate survey biological metrics from spring (March 2022) and Summer (June 2022) surveys carried out on the River Irk (NGR SD 87469 06025)

Date	Season	WHPT-ASPT	WHPT NTAXA	LIFE (TL5)	PSI (TL5)	CCI (TL5)
28/03/2022	Spring	5.01	15	7.78	57.89	3.60
22/06/2022	Summer	4.56	15	7.33	47.22	3.60

- 4.3.5. No protected species were identified in either sample. However, the invasive non-native species (INNS), the New Zealand mud snail *Potamopyrgus antipodarum* was recorded in both the spring and summer samples.

Macrophytes/Phytoplankton (diatoms)

- 4.3.6. In 2021 (Cycle 3), the macrophytes/phytobenthos quality element was assessed as being of 'Poor' status in the River Irk (Wince to Irwell) (GB112069061131) WFD water body, with point source pollution listed as a reason for not achieving Good status.
- 4.3.7. A search of the EA's Ecology and Fish Data Explorer⁹ returned macrophyte data from an EA survey carried out in 2018, at a sampling location approximately 0.3 km upstream of Application 5 (NGR SJ 84863 99641).

4.3.8. A total of 10 taxa were recorded; no protected species were noted, but the INNS Himalayan Balsam *Impatiens glandulifera*, giant hogweed *Heracleum mantegazzianum*, and Japanese knotweed *Fallopia japonica* were recorded. The taxa identified were dominated by flowering macrophytes. The taxa recorded are detailed below in **Table 4-6**.

Table 4-6 - Environment Agency macrophyte taxon list from River Irk (NGR SJ 84863 99641) carried out on 26/06/2018, including respective percentage cover band values.

Latin Name	Common Name	Taxon Cover Value
<i>Cladophora glomerata/Rhizoclonium hieroglyphicum</i>	Filamentous algae (reticulated)	7
<i>Fontinalis antipyretica</i>	Greater water-moss	2
<i>Alisma plantago-aquatica</i>	Common water-plantain	1
<i>Heracleum mantegazzianum</i>	Giant hogweed	1
<i>Impatiens glandulifera</i>	Himalayan balsam	1
<i>Phalaris arundinacea</i>	Reed canary grass	1
<i>Potamogeton pectinatus</i>	Fennel pondweed	1
<i>Fallopia japonica</i>	Japanese knotweed	1
<i>Persicaria hydropiper</i>	Water pepper	1
<i>Rorippa nasturtium-aquaticum</i> agg.	Water cress	1
Total number of taxa		10

PHYSICO-CHEMICAL QUALITY ELEMENTS

A search of the EA's water quality archive¹³ returned water quality data at sampling point NW-88002380 (River Irk at Red Bank above Scotland Weir¹²). 276 samples were taken between 2000 and 2023. **Table 4-7** displays the baseline sampling results of physico-chemical water quality elements that are screened in for this assessment.

Table 4-7 - Baseline data of WFD water quality elements scoped in for assessment River Irk (Wince to Irwell) (GB112069061131) WFD water body

Physico-chemical Quality Element	Determinant	Data Range between May 2022-Feb 2023
Thermal conditions	Temperature of Water (°C)	6.4°C and 17.2°C
Oxygenation conditions	Oxygen dissolved as O ₂ (mg/l)	9.74 mg/l and 12.3 mg/l
Salinity	Conductivity at 25 C (µs/cm)	323 µs/cm and 634 µs/cm
Acidification status	pH	7.99 and 8.17

Physico-chemical Quality Element	Determinant	Data Range between May 2022-Feb 2023
Nutrient conditions	Nitrogen	3.1-6.1mg/l
Specific pollutants	Solids, Suspended at 105 C	<3-38 mg/l

INVASIVE NON-NATIVE SPECIES

- 4.3.9. The following invasive non-native species are present; Himalayan Balsam, Giant Hogweed and Japanese Knotweed.

HYDROMORPHOLOGY QUALITY ELEMENTS

Quantity and Dynamics of Flow

- 4.3.10. The River Irk is a heavily modified, straight sinuous, partly confined river, with a substantial amount of hydraulic variation. There are numerous artificial features within the River Irk which can alter flow dynamics. Some of these features which are close to the Site include:
- Scotland Weir (approximately 400 m downstream of Application 5);
 - Collyhurst Weir (approximately 150 m upstream of Application 5);
 - A culvert (approximately 350 m downstream of the Proposed Development); and
 - Two footbridges (approximately 100 m upstream and 100 m downstream of Application 5).
- 4.3.11. The riverbank is extensively artificial, with brick walls confining either side of the channel. These constraints on the channel restrict natural processes from forming natural in-channel features. There is a lack of bank erosion and natural deposition, having implications for invertebrate and fish numbers who depend on hydromorphological processes.
- 4.3.12. The channel displays some variation in flow patterns, influenced by artificial features and geomorphology of the channel. The majority of bed substrate is comprised of cobble and gravel. The channel flow type is categorised as having no perceptible flow (defined as water not clearly moving due to obstructions in the channel, e.g., a weir).

Table 4-8 provides a comparison of existing and post-development flows within the River taken from the flood model used to inform the accompanying Flood Risk Assessment¹⁷. Six nodes ranging across the Study Area were picked for the assessment of flow dynamics, ranging from 10 m downstream to 10 m upstream of the Proposed Development.

Table 4-8 - Pre and Post development flow dynamics comparison

River Node	Average Flow Pre-development (100-year) (mg/l)	Average Flow Post-development (100 year + 35% climate change) (mg/l)	Difference between Pre-development and Post-development flow (mg/l)
IRK01_1878	30.554	30.55428	0.00028
IRK_1.15di	40.99683	40.98171	-0.01512
IRK01_1424i	36.64304	36.57555	-0.06749
IRK01_1188A	36.64304	36.57555	-0.06749

River Node	Average Flow Pre-development (100-year) (mg/l)	Average Flow Post-development (100 year + 35% climate change) (mg/l)	Difference between Pre-development and Post-development flow (mg/l)
IRK01_1081	42.19047	42.19357	0.0031
IRK01_0961	42.83892	42.82839	-0.01053
IRKR01_0648	39.52414	39.50724	-0.0169

Connection to Groundwater

- 4.3.13. Groundwater flow within the Made Ground and Glacial Till is expected to be variable and limited in lateral and vertical extent with flow occurring within the higher permeability lenses (i.e., sand and gravel).
- 4.3.14. The groundwater flow direction within the bedrock aquifers is considered to be towards the River Irk, based on the results of the GI (2022)²⁵. Groundwater flow within the sandstone aquifer occurs via a combination of intergranular and fracture flow. The Manchester Marls Formation predominantly comprises low permeability mudstones with bands of more permeable sandstones, where flow is expected to occur via a combination of intergranular and fracture flow.
- 4.3.15. The Baseflow Index calculated at the Scotland Weir gauging station is 0.51. This indicates that approximately half of total flow volume in the River Irk is derived from baseflow throughout the catchment.

River Continuity

- 4.3.16. The channel length within the Site is heavily modified, changing the natural morphological state of the River Irk. Within this reach, the River Irk has been confined by brick walls on either side of the riverbank, restricting lateral connectivity of the channel with the floodplain. A single footbridge and single weir (Collyhurst Weir) are located approximately 100 m and 150 m upstream of the site, respectively. Both structures will have an influence on river flow, fixed channel profile and longitudinal connectivity.

River Width and Depth Variation

- 4.3.17. The river width and depth are relatively homogenous due to the anthropogenic pressures that influence the River Irk. The River Irk meanders at plots NT02-04, at this point, the River Irk channel is approximately 10 m wide. Approximately 500 m downstream of plots NT02-04 the channel narrows by approximately 5 m at the confluence with the River Irwell. The River Habitat Survey (RHS) data reveals the channel and banks to be extensively reinforced throughout the surveyed reach.
- 4.3.18. At the location close to where the outfall is proposed, the channel has a typical cross section of 16 m wide and 5 m deep with nearly vertical channel sides. These dimensions are sourced from the topographical survey used to inform the flood model of the River Irk.

Structure and Substrate of the Riverbed

- 4.3.19. The channel substrate was not visible on the day of walkover survey, however the river habitat survey revealed cobble and gravel to be the dominant channel substrate within the survey reach. The river habitat survey revealed large substrate is visible throughout the channel and is a result of

bank protection failure releasing large material into the channel. Artificial constraint of the river results in higher stream power and a lower likelihood of smaller sediments being deposited, this is a result of historical bypass and meanders.

Structure of Riparian Zone

- 4.3.20. No riparian zone is present. The channel side is heavily modified with brick walls, and limited vegetation encroaching through the structure. Within 10 m either side of the River Irk, there is limited vegetation, with only a few trees present. The surrounding area is heavily urbanised with industrial and commercial buildings/wasteland. Three non-invasive species were present Himalayan Balsam, Giant Hogweed and Japanese Knotweed.

CHEMICAL QUALITY ELEMENTS

Priority Substances

- 4.3.21. A review of WFD status in River Irk (Wince to Irwell) (GB112069061131) WFD water body revealed a chemical status of 'Fail'. The River Irk failed on one chemical under priority substances: Cypermethrin. Reasons for not achieving 'Good' status include:
- Point source pollution from sewage discharge (continuous) - pollution is phosphate and ammonia;
 - Physical modification from water industry and local/central government; and
 - Diffuse source pollution from agriculture, urban and transport.

Priority Hazardous Substances

- 4.3.22. A review of WFD status in River Irk (Wince to Irwell) (GB112069061131) WFD water body revealed a chemical status of 'Fail'. The River Irk failed on three priority hazardous substances, Mercury, and its compounds, Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE). No sector is deemed responsible for not achieving 'Good' status. Mitigation measures have been implemented and are awaiting recovery.

4.4 BASELINE CHARACTERISTICS OF WFD SURFACE WATER QUALITY ELEMENTS (RIVER IRWELL)

BIOLOGICAL QUALITY ELEMENTS

Fish

- 4.4.1. The Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD water body has no current data for the fish quality element. A search of the EA's Ecology and Fish Data explorer⁹ returned no fish data for downstream of the Croal Irwell catchment.

Invertebrates

- 4.4.2. A review of WFD status of the Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB112069061452) WFD water body showed that biological elements were not assessed as part of Cycle 3 (2019).
- 4.4.3. A search of the EA's Ecology and Fish Data explorer⁹ returned no invertebrate data for the Croal Irwell operational catchment downstream of Application 5.

Macrophytes/Phytoplankton (diatoms)

- 4.4.4. A search of the EA's Ecology and Fish Data explorer⁹ returned no macrophyte data for the Croal Irwell operational catchment downstream of Application 5.

PHYSICO-CHEMICAL QUALITY ELEMENTS

- 4.4.5. A search on the EA's water quality archive returned water quality data at sampling point NW-88002383 (River Irwell at Regent Rd Bridge (A57))¹³. 194 samples were taken between 2023 and 2000. Recent samples were taken between May 2022 and February 2023. **Table 4-9** displays the baseline sampling results of physico-chemical water quality elements that are screened in for this assessment.

Table 4-9 - Baseline data of WFD water quality elements scoped in for assessment Irwell/Manchester Ship Canal (Irk to Confluence with Upper Mersey) (GB 112069061452) WFD water body

Physico-chemical Quality Element	Determinant	Data Range between May 2022-Feb 2023
Thermal conditions	Temperature of Water (°C)	5.4°C and 18.2°C
Oxygenation conditions	Oxygen dissolved as O ₂ (mg/l)	7.97 mg/l and 12 mg/l
Salinity	Conductivity at 25 C (µs/cm)	226 µs/cm and 632 µs/cm
Acidification status	pH	7.5 and 7.82
Nutrient conditions	mg/l	1.9 - 6.3
Specific pollutants	Suspended Solids 105 C (mg/l)	2.93 mg/l and 6.12 mg/l

INVASIVE NON-NATIVE SPECIES

- 4.4.6. No data has been provided for Invasive Non-Native species along the River Irwell.

HYDROMORPHOLOGY QUALITY ELEMENTS

Quantity and Dynamics of Flow

- 4.4.7. The Irwell/Manchester Ship Canal (Irk to Confluence with Upper Mersey) (GB 112069061452) WFD water body's upstream extent is the confluence with the River Irk (Wince to Irwell) (GB112069061131) WFD water body. The Irwell/Manchester Ship Canal is heavily modified in order to aid navigation from the Mersey Estuary to Manchester.
- 4.4.8. The riverbank is extensively artificial, with brick or concrete walls confining either side of the channel for most of its length. These constraints on the channel restrict natural processes from forming natural in-channel features. The canalised channel will also increase velocities within the channel due to reduced bed and bank friction and reduced hydraulic radius.

River Continuity

- 4.4.9. The channel length downstream of Application 5 (at the confluence of the River Irk and Irwell) is heavily modified. Within this reach, the River Irwell has been confined by brick or concrete walls either side of the riverbank, restricting lateral connectivity of the channel with the floodplain.

River Width and Depth Variation

The width and depth of the River Irwell downstream of the confluence with the Irk is fairly uniform. The width of the channel is approximately 40 m, and the depth of the channel is unknown. The channel widens downstream of the Regent Road bridge.

Structure and Substrate of the Riverbed

- 4.4.10. The structure and substrate of the riverbed is unknown.

Structure of Riparian Zone

- 4.4.11. No riparian zone is present. The channel side is heavily modified with brick walls, and limited vegetation encroaching through the structure. Within 10 m either side of the River Irwell, there is limited vegetation, with only a few trees present. The surrounding area is heavily urbanised with industrial and commercial buildings/wasteland.

Priority Substances

- 4.4.12. A review of WFD status in Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD water body revealed a chemical status of 'Fail' and it failed on one chemical under priority substances, Cypermethrin.

Reasons for not achieving 'Good' status include:

- Point source pollution from sewage discharge (continuous) - pollution is phosphate and ammonia;
- Physical modification from water industry and local/central government; and
- Diffuse source pollution from agriculture, urban and transport.

Priority Hazardous Substances

The Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD water body failed on four priority hazardous substances, Mercury, and its compounds, Perfluorooctane sulphonate (PFOS), Polybrominated diphenyl ethers (PBDE) and Tributyltin. No sector is deemed responsible for not achieving 'Good' status. Mitigation measures have been implemented and are awaiting recovery.

5 DETAILED IMPACT ASSESSMENT

STEP 1: POTENTIAL GENERIC OPERATIONAL IMPACTS OF THE PROPOSED DEVELOPMENT ON WFD QUALITY ELEMENTS

- 5.1.1. Potential pressures and impacts of Application 5 have been identified along with embedded mitigation measures and are presented in **Table 5-1**. The proposed mitigation thus forms the basis of this assessment.

Table 5-1 – Pressures, potential impacts, and associated mitigation for works to the impacted watercourses and downstream water bodies (Source: Annex IV: Flood Risk Management, UKTAG, 2008)

Pressure	Sub-pressures	Potential Impacts	Mitigation Measures
Flow manipulation	New outfall structure	New structures within the channel have the potential to impact flow dynamics. New outfall structures within the channel have the potential to increase discharge; therefore, increasing the rate of flow. New outfall structures within the channel have the potential to trigger a geomorphic response.	Outfall has been angled to go in the direction of flow. This will minimise impact on hydrological and hydromorphological processes. Surface water discharge will be limited to existing runoff rates. Channel is already heavily modified and any potential change to flow dynamics should be controlled by the existing construction of the channel, as it will already be resilient to the potential level of scour anticipated.
Construction	New outfall structure	Works within the channel can impact flow regime and increase the risk of sediments and pollutants entering the watercourse. Entrainment of materials in overland flow from construction works.	All works in the channel will comply with relevant permits. Flow will be maintained whilst works occur. Treatment will be provided through the temporary drainage systems which are proposed to be adopted during the construction phase. Runoff from construction compounds and vehicular access will be treated and mitigated via the CEMP and construction traffic management plan. The works on site will be managed in accordance with the CIRIA guidance 'C532 control of water pollution from construction sites'²⁶.

²⁶ CIRIA (2001) Control of water pollution from construction sites. Guidance for consultant and contractors (C532).

Pressure	Sub-pressures	Potential Impacts	Mitigation Measures
Modifications to sediment regime	Sediment mobilisation during the construction phase. New outfall – increased discharge into the River Irk.	Entrainment of materials in overland flow from construction works.	Treatment will be provided through the temporary drainage systems which are proposed to be adopted during the construction phase. Runoff from construction compounds and vehicular access will be treated and mitigated via the CEMP and construction traffic management plan. The works on site will be managed in accordance with the CIRIA guidance 'C532 control of water pollution from construction sites'²⁶.

STEP 2: SITE SPECIFIC ASSESSMENT OF APPLICATION 5 AGAINST WFD QUALITY ELEMENTS

- 5.1.2. The site-specific impacts of Application 5 on the biological, physico-chemical and hydromorphological quality elements of the surface water WFD water bodies are provided in **Table 5-2** and **Table 5-3**.

Table 5-2 – Operational impacts on the WFD quality elements on the Irk (Wince to Irwell) (GB112069061131) WFD water body

Quality Element	Potential Impact	Mitigation
Water body ID	GB112069061131	
Water body name	Irk (Wince to Irwell)	
Biological Quality Elements		
Fish	Site drainage Acute or prolonged introduction of contaminated run-off (metals, oils, road salt) has potential to reduce water quality for fish. Potential change to fine sediment loads due to entrainment of sediments in site drainage which may impact water quality and affect fish habitat. Direct effects on fish (e.g., gill irritation) and potential for smothering fish eggs in gravel, and degradation of spawning habitat (siltation of gravel beds) may also occur. Outfall Introducing a new inflow to the channel could cause local scour and may change the aquatic habitat.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality. Outfall Outfalls will be designed to control the risk of scour to the bed and banks if required, thus preventing the increase in fine sediment load and associated pollutants. Discharge will be limited to existing rate; therefore, impact to river flow dynamics will be minimal.
Invertebrates	Site drainage Acute or prolonged introduction of contaminated run-off (metals, oils, road salt) has potential to reduce water quality for invertebrates. Potential change to fine sediment loads due to entrainment of sediments in site drainage which may impact water quality and affect invertebrate habitat. Outfall	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.

Quality Element	Potential Impact	Mitigation
	Outfall has the potential to impact on river flow dynamics, substrate, and riverbed, therefore leading to localised change in the nature of the benthic invertebrate habitat.	Outfall Embedded mitigation within the design of the outfalls will ensure that discharge is aligned with the direction of flow. Discharge will be limited to existing rate; therefore, impact to river flow dynamics will be minimal.
Macrophytes and Phytobenthos combined	Site drainage Acute or prolonged introduction of contaminated run-off (metals, oils, road salt) has potential to reduce water quality for macrophytes and phytobenthos. Potential change to fine sediment loads due to entrainment of sediments in site drainage may impact water quality which may affect opportunities for aquatic flora. Outfall There is potential for the new outfall to result in changes to the macrophyte community in its immediate vicinity, due to the change in shading from the new structure. There is limited riparian vegetation where the structure is to be placed; therefore, the impact is negligible.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality. Outfall INNS management to be adopted. Further mitigation, to provide betterment to aquatic flora is to be adopted in Application 4.
Physico-chemical Quality Elements		
Thermal conditions	Site drainage Discharge of site drainage could introduce a change to thermal conditions locally in the channel.	Site drainage All discharge from the Application 5 will be limited to existing rate. Attenuation of surface water will be below ground and therefore unlikely to experience significant warming prior to discharge to the River Irk.
Oxygenation conditions	Site drainage The potential for additional silt to become suspended in the River Irk may lower oxygen levels. This could be sourced from	Site drainage

Quality Element	Potential Impact	Mitigation
	exposed sediments in the construction phase and entrainment via the new drainage network in the operation phase. Outfall The potential for additional sediment loads due to the risk of scour of the bed and banks may also alter oxygenation conditions. Scour is likely to be negligible due to the artificial nature of the channel.	Runoff from construction compounds and vehicular access will be treated and mitigated via the CEMP and construction traffic management plan. All site drainage will be treated and mitigated via the CEMP and CIRIA C532 guidelines²⁶. Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality. Outfall Embedded mitigation within the design of the outfalls will ensure that discharge is aligned with the direction of flow, thus reducing risk of scour, and preventing the increase in fine sediment load.
Salinity	Site drainage There is a potential for an increase in salinity as a result of routine runoff from the Site.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.
Acidification status	Site drainage There is a potential for an increase in acidification as a result of routine runoff from the Site.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and

Quality Element	Potential Impact	Mitigation
		therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.
Nutrient conditions	Site drainage There is potential for an increase in ammonia and nitrates as a result of routine runoff from the Site.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.
Hydromorphological Quality Element		
Quantity and dynamics of water flow	Site drainage Surface water runoff from the Application 5 could add additional water into the River Irk. Infrastructure in the floodplain Potential impact to flood flow dynamics, due to runoff from impermeable surfaces and also reduction of flood storage volume from works within the floodplain. The average in-channel flow in the 1 in 100 year plus climate change flood event, of pre and post development is 39.303 m ³ /s and 39.264 m ³ /s, respectively. Outfall The additional inflow to the River Irk from this outfall could alter local flow dynamics.	Site drainage Surface water discharge will be limited to existing runoff rates. This is likely to be a betterment given the site is currently brownfield and unlikely to have any attenuation of flows. Infrastructure in the floodplain Drainage strategy incorporates SuDS features to account for increased storage capacity and runoff from the development. The flood model shows that there is no significant change to flows within the channel during a flood event as a result of the infrastructure within the floodplain. Outfall Embedded mitigation within the design of the outfalls will ensure that discharge is aligned with the direction of flow. Discharge will be limited to existing rate; therefore, impact to river flow dynamics will be minimal.

Quality Element	Potential Impact	Mitigation
River continuity	Outfall Outfalls may limit lateral connectivity locally. Longitudinal connectivity may also be disrupted at higher flows, albeit locally.	Outfall Embedded mitigation within the design of the outfalls will ensure that discharge is aligned with the direction of flow.
River depth and width variation	Outfall The proposed outfall may initiate bed and bank scour around and downstream of the structure, thereby having the potential to impact upon the watercourse width and depth variation within the River Irk (Wince to Irwell) (GB112069061131) WFD water body. The width and depth of the channel is more influenced by the existing artificial bed and bank profile.	Outfall Embedded mitigation within the design of the outfalls will ensure that discharge is aligned with the direction of flow to reduce likelihood of local scour to bed and banks.
Structure and substrate of the riverbed	Site drainage Routine runoff from the Site could alter sediment loading and therefore the substrate of the river bed. Outfall The proposed outfall may initiate bed and bank scour around and downstream of the structure, thereby having the potential to increase fine sediment load within the channel and increase siltation.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Outfall Embedded mitigation within the design of the outfalls will ensure that discharge is aligned with the direction of flow to reduce likelihood of local scour to bed and banks.
Structure of the riparian zone	Outfall The proposed outfall will lead to the removal of a section of the riverbank wall. There is limited vegetation and natural structure of the riparian zone. It is limited to overgrowth on bank walls.	Outfall INNS management to be adopted. Further mitigation, to provide betterment to aquatic flora is to be adopted in Application 4.

Table 5-3 - Operational impacts on the WFD quality elements on the Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD water body.

Quality Element	Potential Impact	Mitigation
Water body ID	GB112069061452	
Water body name	Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) water body	
Biological Quality Elements		
Fish	Site drainage Acute or prolonged introduction of contaminated run-off (metals, oils, road salt) has potential to reduce water quality for fish. Potential change to fine sediment loads due to entrainment of sediments in site drainage may impact upon water quality which may affect fish habitat. Direct effects on fish (e.g., gill irritation) and potential for smothering fish eggs in gravel, and degradation of spawning habitat (siltation of gravel beds) may also occur.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality. The River Irwell has greater dilution capacity and therefore, any potential impacts are reduced for this water body.
Invertebrates	Site drainage Acute or prolonged introduction of contaminated run-off (metals, oils, road salt) has potential to reduce water quality for invertebrates. Potential change to fine sediment loads due to entrainment of sediments in site drainage may impact upon water quality which may affect invertebrate habitat.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality. The River Irwell has greater dilution capacity and therefore, any potential impacts are reduced for this water body.

Quality Element	Potential Impact	Mitigation
Macrophytes and phytobenthos combined	Site drainage Acute or prolonged introduction of contaminated run-off (metals, oils, road salt) has potential to reduce water quality for macrophytes and phytobenthos. Potential change to fine sediment loads due to the entrainment of sediments in site drainage may impact water quality which may affect opportunities for aquatic flora.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality. The River Irwell has greater dilution capacity and therefore, any potential impacts are reduced for this water body.
Physico-Chemical Quality Elements		
Thermal conditions	Site drainage Discharge of site drainage could introduce a change to thermal conditions; however, these effects are not anticipated to reach the River Irwell, mostly due to its dilution capacity.	Site drainage All discharge of Application 5 will be limited to existing rate. The majority of surface water attenuation will be below ground, whilst above ground bio-retention systems on Dantzic Street will be shaded by planting, therefore unlikely to experience significant warming prior to reaching the River Irwell.
Oxygenation conditions	Site drainage The potential for additional silt to become suspended in the River Irwell may lower oxygen levels. This could be sourced from exposed sediments in the construction phase and entrainment via the new drainage network in the operation phase.	Site drainage Runoff from construction compounds and vehicular access will be treated and mitigated via the CEMP and construction traffic management plan. All site drainage will be treated and mitigated via the CEMP and CIRIA C532 guidelines ²⁶ . Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.

Quality Element	Potential Impact	Mitigation
Salinity	Site drainage There is a potential for an increase in salinity as a result of routine runoff from the Site. The impacts to the River Irwell are reduced by its dilution capacity.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.
Acidification status	Site drainage There is a potential for an increase in acidification as a result of routine runoff from the Site. The impacts to the River Irwell are reduced by its dilution capacity.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.
Nutrient conditions	Site drainage There is potential for an increase in ammonia and nitrates as a result of routine runoff from the Site. The impacts to the River Irwell are reduced by its dilution capacity.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge. Furthermore, the new drainage network will reduce the volume of water drained to the current CSO and therefore this should reduce the frequency of discharges from the CSO to the watercourse, therefore improving water quality.
Hydromorphological Quality Element		
Quantity and dynamics of water flow	Site drainage Surface water runoff from the Proposed Development could add additional water to the River Irk and therefore the River Irwell. Any localised impacts to flow dynamics are not anticipated to reach the River Irwell.	Site drainage Surface water discharge will be limited to existing runoff rates. This is likely to be a betterment given the site is currently brownfield and unlikely to have any attenuation of flows.

Quality Element	Potential Impact	Mitigation
Structure and substrate of the riverbed	Site drainage Routine runoff from the Site could alter sediment loading and therefore the substrate of the river bed.	Site drainage Application 5 includes the implementation of a drainage strategy which provides treatment of surface water prior to discharge.

STEP 3: REVIEW OF MITIGATION MEASURES TO DELIVER WFD OBJECTIVES

- 5.1.3. An assessment of Application 5 compliance with the mitigation measures set out for the Irk (Wince to Irwell) (GB112069061131) WFD water body are presented in **Table 5-4**. There are no mitigation measures applicable within the Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD water body.

**Table 5-4 - Review of how Application 5 could interact with the proposed mitigation measures for the Irk (Wince to Irwell)
(GB112069061131) WFD water body**

Category	Measure	Justification
Working with physical form and function	2. Remove obsolete structure	Mitigation measures to remove obsolete structures have been identified to be located 2.5 km upstream of Application 5. No proposed works within the channel and on the riverbank will impact mitigation upstream of Application 5.
	4. Remove or soften hard bank	Mitigation measures to remove or soften hard banks have been identified to be located approximately 6.5 km upstream of Application 5. Proposed works are not likely to impact mitigation measures upstream of Application 5.
Structural modification	16. Fish passes	Structural modification mitigation measures are proposed to occur approximately 125 m downstream of Application 5.
	19. Enhance ecology	Mitigation measure to enhance ecology have been identified to be located > 7 km upstream of Application 5. Proposed works are not likely to impact mitigation measures upstream of Application 5.
Operations and management	36. Invasive species techniques	Mitigation measures for invasive species techniques have been identified to occur within Application 5. An Invasive Species Method Statement (ISMS) will be produced which will provide details on the protocols for controlling and eradicating INNS from the ground flora within the woodland, in advance of, and during, construction works. The ISMS will cover both the INNS removal and management of application 5, immediately downstream of the Proposed Development and within areas where works are to occur. The ongoing management plan will contribute towards this WFD mitigation measure.
	38. Sediment management strategy	Sediment management strategy mitigation techniques are proposed to occur adjacent to the River Irk (left bank), approximately 20 m from the Proposed Development. Application 5 will have negligible impact to sediment within the channel from treated site drainage and mitigation methods set out in the CEMP. The ongoing management will contribute towards this WFD mitigation measure.
	47. Align and attenuate flow	This mitigation measure to align and attenuate flow has been identified for a location approximately 5.5 km upstream of the Proposed Development. Proposed works are not likely to impact mitigation measures upstream of the Proposed Development.

Category	Measure	Justification
	54. Educate landowners	This mitigation measure to educate landowners has been identified for a location approximately 5.5 km upstream of the Proposed Development. Proposed works will not interfere with the education of landowners in the upper catchment.

STEP 4: ASSESSMENT OF APPLICATION 5 AGAINST WFD OBJECTIVES

- 5.1.4. The compliance of Application 5 will be determined based upon an assessment against the following objectives relating to the biological, physico-chemical and hydromorphological quality elements:
- Does Application 5 cause deterioration in the Ecological Potential or Status of a body of surface or ground water?
 - Does Application 5 compromise the ability of the water body to achieve Good Ecological Status or Potential?
 - Does Application 5 cause a permanent exclusion or compromise achievement of the WFD objectives (e.g., mitigation measures) in other water bodies within the same river basin district?
 - Does Application 5 contribute to the delivery of the WFD objectives (e.g., mitigation measures)?
- 5.1.5. The WFD compliance assessment for Application 5 is summarised in **Table 5-5**. All construction phase elements within the Proposed Development, highlighted in Section 6, are all short term, with impacts to be mitigated through the CEMP. All activities associated with the operational phase are assessed for compliance with WFD status.

Table 5-5 – Compliance assessment of Application 5 against WFD Status

Water Body ID	GB112069061131	GB112069061452
Water body name	Irk (Wince to Irwell) Water body	Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey)
Deterioration in the status/potential of the water body	Biological: No deterioration of the current and potential biological status for this water body is expected when the mitigation outlined in the CEMP is implemented. Furthermore, the treatment and control of site drainage, potential reduced frequency of CSO output and design of the proposed outfall are all expected to reduce potential impact to aquatic habitat and species so that there is no deterioration in biological quality elements. Physico-chemical: The treatment and control of site drainage, potential reduced frequency of CSO output and design of the proposed outfall are all expected to reduce potential impact to physico-chemical quality elements so that there is no deterioration in this current status. Hydromorphological: The treatment and control of site drainage and design of the proposed outfall are all expected to reduce potential localised scour. Furthermore, modelling shows that permanent works within the floodplain are not anticipated to significantly affect flow dynamics within the channel during a flood event.	Biological: No deterioration of the current and potential biological status for this water body is expected when the mitigation outlined in the CEMP is implemented. Furthermore, the treatment and control of site drainage and potential reduced frequency of CSO output is anticipated to reduce potential impact to aquatic habitat and species so that there is no deterioration in biological quality elements. Physico-chemical: The treatment and control of site drainage and potential reduced frequency of CSO output are expected to reduce potential impact to physico-chemical quality elements so that there is no deterioration in this current status. Hydromorphological: The control of site drainage is expected to reduce potential impact to sediment processes within the River Irwell. Furthermore, modelling of the River Irk shows that permanent works within the floodplain are not anticipated to significantly affect flow dynamics within the channel during a flood event, therefore negligible change is also anticipated for the River Irwell.

Water Body ID	GB112069061131	GB112069061452
Ability of the water body to achieve Good Ecological Potential/Status	No long-term disturbance is expected because of the works, the ability of the water body to achieve Good Ecological potential/status remains unchanged.	No long-term disturbance is expected because of the works, the ability of the water body to achieve Good Ecological potential/status remains unchanged.
Impact on the WFD objectives of other water bodies within the same RBD	There are no upstream impacts anticipated from the Proposed Development. Downstream impacts have been accounted for as part of this assessment. Downstream impacts are negligible.	There are no downstream impacts anticipated for this water body. Upstream impacts have been accounted for as part of this assessment. Upstream impacts are negligible.
Ability to contribute to the delivery of the WFD objectives	The Proposed Development does not prevent the implementation of WFD mitigation measures within the water body. The Proposed Development forms part of a wider development along the River Irwell, in which improvements are proposed. INNS will be managed as part of the Proposed Development which contributes towards the mitigation measure for the River Irk.	There are no mitigation measures applicable to this water body. The Proposed Development does not prevent the implementation of future improvement works to the River Irwell.

STEP 5: ASSESSMENT OF APPLICATION 5 AGAINST OTHER EU LEGISLATION

- 5.1.6. There is one protected area associated with the Irk (Wince to Irwell) (GB112069061131) WFD water body, a Nitrate Vulnerable Zone (NVZ) which is present across the Study Area. Impacts to the NVZ are predicted to be negligible on the basis of implementation of a CEMP and treated site drainage.
- 5.1.7. There are no protected areas associated with the Irwell/Manchester Ship Canal (Irk to Confluence with Upper Mersey) (GB112069061452) WFD water body.

6 CONSTRUCTION IMPACTS

6.1 POTENTIAL CONSTRUCTION IMPACTS

- 6.1.1. The construction period can be long and have the potential for medium- to long-term effects upon the water environment. Therefore, it is important to consider potential construction impacts upon the WFD quality elements, WFD mitigation measures and actions, and the overall WFD status. Further assessment may also be required pre-construction for application of relevant permit.
- 6.1.2. Effective mitigation should be put in place to eliminate or reduce any potential construction impacts to the receiving water bodies. Construction impacts could also have long-reaching effects extending to other upstream and downstream water bodies, which also need to be considered within the assessment to reduce the risk of impacts to WFD receptors.
- 6.1.3. Furthermore, construction activities may have an adverse impact upon fluvial geomorphological processes, which may consequently have knock-on effects to the hydromorphology, biological and physico-chemical quality elements.
- 6.1.4. Potential Environmental Risks include but are not limited to:
 - Fuel and oil spillage resulting in contamination of watercourse;
 - Contamination of watercourse with sediments; and
 - Temporary change to flow dynamics relating to works within the channel.
- 6.1.5. The release of potentially toxic compounds such as fuel, oils and chemicals could have a significant impact in the vicinity and downstream of the construction site. Measures need to be in place to prevent the accidental release of pollutants into the watercourse.
- 6.1.6. The objectives of the mitigation measures included in the CEMP are to prevent/avoid, reduce and offset these construction impacts. The following mitigation measures, which are not exhaustive, are recommended to be included within the CEMP:

Sediment and pollution control

- Avoid the positioning of stockpiles near to watercourses and ensure they are located outside of the flood zone;
- Stockpiles should be located a minimum of 10 m from the top of bank of any watercourse;
- Cover stockpiles when not in use;
- Contain stockpiles with bunds or sediment fences;
- Control of runoff during construction. This may include creating temporary drainage systems to both alleviate flood risk and help to prevent sediment laden runoff entering the watercourse;
- Compliance with the relevant Sections of *BS6031:2009 Code of Practice for Earthworks*²⁷ with respect to protection of water quality and control of site drainage including washings, dewatering, abstractions, and surface water;
- Fuels and potentially hazardous construction materials should be stored in bunded areas with external cut-off drainage, and fuel should be stored in double skinned tanks with 110% capacity;
- Waste fuels and other fluid contaminants should be collected in leak-proof containers prior to removal from site to an approved processing facility;

²⁷ British Standards Institute (2009) BS 6031:2009 Code of practice for earthworks

- Fuelling and lubrication of construction vehicles and plant should be done on hard standing or on haul roads, where reasonably practical, with appropriate cut-off drainage and located away from watercourses. In the event of plant breakdown drip trays should be used during any emergency maintenance and spill kits will be available on site;
- Provide sediment barriers between earth works and the construction zone and the watercourse to prevent sediment from washing into the river. An exclusion zone of 8 m from the watercourse should be maintained as far as practicable;
- Use of silt fences, silt traps, filter bunds, settlement basins and/or proprietary units to treat sediment laden water generated on site before discharge;
- Use of in-channel silt management systems such as silt curtains within the River Irk during in-channel works or works adjacent to the channel;
- Availability of oil absorbent booms on site to be deployed in the event of a significant spillage;
- Regular inspection of control and treatment measures to ensure they are working effectively;
- Regular checking of construction plant for oil and fuel leaks, particularly when construction works are undertaken in or near the existing site water bodies;
- Collection of waste fuels and other fluid contaminants in leak-proof containers prior to removal from construction site to an approved recycling processing facility;
- Concrete mixing and washing areas should be located more than 10 m from any watercourse; have settlement and re-circulation systems for water reuse; have a contained area for washing out of concrete batching plant or ready-mix lorries; and collect wash-waters and, where necessary, contain wash-water for authorised off-site disposal. Wash-water from concrete should not be discharged into the watercourse;
- Avoiding vehicle cleaning near to existing watercourses;
- Dewatering working areas to maintain a dry construction area and passing any water generated by the dewatering process through silt busters or sediment tanks prior to returning this water to the watercourse;
- Lining any temporary excavations to prevent infiltration of contaminants to the groundwater;
- The creation of a dry-working area for outfall creation;
- Implementation of a temporary drainage system to control contaminants and sediments on site washing into the River Irk;
- Foul drainage from site welfare facilities should be disposed of appropriately. This may be by discharge to the foul sewer or by collection in a septic tank for disposal off site; and
- Deploying appropriate measures/methods in areas where contamination has been identified (or is suspected).

Vegetation Clearance

- Limit the clearance of vegetation on the channel banks and riparian zone. Where practicable, maintain a vegetated buffer strip between the construction zone and the watercourse. Ideally, a minimum buffer strip of 8 m should be retained where possible;
- Where works are required on the watercourse banks, or in-channel, vegetation clearance should be restricted to the working area and should be undertaken only immediately prior to the commencement of those works, except for other circumstances where earlier clearance may be required due to the presence of protected species. Vegetation should be re-established as soon as practicable; and,
- Appropriate management and disposal of invasive non-native species.

Timing of Works

- River works including wall demolition will be timed to avoid disturbance of spawning fish. For the species encountered during detailed fish surveys this period is April- July;
- Undertaking the construction works during the late-spring and summer period typically coincides with lower flow conditions, less precipitation and reduced risk of high flow events, thus reducing the risk of the impacts listed above; and
- Avoid construction activities during high flow events and heavy rainfall. Monitoring of flows and rainfall within the upstream catchment should be undertaken and action taken to halt works should high flows be anticipated due to prevailing weather conditions.

Managing Flood Risk

- Adoption and implementation of a Flood Action Plan by the Principal Contractor;
- Sign up for flood warnings and check online warnings regularly;
- Avoid works in the floodplain or watercourses during high flow events, intense rainfall events or when a flood warning is issued;
- Avoid long term works in the floodplain during winter when fluvial flooding is more likely;
- Site compound(s) should be located outside of the floodplain;
- Materials and mobile machinery should be stored outside the floodplain;
- If a flood warning is received from the EA, all machinery and equipment should be moved out of the floodplain. If this cannot be completed in a safe time, equipment should be secured to prevent it being washed away; and
- All relevant consents should be sought as required from the EA for any temporary works or permanent structures within 8 m of a 'main river' watercourse.

Invasive Non-native Species (INNS)

- 6.1.7. An Invasive Species Method Statement (ISMS) will be produced which will provide details on the protocols for controlling and eradicating INNS from the ground flora within the woodland, in advance of, and during, construction works. The ISMS will cover both the INNS removal and management of application 5, immediately downstream of the Proposed Development and within areas where works are to occur.

Habitats

- 6.1.1. Mitigation should include the protection of habitats as follows:
- Minimise the amount of dredging required;
 - Habitat enhancement opportunities will be sought during the detailed design stage for Application 4 to off-set potential impacts; and
 - Consideration of the lighting design during construction and post-construction, avoiding use at night and directing away from water bodies.

7 CONCLUSION

- 7.1.1. This WFD Assessment has been prepared by WSP on behalf Far East Consortium to assess the impacts and to identify appropriate mitigation measures for the proposed works associated with Red Bank and Dantzic Street Full Application (Application 5).
- 7.1.2. Application 5 has the potential to impact upon the Irk (Wince to Irwell) (GB 112069061131) and Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB 112069061452) WFD Water bodies, which are both at Moderate status, and are within the Roch Irk Medlock and Croal Irwell management catchments, respectively.
- 7.1.3. The potential impacts of the following activities have been assessed against WFD quality elements:
- Installation of a new outfall on the River Irk;
 - Site drainage discharging to the River Irk; and
 - Construction of infrastructure within the floodplain.
- 7.1.4. Overall, the mitigation measures presented are considered suitable to neutralise the potential impacts of Application 5. Application 5 does not cause deterioration of the current WFD status, nor does it prevent the water bodies from achieving good ecological potential, not prevent the implementation of identified mitigation measures. It is therefore concluded that Application 5 is compliant with the WFD.

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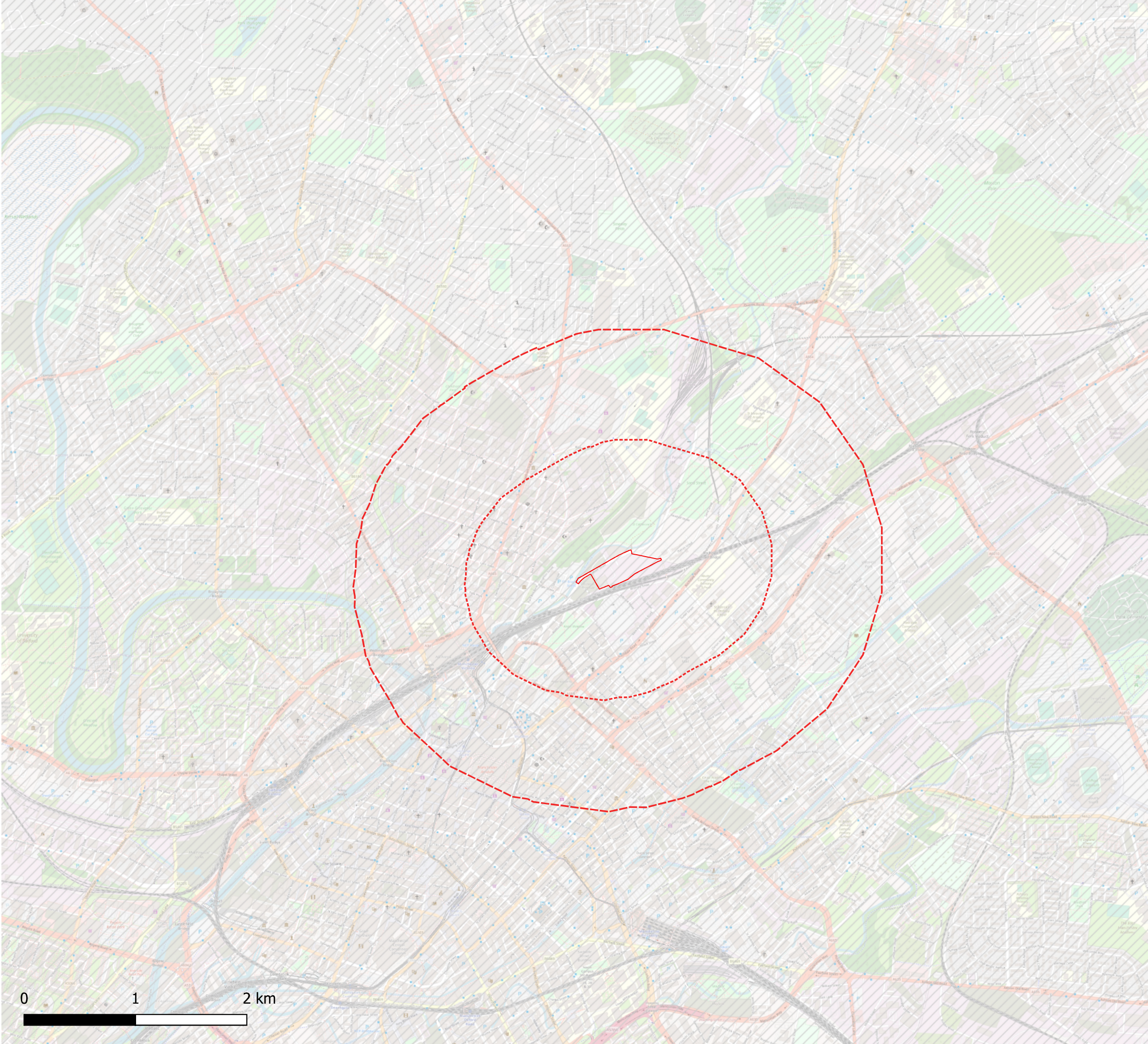
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Appendix A

FIGURES



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Application 5 (Full Planning)

1km RLB Buffer

500m buffer

P01	03.04.2023	JC	FIRST ISSUE	FM	SH
REV	DATE	BY	DESCRIPTION	CK	AP

DRAWING
A - AUTHORISED AND ACCEPTED



No 8 First Street, Manchester, M15 4RP
+44 (0)1618 862 400 wsp.com

CLIENT:

Far East Consortium Ltd. (FEC)

PROJECT:

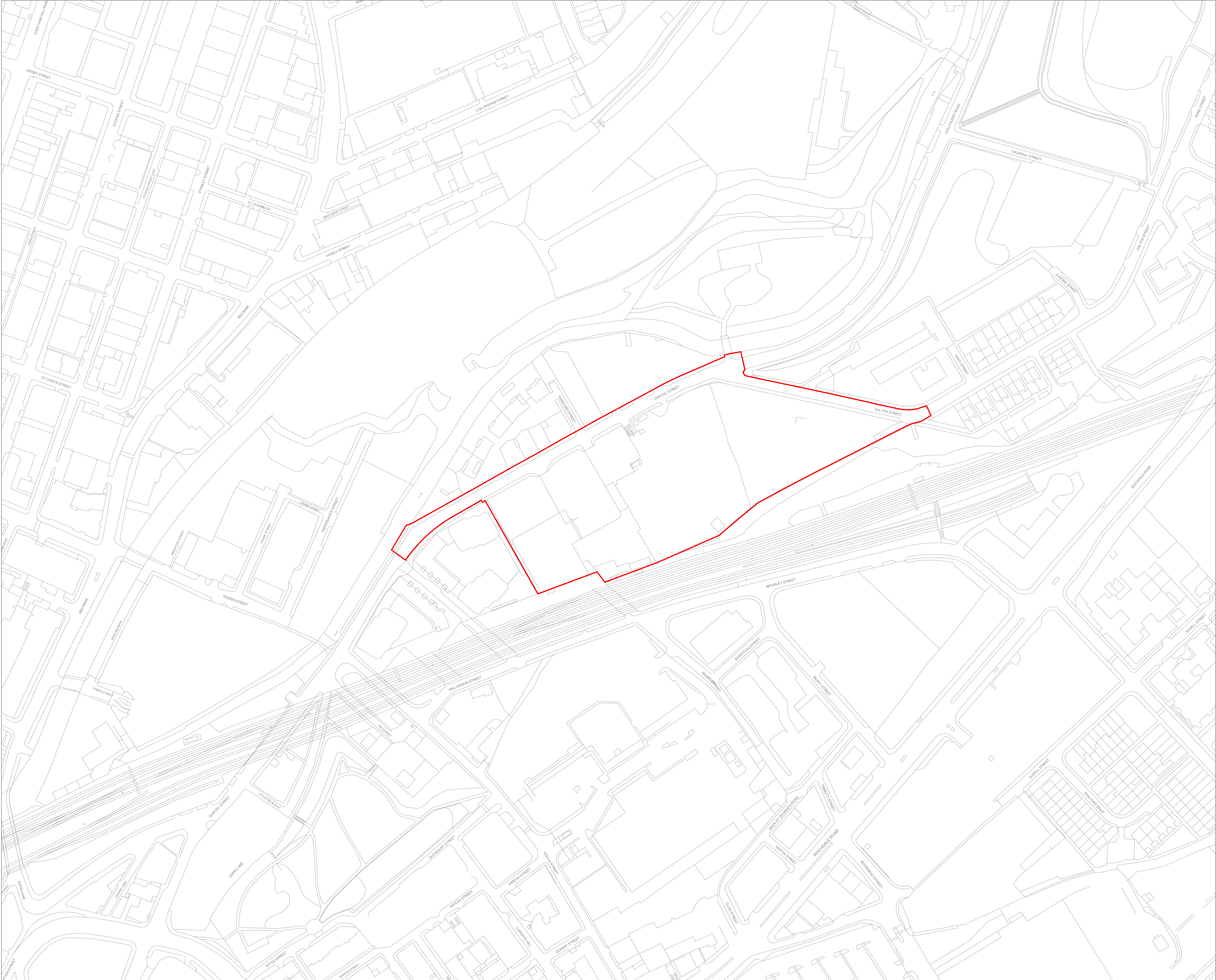
Redbank and Dantzie Street Masterplan

TITLE:

Application 5 (Full Application) Boundary

DRAWN: JC	CHECKED: FM	APPROVED: SH
PROJECT 70079268	SCALE 1:1	DATE: 25/04/2023
DRAWING 70079268-WSP-DR-0002		RFV: C

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0 25 75m

Legend

Application boundary

**MACCREANOR
LAVINGTON**

Proj. No.
RDB

Sheet Name
Sitewide Existing Location Plan

CDE ID
RDB-MLA-00-XX-DR-AR-00010001

Project
Red Bank Manchester

Date
12/04/2023

Client
FEC

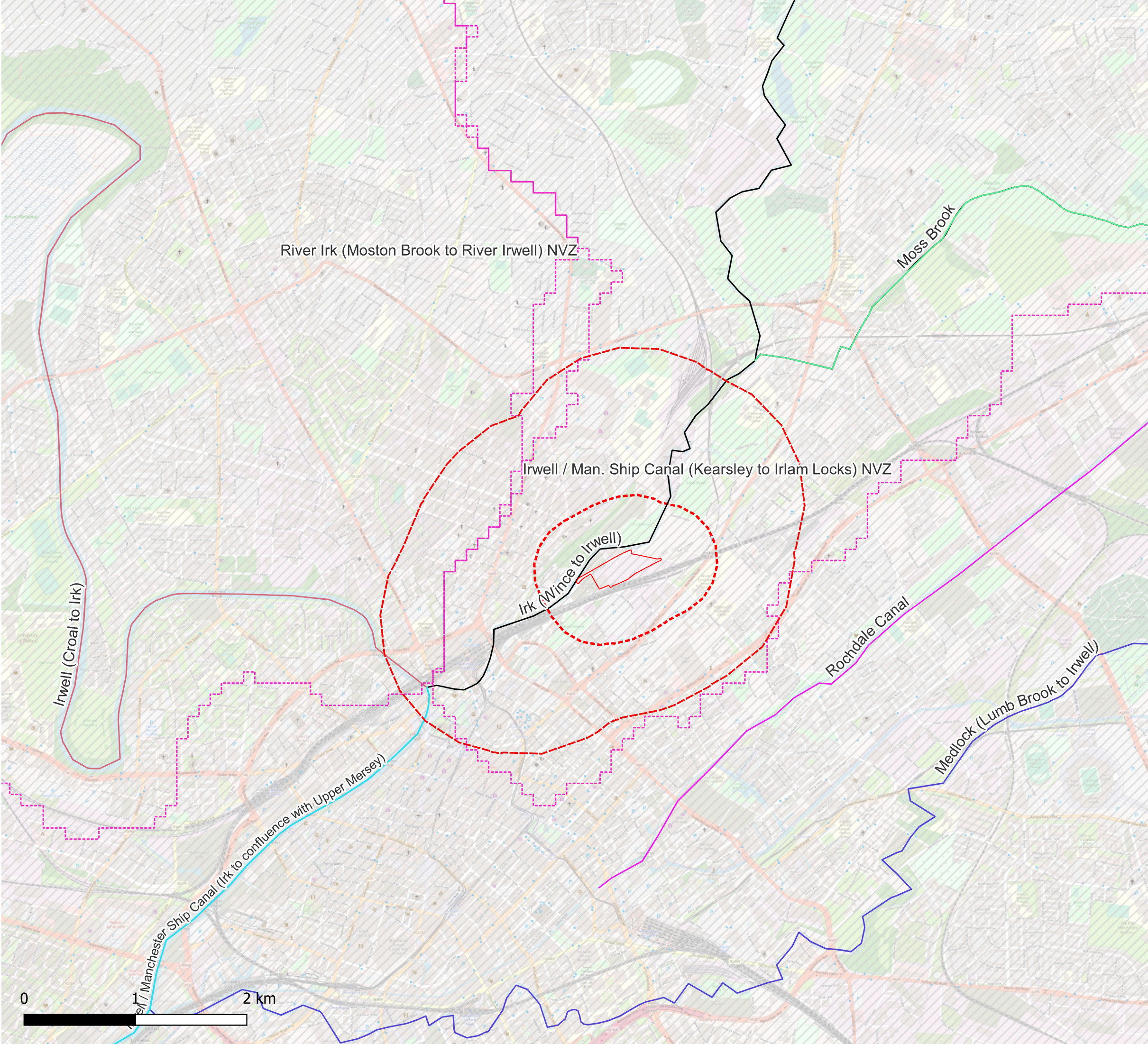
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3032 SB Rotterdam
The Netherlands
+31(0)10 443 50 60

Scale
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Size
A1

Rev.
P0

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Application 5 Boundary (Detailed Design)

- 1km RLB Buffer
- 500m buffer
- Nitrate Vulnerable Zone
- Manchester and Cheshire East Permo-Triassic Sandstone Aq

WFD Surface Water bodies

- Irk (Wince to Irwell)
- Irwell (Croal to Irk)
- Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey)
- Medlock (Lumb Brook to Irwell)
- Moss Brook
- Rochdale Canal

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PROJECT:

Redbank and Dantzie Street Masterplan

TITLE:

Application 5 (Detailed Design) WFD Surface and Grounwater bodies

DRAWN: JC	CHECKED: FM	APPROVED: SH
PROJECT 70079268	SCALE 1:1	DATE: 13/04/2023

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