

Manchester City Council

**Victoria North Infrastructure
Works**

**Appendix 9.4: Preliminary Water
Framework Directive Compliance
Assessment**

Final | 3 March 2022

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

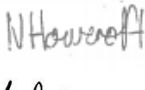
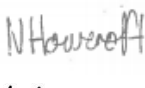
Job number 282022-55

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Document verification

ARUP

Job title		Victoria North Infrastructure Works		Job number 282022-55	
Document title		Appendix 9.4: Preliminary Water Framework Directive Compliance Assessment		File reference	
Document ref					
Revision	Date	Filename	Preliminary Water Framework Directive Compliance Assessment.docx		
Draft 1	25 Feb 2022	Description	First draft		
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Final	3 Mar 2022	Filename	VN Infra Works Preliminary WFD Compliance Assessment.docx		
		Description	Final report		
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		Filename			
		Description			
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		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by

		Name			
		Signature			
Issue Document verification with document					☒

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Executive summary

Arup has been commissioned by Manchester City Council to produce a Preliminary Water Framework Directive (WFD) Assessment for the Housing Infrastructure Fund (HIF) to deliver critical infrastructure and enabling works that form part of the 'Victoria North' initiative, in order to identify the potential effects on the current status and status objectives of the relevant water bodies present at the site. The proposed scheme involves works to the river channel and adjacent riparian zone to improve marginal habitat, create greater geomorphological continuity and improve water quality. The proposed works will also include the removal of some sections of existing wall and reprofiling of river banks.

The site of the proposed scheme is located within the lower catchment of the 'Irk (Wince to Irwell)' (GB112069061131) river water body and the 'Manchester and East Cheshire Permo-Triassic Sandstone Aquifers' (GB41201G101100) groundwater body. The site is set in a highly urban setting, is very constrained by current land use and suffers from the pressures of being located in an urban setting.

The proposed works are not anticipated to result in a deterioration of the current WFD status for both water bodies when considered against the embedded construction mitigation that is assumed to be set out in an Construction Environmental Management Plan (CEMP) produced ahead of the construction phase. The proposed works are also not anticipated to prevent the future achievement of the status objectives of the water bodies, with regard to the implementation of measures identified by the EA to address key existing pressures on quality elements status. Aspects of the proposed scheme have the potential to contribute towards the overarching objectives of the WFD through creation of marginal and in-channel habitats, improvements to geomorphological continuity and flow diversity and removal of invasive species. Further opportunities to maximise the WFD objectives and measures for this water body should be considered at later design stages.

Consequently, the proposed scheme is considered to be compliant with the objectives of the WFD at this stage. The assessment should be updated as a 'living document' where necessary to account for any subsequent design changes and/or the provision of any further EA WFD data. It is recommended that further, targeted geomorphological and marginal habitat surveys be undertaken to verify baseline condition and sensitivity at the impact sites and inform construction method statements and mitigation development.

1 Introduction

1.1 Project background

Manchester City Council has secured £51.6m of funding from the Housing Infrastructure Fund (HIF) to deliver critical infrastructure and enabling works that form part of the ‘Victoria North’ initiative (within the Northern Gateway Strategic Regeneration Framework (SRF)) across the 20ha Initial Development Area in the Lower Irk Valley.

The Initial Development Area has the potential to deliver 5,500 homes across 21 housing development plots, with 4,000 dwellings planned in the First Phase. 150 years of industrial use and Victoria/pre-Victorian infrastructure necessitates infrastructure investment where the private sector cannot viably fund in isolation to enable such development.

To this end, Manchester City Council is seeking planning permission to approve the:

- Demolition of selected existing structures;
- Remediation and earthworks across site;
- Construction of internal access roads and junctions;
- Creation of SUDs;
- Utility and services connections and diversions. The redline extends to Queens park substation to cover the proposed service connections in the adopted highway; and
- Provision of green infrastructure including (among others):
 - Creation of green links.
 - Creation of new City River Park.

The EIA process has facilitated the identification and incorporation of mitigation measures where environmental constraints and adverse effects throughout the design process, and a WFD Assessment in particular will help mitigate any potential adverse effects towards the water environment.

1.2 Purpose of this report

Arup has been commissioned to undertake a Water Framework Directive (WFD) Compliance Assessment to support the critical defence works to unlock the potential of an urban development that forms part of the ‘Victoria North’ urban development.

The key objectives of the assessment are to:

- identify the relevant WFD water bodies that may be affected by the proposed scheme and collate the available WFD baseline information;
- identify relevant scheme components with the potential to affect the WFD water bodies at the site, together with any embedded mitigation measures integrated into the current design;
- undertake a scoping assessment to identify the likely impacts of the proposed scheme on the current status and status objectives of the relevant waterbodies (including identification of any additional mitigation requirements);
- identify any risks of non-compliance with WFD objectives and associated requirements for further detailed impact assessment and/or mitigation design; and
- identify potential enhancement opportunities to support the delivery of WFD objectives.

This report summarises the proposed scheme and the assessment methodology and results. The assessment has been undertaken in accordance with relevant guidance (see Appendix A) and has involved a desk-based study using readily available Environment Agency (EA) WFD baseline information and existing available site visit information.

1.3 Other relevant reports

Other relevant reports which have been produced to support the development of works include the following and have been cross-referenced within this assessment:

- Victoria North WFD Geomorphology Desk Study (Arup Geomorphology);
- River Works Site History report (Arup Geotechnical);
- River Irwell Management Catchment – Evidence and Measures report (APEM);
- River Restoration Centre, River Irk, Manchester. Identification of opportunities for ecological improvement in the River Irk Catchment;
- Mapping urban diffuse pollution sources on the Rivers Irk & Medlock report;
- River Irwell Catchment Management Plan;
- River Irk at Alkrington Case Study;
- River Irk Restoration Plan Case Study;
- Natural Environment topic paper. Greater Manchester Spatial Framework, 2019.

2 Legislative context

2.1 Water Framework Directive

The EU WFD¹ has been in force since 2000 and is currently the largest and most influential piece of EU legislation relating to the water environment. The Directive was transposed into UK law by The Water Environment (Water Framework Directive) (England and Wales) Regulations (amended 2017)². The EA is the competent authority responsible for delivering the Directive in England.

The WFD establishes a legislative framework for the protection of surface waters and groundwater across all EU Member States, and the UK. It takes an integrated approach to the sustainable management of water by considering the interactions between surface water, groundwater and water-dependent ecosystems.

Under the WFD, ‘water bodies’ are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger River Basin District (RBD), for which River Basin Management Plans (RBMPs) are developed and environmental objectives are set. These RBMPs are produced every six years, in accordance with the river basin management planning cycle.

The WFD requires all signatories to classify the current condition or ‘status or potential’ of surface water and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies reach and / or maintain ‘good status or potential’. These overall Environmental Objectives are to:

- prevent the deterioration of (and where possible enhance) the status of surface water bodies, ground water bodies and their ecosystems;
- aim to achieve at least ‘Good’ ecological status or potential and ‘Good’ surface water chemical status for all water bodies by 22nd December 2021. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve Good status or potential by 2027;
- meet the requirements of Water Framework Directive Protected Areas;
- promote sustainable use of water as a natural resource;
- conserve habitats and species that depend directly on water;
- progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to surface water (particularly the aquatic environment);
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- contribute to mitigating the effects of floods and droughts.

¹ European Commission, 2000. *Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy*

² *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 No. 407*. [Available at: <https://www.legislation.gov.uk/uksi/2017/407/contents/made>]

All new (and current on-going) activities in the water environment now need to be guided by the requirements of the WFD. This includes ensuring that no changes occur that causes a deterioration of current status of a water body or prevents the achievement of the future status objectives of a water body. This principle is now integrated into the planning permission application process for proposed schemes / activities.

Further background information regarding the determination of WFD status and the WFD compliance assessment requirements for new schemes/developments is provided in Appendix A2.

3 Assessment Methodology

3.1 Scope of assessment

This assessment comprises the screening and scoping assessment elements of process to support the detailed planning application for the proposed infrastructure works.

The spatial scope of the assessment includes all WFD designated surface water and groundwater bodies potentially affected by the proposed scheme. The assessment considers the potential impacts of the proposed scheme on all of the relevant quality elements associated with the surface water and groundwater bodies affected, at the water body scale.

The assessment focuses on the permanent impacts of the proposed scheme.

Temporary impacts are not considered to result in deterioration in WFD status and so have not been considered within the assessment in accordance with current guidance³. In this sense, impacts are not considered to result in a deterioration of the status if the water body:

- is only impacted for a short time period;
- is likely to recover within a short time period; and/or
- is likely to recover without the need for any restoration measures.

3.2 Data sources

The following data sets and resources are readily available online and have been used to inform this assessment:

- Cycle 2 River Basin Management Plan (RBMP), North West River Basin District⁴
- Cycle 2 RBMP water body status classification and status objectives data, RNAG (reasons for not achieving good) data, WFD protected area data⁵;
- Historic OS maps⁶;
- Biological Monitoring Data: Ecology & Fish Data Explorer⁷;

³ Natural Resources Wales, 2017. *Guidance for assessing activities and projects for compliance with the Water Framework Directive*

⁴ Environment Agency and DEFRA, 2015. *North West River Basin Management Plan 2015*. [Available at: <https://www.gov.uk/government/collections/river-basin-management-plans-2015>]

⁵ Environment Agency, 2017 *Catchment Data Explorer* [Available at: <http://environment.data.gov.uk/catchment-planning/>]

⁶ National Library of Scotland. *Historical OS maps*. [Available at: <http://maps.nls.uk/os/>]

⁷ Environment Agency and DEFRA. *Ecology and Fish Data Explorer*. [Available at: <https://environment.data.gov.uk/ecology/explorer/>]

- Water quality data archive⁸;
- Ordnance Survey (OS) Open Data⁹; and
- DEFRA ‘MAGIC’ map (providing authoritative geographic information about the natural environment from across government)¹⁰.

In addition to the above, the EA holds internal datasets including extended water body reports regarding the RNAG investigations and mitigation measures identified to support the achievement of water body status objectives. This data was requested and has also been used to inform this assessment.

⁸ Environment Agency. *Water Quality Data Archive*. [Available at: <https://environment.data.gov.uk/water-quality/view/landing>]

⁹ Ordnance Survey. *Open Data maps*. [Available at: <https://www.bing.com/mapspreview>]

¹⁰ DEFRA. *MAGIC map*. [Available at: <https://magic.defra.gov.uk/magicmap.aspx>]

4 Proposed Scheme

4.1 Overview

The Initial Development Area comprises an area of approximately 20 hectares (ha). It is located within the Lower Irk Valley. Presently, the location is affected by the legacy of more than 150 years of industrial uses and Victorian / pre-Victorian infrastructure. As a result, a comprehensive programme of infrastructure investment is required to facilitate development where works cannot be taken forward on a piecemeal, site by site basis, and are not viable for the private sector to fund in isolation.

To unlock the full potential of the area, MCC has secured £51.6m of Government Funding through the Housing Infrastructure Fund (HIF) to deliver critical infrastructure and enabling works within the Initial Development Area. A key condition of the funding is that the spend availability period runs until March 2024 and, therefore, practical completion of the infrastructure and enabling works by this date is imperative.

The infrastructure and enabling works, and the plot development on land controlled and owned by MCC and FEC at Red Bank constitutes the “development project”. Due to the HIF funding and programme requirements, it is necessary to approach the delivery of this development project by a number of separate planning applications. Four in total, are to be made, as follows:

- *HIF Advance Enabling Works* (referred to as ‘Application 1’). – planning permission has been granted for the demolition of Creamline dairy, tree and shrub clearance and construction of a temporary haul road.
- *HIF Infrastructure Works* (‘Application 2’ - the focus of this assessment / report and application, referred to hereafter as the ‘proposed works’ or ‘proposed scheme’). Creation of development platforms, demolition of sections of existing River Wall, remediation and earthworks, construction of Plateau Avenue and junction from Red Bank, creation of SUDs, utility and service connections and diversions and provision of green infrastructure including creation of green links and first phase of the new City River Park.
- *HIF Flood Defence Works* (referred to as ‘Application 3’) – flood mitigation and defence works along the River Irk to reduce the area within flood zone 3.
- *Red Bank Neighbourhood* (referred to as ‘Application 4’) – approximately 4,000 new dwellings including a number of landmark buildings at height. Retail and commercial floorspace, open and amenity space, access and associated infrastructure.

Figure 1 below indicates the Red Line Boundary (RLB) of the proposed works and Figure 2 illustrates the Stage 3 Masterplan.

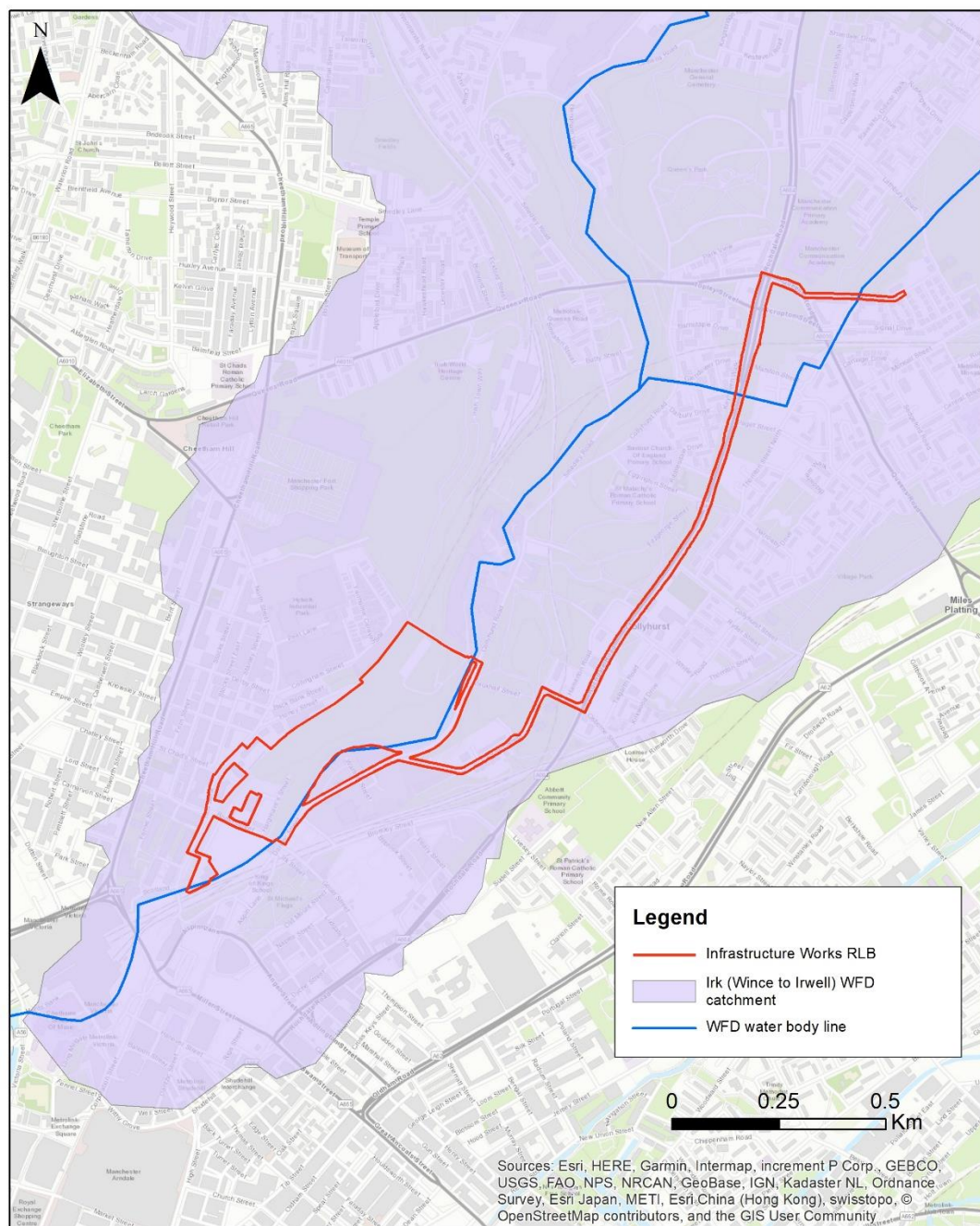


Figure 1 HIF Infrastructure Works RLB shown within the River Irk water body.

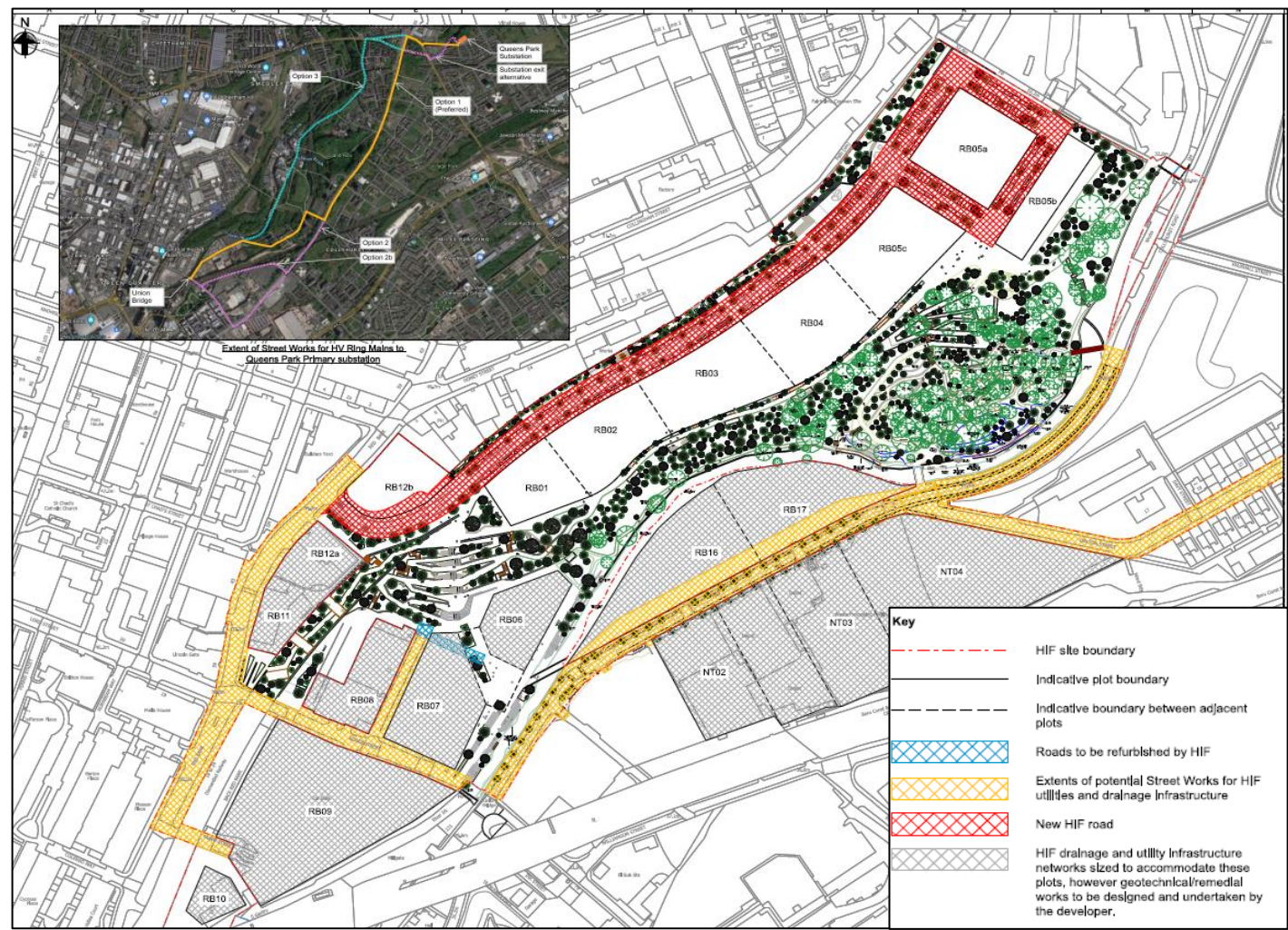


Figure 2 Stage 3 Masterplan for the HIF Infrastructure Works

An outline of the proposed development is provided in Chapter 1: Introduction and Chapter 5: Proposed Development of the Environmental Statement.

4.2 Construction phase mitigation

For the purposes of this preliminary assessment, it is assumed that an Construction Environmental Management Plan (CEMP) will be prepared for the pre-construction, construction and post-construction phases of the project to implement the works associated with the proposed scheme along the River Irk. This document will outline environmental issues identified within the proposed development site; provide a register of relevant legislation and consents requirements; define agreed mitigation measures in work method statements to ensure compliance with current legislation, works licences and permits, planning approvals, and best practice guidance. It is assumed that this document will be adopted and adapted during the construction phase by the appointed contractor(s).

The CEMP should include measures to avoid and minimise impacts to the water environment during construction of the proposed development, in alignment with EA guidance and best practice. For the basis of this assessment, it is assumed at this stage that reference will be made in the CEMP, where necessary, to the environmental good practice advice in the Pollution Prevention Guidelines (PPG)¹¹, together with the replacement guidance series, Guidance for Pollution Prevention (GPP) as and when this becomes available. Whilst PPGs and GPPs do not provide regulatory guidance in England, they form environmental good practice guidance for the whole UK. The PPG/GPPs listed below are of particular relevance to the proposed development:

- GPP 5: Works and maintenance in or near water;
- PPG 6: Working at construction and demolition sites;
- PPG 7: Safe storage – The safe operation of refuelling facilities;
- GPP 8: Safe storage and disposal of used oils;
- GPP 13: Vehicle washing and cleaning;
- PPG 18: Managing fire, water and major spillages;
- GPP 21: Pollution incident response planning; and
- GPP 22: Dealing with spills.

¹¹ See: <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

4.2.1 Pollution control

Control of sediment runoff

Best practice will be adopted in line with GPP 5¹² to minimise the risk of silt pollution to nearby watercourses during construction activities. This will involve the identification of potential sources and pathways to the watercourses, and the application of appropriate measures, where necessary, to avoid or control silt runoff. For example, this may include:

- seeding or covering exposed ground and sediment stockpiles;
- only removing vegetation from areas that need to be exposed in the near future;
- minimising the amount of time soil stockpiles are exposed for;
- all plant and wheel washing to be carried out in a designated area at least 10m from any water body or surface drain;
- runoff to be collected in lagoons or settlement tanks (or similar) to allow suspended solids to settle and be removed to appropriate levels before discharge to the nearby watercourse;
- any runoff water containing silt or other pollutants to be treated appropriately before discharge back to the water environment.

Spillages

A pollution risk assessment will be carried out for the proposed site ahead of construction, considering both the storage and transportation of materials used. This would identify potentially hazardous materials or activities and assess the probability and magnitude of potentially harmful effects. From this, a pollution incident response plan (see GPP 21¹³) would be compiled to identify the specific measures needed to reduce the likelihood of a spillage happening, and to minimise the impact of any spills that may occur.

Piling

A piling risk assessment should be undertaken to identify any mitigation measures required.

The piling methodology should be selected to minimise the potential for alteration of the hydraulic properties of the surrounding ground, down-drag of contaminants and generation of suspended solids. Reference shall be made to the EA's guide on piling and ground improvement methods on land affected by Contamination¹⁴.

¹² NRW, NIEA, & SEPA (2018), *Guidance for Pollution Prevention: Works and maintenance in or near water*: GPP 5.

¹³ NRW, NIEA, & SEPA (2017), *Guidance for Pollution Prevention: Pollution Incident Response Plans*: GPP 21.

¹⁴ Environment Agency (2001), *Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention*

The properties of any materials being added to soils for soil mixed columns will be considered to ensure a pollution risk is not created. The properties of any soil stabilisation materials being added will be considered to ensure a pollution risk is not created in accordance with the EA's Groundwater Protection guidance¹⁵.

4.2.2 Minimising disturbance

Appropriate measures should be included within the work method statements to reduce potential environmental impacts of in-channel and marginal construction activities. This should include measures to:

- minimise the footprint of any in-channel works as far as reasonable possible to reduce the degree of physical disturbance of the river bed and banks;
- reinstate any impacted marginal habitats where necessary; reduce associated noise, vibration, and any artificial lighting impacts where possible; and
- control the timing of works so that any in-channel works are programmed to take place outside of sensitive times of year for juvenile fish, migratory fish and/or other sensitive species such as bats, otters or breeding birds.

4.2.3 Biosecurity

Good biosecurity practices are vital for preventing the spread of invasive non-native species and pathogens such as waterborne fish diseases. Measures should be adopted so that the construction activities do not lead to the spread of invasive non-native species or pathogens.

All site personnel and site visitors should be informed that Himalayan Balsam and Japanese knotweed is present on site and that they are jointly responsible for preventing its spread/impacts. They should be made aware of what this species looks like, so they can avoid it where possible and take appropriate actions. Biosecurity measures will be in place to prevent the spread of crayfish plague, Himalayan balsam or Japanese knotweed throughout the construction area. This will include clearing and disinfection of (but not limited to): all equipment; footwear; clothing; vehicle parts (wheels, tracks, buckets); pumps; pipework; any other equipment in contact with the watercourse of riverbanks.

To avoid the spread of invasive species the following measures are assumed to be adhered to during construction:

- Contractor's Ecologist to undertake toolbox talks for Himalayan Balsam, Japanese knotweed and Signal crayfish prior to works starting. Toolbox talks are to be signed by contractor on site;
- ensure all site teams are briefed in EA Check, Clean Dry procedure and will be made aware of areas on site where INNS are known to be present; and

¹⁵ Environment Agency (2017) *Groundwater protection guides covering: requirements, permissions, risk assessments and controls* (previously covered in GP3) (online) Accessible from: <https://www.gov.uk/government/collections/groundwater-protection>

avoid working in areas where Himalayan Balsam and Japanese knotweed present. Where this is not possible, appropriate biosecurity measures are to be adopted.

5 Baseline assessment (screening)

5.1 Overview

A screening and baseline assessment has been undertaken to identify the relevant WFD water bodies affected by the proposed scheme and to collate the latest available EA Cycle 2 WFD baseline data, in order to inform a scoping assessment of the likely effects of the scheme on WFD status and objectives (see Section 6). This has included the completion of a baseline fluvial geomorphological survey within the current site boundary.

The zone of influence of the scheme includes the physical footprint of the works and the WFD surface water bodies that run through the site and the WFD groundwater body that underlies the site.

5.2 River Basin Management Plan

The proposed scheme is located within the Alt Operational Catchment in the North West River Basin District (RBD). The WFD status, status objectives and programme of measures derived by the EA for water bodies located within this RBD are outlined within the 2015 Cycle 2 North West RBMP¹⁶.

5.3 Relevant water bodies

The following WFD water bodies in Table 1 have the potential to be affected by the scheme and are therefore considered in the assessment. Their map extents are shown in Appendix B. The latest available WFD baseline information for these water bodies is summarised in the below sections.

¹⁶ DEFRA and Environment Agency (2015). North West River Basin District, River Basin Management Plan. Available from:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718335/North_West_RBD_Part_1_river_basin_management_plan.pdf

Table 1: WFD water bodies present at the site of the proposed scheme.

Water Body Name	Water Body ID	Water Body Type	Hydro-morphological Designation	Catchment Area
Irk (Wince to Irwell)	GB112069061131	Surface water body (river)	Heavily modified	30.975 km ²
Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	GB41201G101100	Groundwater body	Not applicable	367.346 km ²

5.4 Irk (Wince to Irwell) (GB112069061131)

5.4.1 Catchment description

The proposed scheme is located within the WFD river water body ‘Irk (Wince to Irwell)’ (GB112069061131). The water body has a total length of 17.85 km and a catchment area of 31.0 km². The water body is designated as a Heavily Modified Water Body (HMWB), in recognition of physical modifications by human activity and a resultant substantial change in character (urbanisation, transport).

5.4.2 Status and objectives

The water body is designated as a Heavily Modified Water Body (HMWB), owing to physical modifications by human activity and a resultant substantial change in character (flood protection). The water body currently has an Overall Status of ‘Moderate’ with an Ecological Potential of ‘Moderate’ and a Chemical Status of ‘Fail’.

A breakdown of the current status and status objectives of the water body is provided in Table 2. The water body is also currently failing its Mitigation Measure Assessment (Moderate or less), as a result of measures identified for the water body not being in place.

Table 2: Cycle 2 RBMP WFD status and objectives for the 'Irk (Wince to Irwell)' (GB112069061131) river water body

	Status	Objective (as of 2019)
OVERALL STATUS	MODERATE	MODERATE BY 2027
ECOLOGICAL POTENTIAL	MODERATE	MODERATE BY 2027
Biological quality elements	Poor	Moderate by 2021
Invertebrates	Poor	Moderate by 2021
Supporting elements (Surface Water)	Moderate	Good by 2027
Mitigation measures assessment	Moderate or less	Good by 2027
Physicochemical quality elements	Moderate	Moderate by 2015
Acid Neutralising Capacity	High	-
Ammonia (Phys-Chem)	High	Moderate by 2015
Biochemical Oxygen Demand (BOD)	High	-
Dissolved oxygen	High	Good by 2015
pH	High	Good by 2015
Phosphate	Moderate	Poor by 2015
Temperature	High	Good by 2015
Specific pollutants	High	High by 2015
Copper	High	High by 2015
Triclosan	High	High by 2015
Manganese	High	High by 2015
Copper	High	High by 2015
Iron	High	High by 2015
Zinc	High	High by 2015
Hydromorphological Supporting Elements	-	Not assessed by 2015
CHEMICAL STATUS	FAIL	GOOD BY 2015
Priority substances	Fail	Good by 2015
Priority hazardous substances	Fail	Good by 2015
Other Pollutants	Does not require assessment	Does not require assessment by 2015

5.4.3 WFD Protected Areas

WFD Protected Areas are areas that have been designated under other EU legislation as requiring special protection for surface waters or groundwaters, or

for protected habitats and species depending directly on water. Where a WFD water body falls within or forms all or part of a designated WFD Protected Area, the water body is subject to additional environmental objectives (and associated monitoring regimes, risk assessments, and regulations) in accordance with the relevant, previous Directive(s).

The ‘Irk (Wince to Irwell)’ water body is located within a Nitrate Vulnerable Zone (NVZ)¹⁷ as designated under the Nitrates Directive. The Surface Water NVZ (ID S638) ‘River Irk (Moston Brook to River Irwell)’¹⁸ covers a 74.47 km² area in the north west of Manchester. The footprint of the Proposed Scheme sits entirely within this protected area.

5.4.4 EA monitoring data

EA biological monitoring data is available for the site within the ‘Irk (Wince to Irwell)’ water body. A summary of this monitoring data is provided in Appendix C.

According to the available data online, the extent of the site contains the invertebrate and macrophyte monitoring station 176487, at the location SJ8486399641. There are no fish or diatom monitoring sites within the extent of the site or the water body.

The EA also monitor water quality 350 m upstream of the proposed site, and within the downstream extent of the proposed site: the ‘River Irk @ Red Bank Above Scotland Weir’ site is located at SJ8412499197 and the ‘River Irk D/S Moston Brook’ site is located at SJ8491099769.

5.4.5 Reasons for not achieving Good status (RNAG)

The RNAGs for the water body identified in the Cycle 2 RBMP are summarised in **Table 3**.

Table 3: Reasons for not achieving good (RNAG) status identified for the ‘Irk (Wince to Irwell)’ (GB112069061131) water body.

Failing element	RNAG					
	ID	Category	Business	SWMI	Activity	Pressure Tiers
Ammonia (Phys-Chem)	481987	Water Industry	Waste water treatment	Point source	Sewage discharge (continuous)	Ammonia (Phys-Chem)

¹⁷ DEFRA (2018), Nitrate Vulnerable Zones. Available at: <https://www.gov.uk/government/collections/nitrate-vulnerable-zones>

¹⁸ Environment Agency (2016), DATASHEET: Nitrate Vulnerable Zone (NVZ) designation 2017 - Surface Water. Available at: http://apps.environment-agency.gov.uk/static/documents/nvz/NVZ2017_S638_Datasheet.pdf

Failing element	RNAG					
	ID	Category	Business	SWMI	Activity	Pressure Tiers
	481988	Urban and transport	Urban	Diffuse source	Urbanisation - urban development	Ammonia (Phys-Chem)
	481992	Urban and transport	Not applicable	Diffuse source	Contaminated land	Ammonia (Phys-Chem)
	482100	Urban and transport	Roads	Diffuse source	Transport Drainage	Ammonia (Phys-Chem)
	482102	Agriculture and rural land management	Agriculture - Livestock	Diffuse source	Poor Livestock Management	Ammonia (Phys-Chem)
	482816	Water Industry	Waste water treatment	Diffuse source	Sewage discharge (intermittent)	Ammonia (Phys-Chem)
	530928	Agriculture and rural land management	Agriculture - Livestock	Diffuse source	Poor nutrient management	Ammonia (Phys-Chem)
	530929	Agriculture and rural land management	Agriculture - Livestock	Diffuse source	Poor soil management	Ammonia (Phys-Chem)
	530930	Agriculture and rural land management	Agriculture - Livestock	Diffuse source	Riparian/in-river activities (inc bankside erosion)	Ammonia (Phys-Chem)
Invertebrates	482103	Domestic General Public	Not applicable	Point source	Misconnections	Ammonia
	489756	Water Industry	Waste water treatment	Point source	Sewage discharge (continuous)	Ammonia

Failing element	RNAG					
	ID	Category	Business	SWMI	Activity	Pressure Tiers
	489757	Water Industry	Waste water treatment	Point source	Sewage discharge (continuous)	Ammonia
	489758	Urban and transport	Unknown (pending investigation)	Point source	Landfill leaching	Ammonia
	489759	Water Industry	Waste water treatment	Point source	Sewage discharge (continuous)	BOD
	489760	Water Industry	Waste water treatment	Point source	Sewage discharge (continuous)	BOD
	489761	Urban and transport	Urban	Diffuse source	Urbanisation - urban development	Ammonia
Phosphate	481989	Water Industry	Waste water treatment	Point source	Sewage discharge (continuous)	Phosphate
	481994	Urban and transport	Urban	Diffuse source	Urbanisation - urban development	Phosphate

5.4.6 Measures and actions

The EA have identified a number of Water Body Level Measure Actions which have been provided through the Extended Waterbody Summary Report held internally by the EA. These actions are shown in Table 4. The Wider Area Measures Actions for the Greater Manchester Merseyside and Cheshire area are shown in Table 5.

Table 4: Waterbody Level Measure Actions identified in the Extended Waterbody Summary Report for the 'Irk (Wince to Irwell)' (GB112069061131) water body.

CPS Action ID	Title	Measure Aim
19898	Additional treatment to reduce BOD and concentrations of ammonia from Oldham STW	- To control or manage point source inputs - Mitigate/Remediate point source impacts on receptor - Install other treatment
19869	Cease discharge from Royton STW by transfer of sewage to Oldham wastewater treatment works	- To control or manage point source inputs - Mitigate/Remediate point source impacts on receptor - Relocate discharge
19899	Improvements to Oldham wastewater treatment works storm tanks overflow: AMP 5	- To control or manage point source inputs - Mitigate/Remediate point source impacts on receptor - Change timing or frequency of discharge
19862	Improvements to Royton wastewater treatment works storm tanks overflow	- To control or manage point source inputs - Mitigate/Remediate point source impacts on receptor - Change timing or frequency of discharge
35114	MMA We0193: Remove obsolete structure	Mitigation Measure
35115	MMA We0194: Remove obsolete structure	Mitigation Measure
35116	MMA We0195: Remove obsolete structure	Mitigation Measure
35117	MMA We0196: Remove obsolete structure	Mitigation Measure
35118	MMA We0197: Remove obsolete structure	Mitigation Measure
35119	MMA We0198: Enhance ecology	Mitigation Measure
35120	MMA We0199: Remove obsolete structure	Mitigation Measure
35121	MMA We0200: Remove or soften hard bank: artificial	Mitigation Measure
35122	MMA We0201: Remove or soften hard bank: stone bank	Mitigation Measure

CPS Action ID	Title	Measure Aim
35123	MMA We0202: Remove or soften hard bank: stone bank	1. Mitigation Measure
35124	MMA We0203: Remove or soften hard bank: steel bank	1. Mitigation Measure
35125	MMA We0204: Remove or soften hard bank: steel bank	1. Mitigation Measure
35126	MMA We0205: Remove or soften hard bank: stone bank	1. Mitigation Measure
35127	MMA We0206: Remove or soften hard bank: stone bank	1. Mitigation Measure
35128	MMA We0207: Remove or soften hard bank: stone bank	1. Mitigation Measure
35129	MMA We0208: Remove or soften hard bank: concrete	1. Mitigation Measure
35130	MMA We0209: Remove or soften hard bank: outfall	1. Mitigation Measure
35131	MMA We0210: Remove or soften hard bank: stone bank	1. Mitigation Measure
35132	MMA We0211: Remove obsolete structure	1. Mitigation Measure
35133	MMA We0212: Remove or soften hard bank	1. Mitigation Measure
35134	MMA We0214: Remove or soften hard bank: wooden revetments	1. Mitigation Measure
35135	MMA We0215: Remove or soften hard bank: wooden revetments	1. Mitigation Measure
35136	MMA We0216: Remove obsolete structure	1. Mitigation Measure
35137	MMA We0217: Remove or soften hard bank: sheet piling	1. Mitigation Measure
35138	MMA We0219: Enhance ecology	1. Mitigation Measure
36048	MMA We2088: Fish passes	1. Mitigation Measure
36049	MMA We2089: Fish passes	1. Mitigation Measure
36050	MMA We2090: Fish passes	1. Mitigation Measure

CPS Action ID	Title	Measure Aim
36051	MMA We2091: In-channel morph diversity	1. Mitigation Measure
36052	MMA We2092: In-channel morph diversity	1. Mitigation Measure
36053	MMA We2093: In-channel morph diversity	1. Mitigation Measure
36054	MMA We2094: Fish passes	1. Mitigation Measure
36055	MMA We2095: Remove or soften hard bank near large weir	1. Mitigation Measure
36056	MMA We2096: Fish passes	1. Mitigation Measure
36057	MMA We2097: Fish passes	1. Mitigation Measure
36058	MMA We2098: Remove or soften hard bank: weir	1. Mitigation Measure
36059	MMA We2099: Fish passes	1. Mitigation Measure
36060	MMA We2100: Remove or soften hard bank near large weir	1. Mitigation Measure
36061	MMA We2101: Fish passes	1. Mitigation Measure
36062	MMA We2102: Remove or soften hard bank: weir	1. Mitigation Measure
36063	MMA We2103: Fish passes	1. Mitigation Measure
36236	MMA Wo0232: reopening culverts	1. Mitigation Measure
36237	MMA Wo0233: alter channel culvert bed	1. Mitigation Measure
36238	MMA Wo0234: Fish pass: Scotland Weir	1. Mitigation Measure
36239	MMA Wo0235: Vegetation control timing	1. Mitigation Measure
36240	MMA Wo0236: invasive species techniques	1. Mitigation Measure
36241	MMA Wo023708: Sediment management strategy	1. Mitigation Measure

CPS Action ID	Title	Measure Aim
36242	MMA Wo0238: Maintenance – minimise habitat impact	1. Mitigation Measure
36252	MMA Wo0254: Vegetation control timing	1. Mitigation Measure
36253	MMA Wo0255: Invasive species techniques	1. Mitigation Measure
36254	MMA Wo0256: sediment management strategy	1. Mitigation Measure
36255	MMA Wo0257: Maintenance – minimise habitat impact	1. Mitigation Measure
36256	MMA Wo0258: Maintenance – prevent sediment transfer	1. Mitigation Measure
36257	MMA Wo0259: align and attenuate flow	1. Mitigation Measure
36258	MMA Wo0260: educate land owners	1. Mitigation Measure
36504	MMA Wo0844: Selective vegetation control	1. Mitigation Measure
36505	MMA Wo0845: Vegetation control	1. Mitigation Measure
36506	MMA Wo0846: Vegetation control timing	1. Mitigation Measure
36507	MMA Wo0847: Retain habitats	1. Mitigation Measure
36508	MMA Wo0848: Maintenance – minimise habitat impact	1. Mitigation Measure
36509	MMA Wo0849: Maintenance – prevent sediment transfer	1. Mitigation Measure
36522	MMA Wo0867: Selective vegetation control	1. Mitigation Measure
36523	MMA Wo0868: Vegetation control	1. Mitigation Measure
36524	MMA Wo0869: Vegetation control timing	1. Mitigation Measure
36525	MMA Wo0870: Invasive species techniques	1. Mitigation Measure
36526	MMA Wo0871: Retain habitats	1. Mitigation Measure
36527	MMA Wo0872: Sediment management strategy	1. Mitigation Measure

CPS Action ID	Title	Measure Aim
36528	MMA Wo0873: Maintenance – minimise habitat impact	1. Mitigation Measure
36529	MMA Wo0874: Maintenance – prevent sediment transfer	1. Mitigation Measure
19850	R.IrK (Wince to Irwell) Moston Brook 10 - Deliver improvements to Alford Street (OLD0123) storm overf	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Change timing or frequency of discharge
19851	R.IrK (Wince to Irwell) Moston Brook 11 - Deliver improvements to Suffolk Street (OLD0037) storm over	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Change timing or frequency of discharge
19853	R.IrK (Wince to Irwell) Moston Brook 6: drainage improvements	1. To control or manage diffuse source inputs 2. Reduce diffuse pollution pathways (i.e. control entry to water environment) 3. Surface run-off & drainage management
19856	R.IrK (Wince to Irwell) Moston Brook 9: Queens Rd CSO	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Change timing or frequency of discharge
19872	R.IrK (Wince to Irwell) River Irk (Wince Brook to Moston Brook) 12 – Deliver improvements to Boothroy	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Change timing or frequency of discharge
19852	River Irk (Wince Brook to Irwell) Moston Brook 3: contaminated land	1. To control or manage diffuse source inputs 2. Mitigate/Remediate diffuse pollution impacts on receptor 3. Remediation of land contamination and/or Groundwater
25347	Treatment to reduce concentrations of Phosphorus at Castleton WwTW (GB112069061161)	1. To control or manage point source discharges 2. Amend permit limits at Sewage Treatment Works 3. Improve Sewage Treatment Works to meet an amended permit limit

CPS Action ID	Title	Measure Aim
25347	Treatment to reduce concentrations of Phosphorus at Castleton WwTW (GB112069061161)	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Install nutrient reduction
19905	Wince Brook 3: Install nutrient reduction Oldham WwTW for UWWTD	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Install nutrient reduction
19910	Wince Brook 3a – Oldham WwTW P Reduction	1. To control or manage point source inputs 2. Mitigate/Remediate point source impacts on receptor 3. Install nutrient reduction

Table 5: Wider Measure Actions identified in the Extended Waterbody Summary Report for the 'Irk (Wince to Irwell)' (GB112069061131) water body.

CPS Action ID	Title	Measure Aim	Linked Boundary
41510	WAMA – RSA - Hydrology – GB111067052120 – Cycle 2 – 2020	1. To control or manage abstractions Greater Manchester 2. Amend permit limits on abstractions Merseyside and Cheshire 3. Reduce abstraction annual quantity	Greater Manchester Merseyside and Cheshire

5.5 Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB41201G101100)

5.5.1 Overview

The Manchester and East Cheshire Permo-Triassic Sandstone Aquifers groundwater body is 367 km² covering Manchester and north and east Cheshire (see Appendix C2). This groundwater body underlies all the Site area.

5.5.2 Status and objectives

The water body currently has an Overall Status of Poor, with a current Quantitative Status of Poor and Chemical Status of Poor. A breakdown of the current status and status objectives of the water body is provided in Table 6. The quality element currently limiting the status of the water body is Quantitative Saline Intrusion (Poor) and Chemical Saline Intrusion (Poor).

Table 6: WFD status and objectives for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB41201G101100) groundwater body.

	Status	Objective (as of 2019)
OVERALL STATUS	Poor	Good by 2021
QUANTITATIVE STATUS	Poor	Good by 2021
Quantitative Status element	Poor	Good by 2021
Quantitative Dependant Surface Water Body Status	Good	Good by 2015
Quantitative GWDTEs test	Good	Good by 2015
Quantitative Saline Intrusion	Poor	Good by 2021
Quantitative Water Balance	Good	Good by 2015
CHEMICAL STATUS	Poor	Good by 2021
Quantitative Status element	Poor	Good by 2021
Chemical Dependant Surface Water Body Status	Good	Good by 2015
Chemical Drinking Water Protected Area	Good	Good by 2015
Chemical GWDTEs test	Good	Good by 2015
Chemical Saline Intrusion	Poor	Good by 2021
General Chemical Test	Good	Good by 2015
Supporting Elements (Groundwater)		
Prevent and Limit Objective	Active	-
Trend Assessment	Upward trend	-

5.5.3 Reasons for not achieving Good status (RNAG)

The EA's RNAG data identifies that point sources from abandoned mines is the reason for the Don and Rother Millstone grit and Coal Measures groundwater body not achieving its Good status objective. The RNAG for the water body provided with the Cycle 2 2015 RBMP are summarised in Table 7.

Table 7: Reasons for not achieving good (RNAG) status identified for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB41201G101100) water body.

Failing element	RNAG					
	ID	Category	Business	SWMI	Activity	Pressure Tiers
Quantitative Saline Intrusion	490676	No sector responsible	Not applicable	Natural	Saline or other intrusion	Abstraction and flow
Chemical Saline Intrusion	509546	No sector responsible	Not applicable	Other pressures	Saline or other intrusion	Chemicals
Trend Assessment	509578	Sector under investigation	Not applicable	Unknown (pending investigation)	Unknown (pending investigation)	Other

5.5.4 Programme of measures

At the time of writing, information on the programme of measures associated with this groundwater body had not been made available to Arup.

5.5.5 WFD Protected Areas

The groundwater body is associated with the WFD Protected Areas summarised in Table 8. There are no drinking water safeguard zones (surface water and groundwater) within the 5km of the proposed scheme.

Table 8: WFD Protected Areas for the Don and Rother Millstone grit and Coal Measures (GB40402G992300) groundwater body

Directive	Protected Area Name	ID
Nitrates Directive	River Weaver (Dane to Frodsham) NVZ S636	S636
Nitrates Directive	River Irk (Moston Brook to River Irwell) NVZ S638	S638
Nitrates Directive	River Glaze NVZ S641	S641

Directive	Protected Area Name	ID
Nitrates Directive	Irwell / Man. Ship Canal (Kearsley to Irlam Locks) NVZ S643	S643
Drinking Water Protected Area	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	UKGB41201G101100

5.5.6 Groundwater Dependant Terrestrial Ecosystems (GWDTE)

There are no statutory or non-statutory designated GWDTEs within the water body catchment within 1km of the Proposed Development.

6 Impact assessment (scoping)

6.1 Overview

A preliminary (scoping) assessment has been undertaken to establish the likely impacts of the proposed development on the WFD status elements of the 'Irk (Wince to Irwell)' river water body and 'Manchester and East Cheshire Permo-Triassic Sandstone Aquifers' groundwater body present at the site. This has taken into account the relevant mitigation measures embedded within the design and construction strategy for the proposed scheme.

Impacts have been considered with regard to the risk of the proposed development:

- causing a deterioration in current status of the water body; and/or
- preventing the future achievement of water body status objectives.

Where any residual adverse (amber or red) effects remain at the detailed design stage following consideration of additional mitigation Regulation 19 derogation assessment requirements should be considered in consultation with the EA.

6.2 Potential impacts on current status

The assessment has considered the key components of the proposed scheme that have the potential to impact upon the current status of the surface water body.

It has been assumed for the purposes of this assessment that the control and mitigation measures summarised in Section 4.2 will be implemented throughout the construction phase of the proposed scheme. As such, assessment of the effects of the proposed scheme on the status of the various quality elements has taken into account these measures and considered additional mitigation where necessary.

Surface water

The proposed scheme includes a suite of design principles which aim to improve the flow diversity and geomorphological processes in addition to creating a diverse physical habitat to improve aquatic ecology. The principles focus on the achievement of the following and were adopted in consultation with an experienced geomorphologist and aquatic ecologist:

- Creating a low flow channel – using a variety of features and techniques;
- Softening artificial banks, where possible;
- Removal of structures and barriers; and
- Removal of debris/rubbish from the channel.

Assuming these principles are adopted, it is expected that the interventions would result in the following on the River Irk within the vicinity of the Infrastructure Works:

- Improvements to physical habitat for fish and invertebrates;
- Creation of marginal aquatic habitats;
- Improvements in connectivity between river and bank top for ecology;
- Improvement to habitat and geomorphological continuity; and
- Improvements in water quality.

With regard to the current WFD status, it is expected that all of the in-channel works associated with the proposed scheme will have a beneficial effect on the current status of the WFD surface water body. The proposed aquatic habitat improvements and enhancements are very likely to have localised beneficial effects on fish, macroinvertebrates and macrophytes and phytobenthos. The interventions are also likely to improve hydromorphological quality elements with improvements to river width and depth through the creation of a low flow channel that has more diversity of flow types. Enhancement of the marginal habitat is also likely to benefit hydromorphology and provide greater connectivity of habitats both upstream/downstream and in-channel/riparian zone.

The proposed scheme is also due to remove a short section of existing river walls. In the vicinity of St Catherine's Wood where the river wall is due to be removed new reprofiled banks and elevated walkway structures to allow better access for the public to the water's edge will be constructed. This is likely to have a minor localised improvement to the riparian habitat structure in these areas and greater bank and in-channel connectivity. The Union Walk area will also feature river terracing which is expected to replace the existing wall with softer engineered wall solutions where possible to improve habitat. The proposed scheme is also due to incorporate SuDS based design solutions where possible which is expected to result in localised benefits for water quality. There is also the opportunity to investigate further options to improve water quality at the detailed design stage, particularly with regard to existing outfalls along the river walls.

Groundwater

The proposed scheme does include features that will require below ground working so there is the potential for the proposed scheme to interact with the groundwater. Any potential risk of groundwater contamination is due to excavations is expected to be managed appropriately and will be assessed when more detail is available.

At this stage it is not anticipated that the proposed scheme would result in a deterioration of the groundwater body, however the potential risk will be investigated in more detail at the detailed design stage.

6.3 Potential impacts on future status

Surface water

The proposed scheme is not anticipated to inhibit the water body level measures set out for the surface water body.

The proposed in-channel and riparian improvements may contribute to a number of the water body level measures associated with the HMWB Mitigation Measures for the water body specifically those around enhancing ecology, removing or softening hard bank protection and creating in-channel morphological diversity.

The potential risk to the water body level measures and potential opportunities to address or supplement these measures should be assessed at the detailed design stage.

Groundwater

The proposed scheme is not anticipated to involve any activities or construction of features that would prevent the groundwater body from achieving a good overall status in the future. However, Arup do not have sight of the specific water body level measures at the time of writing, therefore further investigation is required at the detailed design stage.

6.4 Compliance summary

The proposed development is considered to be compliant with the following overarching assessment objectives identified by the EA (assuming the proposed in-channel and riparian interventions suggested are adopted at the detailed design stage):

- Objective 1: The proposed development does not cause deterioration in the Status of the relevant water bodies;
- Objective 2: The proposed development does not compromise the ability of the relevant water bodies to achieve their WFD status objectives;
- Objective 3: The proposed development does not cause a permanent exclusion or compromised achievement of the WFD objectives in other water bodies within the same RBD; and
- Objective 4: The proposed development contributes to the delivery of the WFD objectives.

It is recommended that once more detailed design information is available, this WFD assessment is revisited and reassessed based on the latest information.

7 Conclusions

The proposed scheme has the potential to affect the ‘Irk (Wince to Irwell)’ (GB112069061131) river water body and the ‘Manchester and East Cheshire Permo-Triassic Sandstone Aquifers’ (GB41201G101100) groundwater body. An assessment of compliance

An assessment of the compliance of the proposed scheme with the objectives of the WFD has therefore been undertaken. This report summarises the assessment approach, results and relevant mitigation requirements with respect to achieving compliance with WFD objectives.

A baseline (screening) assessment has been completed to identify the relevant WFD water bodies potentially affected by the proposed scheme and collate the available data available regarding water body baseline condition and WFD status and objectives. This has also included identification of the relevant components of the scheme design with the potential to affect the water body, together with relevant embedded construction phase mitigation and measures.

A preliminary (scoping) assessment has then been undertaken to identify the potential effects of the proposed scheme on the current status and status objectives of the water body. This assessment is based on the currently available site and design information and assumptions regarding best practice and mitigation measures to be developed and included within the CEMP for the proposed scheme at the construction stage.

The proposed scheme is not anticipated to cause any significant adverse effects on the quality elements of the ‘Irk (Wince to Irwell)’ and the ‘Manchester and East Cheshire Permo-Triassic Sandstone Aquifers’ water bodies, when considered against the embedded construction mitigation outlined in Section 4.4 (which are assumed to be incorporated into an CEMP). Accordingly, the proposed scheme is not anticipated to cause a deterioration in the current status of the water bodies.

The proposed scheme is also not anticipated to prevent the future achievement of the status objectives of the water body, with regard to the risk of exacerbating existing ‘reason for not achieving good’ or of inhibiting the implementation of measures identified by the EA to address these existing pressures. Aspects of the proposed scheme have the potential to contribute towards the overarching objectives of the WFD through the creation of marginal aquatic habitats and improvements to physical habitats, geomorphological continuity and water quality.

This WFD assessment provides an indication of the likely compliance of the proposed scheme at the time the assessment was prepared. It is recommended that this assessment is updated as a ‘living document’ at subsequent design and construction stages of the project to account for any:

- a. new baseline information that becomes available for the site and/or the relevant WFD water bodies present at the site; and
- b. significant updates to the design details and construction methodology for the proposed development.

It is recommended that further, targeted geomorphological and marginal habitat surveys are undertaken as part of any updated assessment, in order to verify baseline conditions and sensitivity at the impact sites and inform construction method statements and mitigation development (if required).

Appendix A

Background information - WFD
status determination and
compliance assessment process

A1 WFD Background

A1.1 Determination of WFD Status

A1.1.1 Introduction

Surface water bodies and groundwater bodies are defined within WFD legislation. There are three types of surface water body, as follows:

- natural water bodies;
- heavily modified water bodies (HMWBs);
- artificial water bodies (AWBs).

The Overall Status of natural surface water bodies is determined on the basis of their Ecological Status and Chemical Status. The overall status of heavily modified and artificial water bodies is classified based on their ecological potential and chemical status. The overall status of groundwater bodies is determined on the basis of their Quantitative Status and Chemical Status.

Groundwater bodies are defined within WFD legislation as Groundwater Management Units (GWMU) and Water Resource Management Units (WRMU) and their status is determined on the basis of quantitative and chemical sub-elements.

The means by which these determinations are made for both surface water and ground water bodies is described in this section.

A1.1.2 Surface water bodies

A1.1.2.1 Ecological status

Ecological Status is defined by the overall quality of the structure and functioning of aquatic ecosystems associated with surface waters, i.e. the condition of the watercourse. This is assigned on a scale of high, good, moderate, poor or bad, and on the basis of four classification elements or ‘tests’, as follows:

- Biological - this test is designed to assess the status indicated by a biological quality element such as fish, invertebrates, macrophytes or phytobenthos (diatoms). The biological quality elements can influence an overall water body status from bad through to high. It is also important to note that the presence of invasive species prevents a water body from achieving high status when all other elements attain high;
- Physicochemical - this test is designed to assess the status indicated by physicochemical quality elements such as dissolved oxygen, phosphorus and ammonia, against environmental standards. The physicochemical quality elements can only influence an overall water body status from moderate through to high;

- Specific pollutants - this test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physicochemical test, the specific pollutant assessment can only influence an overall water body status from moderate through to high; and
- Hydromorphology - for natural surface water bodies this test is undertaken by the EA during classification when the biological and physicochemical tests indicate that a water body may be of high Overall Status. It specifically assesses hydromorphological quality elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological quality elements do not support high Ecological Status, then the status of the water body is limited to good Overall Status. Hydromorphological assessments are used to determine 'high' Overall Status only and are not be used to drive a water body status class below good. The 'does not support good' classification should be reported for the purposes of identifying water bodies which fail the flow test.

The worst-case classification is assigned as the overall surface water body status, in a 'one-out all-out' system. This system is summarised in **Figure 11**.

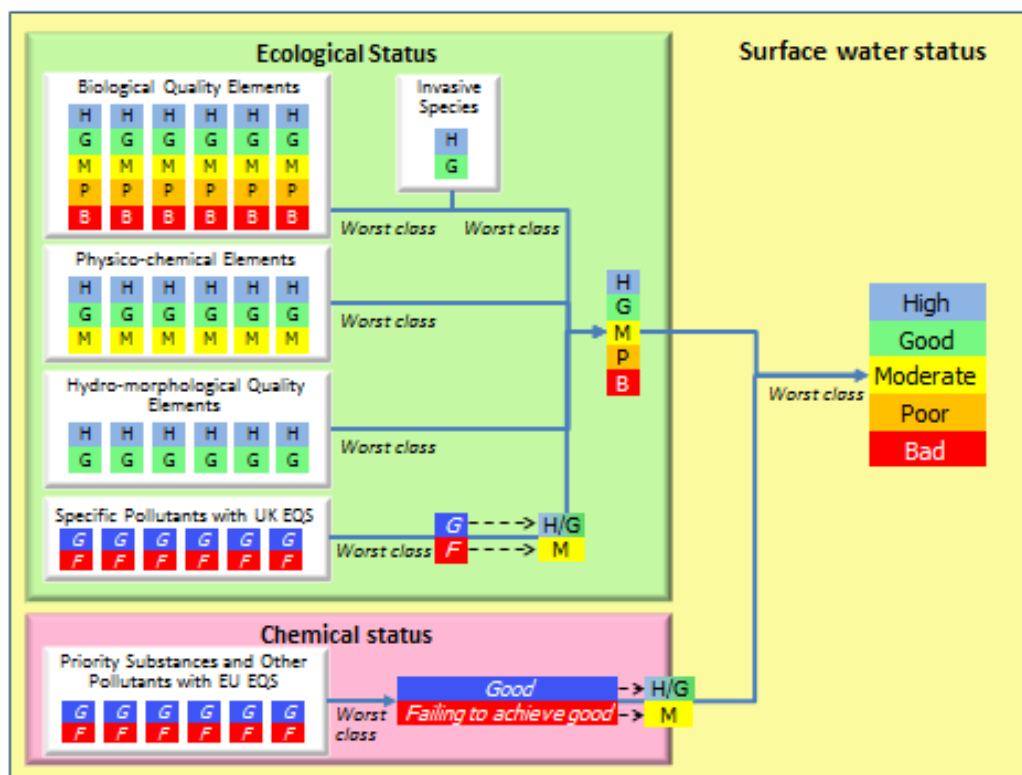


Figure 3: Ecological status classification process (Source: Environment Agency (2015))¹⁹

¹⁹ Environment Agency (2015), *Rules for assessing Surface Water Body Status and Potential*, V2.0

A1.1.2.2 Chemical status

Chemical Status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC)²⁰. This is assigned on a scale of good or fail.

Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise surface water bodies are reported as being of good Chemical Status.

A1.1.2.3 Ecological potential for heavily modified (and artificial) water bodies

Ecological Potential is assigned to AWB (such as reservoirs and canals), or natural water bodies which, as a result of physical alterations by human activity, are substantially changed in character. The latter are termed HMWB. The term 'ecological potential' is used to classify AWBs and HMWBs as it may be impossible for these water bodies to achieve good Ecological Status (GES) because of their creation or modification for a specific use, such as navigation, water supply or flood protection. The Ecological Potential of an AWB or HMWB represents the degree to which the quality of the water body approaches the optimum condition it could achieve given its artificial or heavily modified state.

AWB and HMWB are subject to an additional set of rules that need to be implemented prior to running the one-out-all-out process. These rules determine which biological quality elements should be used in the water body Ecological Potential classification. Under normal circumstances, AWB and HMWB are classified according to an assessment of mitigation measures, which defines good Ecological Potential (GEP) in water bodies where all applicable mitigation is in place, and moderate ecological potential in water bodies where some or all relevant mitigation is missing. However, to prevent AWB and HMWB being incorrectly classified as good potential in situations where all mitigation is in place, but other pressures are causing an impact (e.g. nutrient enrichment or pollution from toxic substances), the methodology adopted in the UK additionally considers biological indicators providing they are not sensitive to the heavily modified nature of the water body.

AWB and HMWB hydromorphological elements are assessed using a three-stage process, firstly looking at flow, then mitigation measures and biological quality elements.

Flow conditions are assessed initially on a fail or pass basis to determine which of the biological and physicochemical quality elements should be used in the classification of Ecological Potential.

²⁰ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008; *on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council*. Strasbourg, European Parliament and European Council

Where the flow conditions are unaffected by the physical modification (flow conditions pass), the water body Ecological Potential is determined by the worst of either the mitigation measures assessment, or any element that is not sensitive to the modified nature of the water body.

Where the flow conditions are significantly impacted by the physical modification (flow conditions fail), the water body Ecological Potential is determined by the worst of any of the mitigation measures assessments or the assessment of biological quality elements, physicochemical quality elements or specific pollutants.

Where a water body is designated as artificial or heavily modified for water resources usage, either solely or jointly with other uses, the flow condition is assumed to be good (pass).

A1.1.3 Groundwater bodies

Under the WFD, groundwater body Overall Status is classified on the basis of Quantitative Status and Chemical Status. The groundwater bodies are separated into GWMU and WRMU. GWMU are sub-divisions of the groundwater to aid the resource assessment process. WRMU are sub-divisions according to the water resource availability and the management of water.

The worst-case classification dictates the Overall Status, via a ‘one-out all-out’ system. This system is summarised below in **Figure 4**.

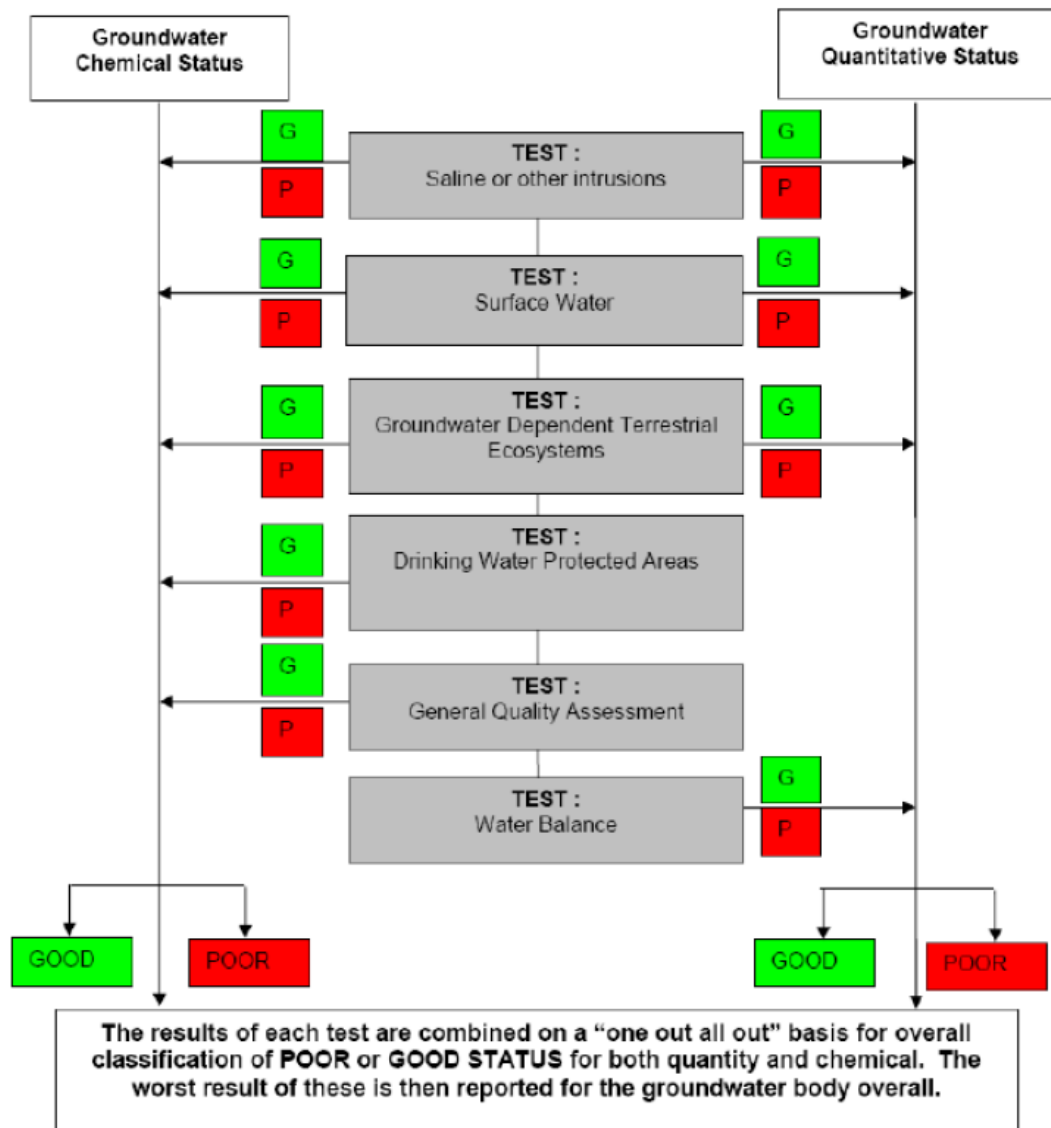


Figure 4: Groundwater body status classification (Source: UKTAG (2012)²¹)

²¹ UKTAG (2012), *Paper 11b(ii): Groundwater Quantitative Classification for purposes of the Water Framework Directive*, V3.1

A1.1.3.1 Quantitative status

Quantitative Status is defined by the quantity of groundwater available as base flow to watercourses and water-dependent ecosystems and as ‘resource’ available for use as drinking water and other consumptive purposes. It is assigned on a scale of good or poor, and on the basis of four classification elements or ‘tests’ as follows:

- saline or other intrusions - this test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions;
- surface water - this test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the Ecological Status of associated surface water bodies;
- Groundwater Dependent Terrestrial Ecosystems (GWDTE) - this test is designed to identify groundwater bodies where groundwater abstraction is leading to significant damage to associated GWDTE; and
- water balance - this test is designed to identify groundwater bodies where groundwater abstraction exceeds the ‘available groundwater resource’, defined as the rate of overall recharge to the groundwater body itself less the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTE.

A1.1.3.2 Chemical status

Chemical Status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of good or poor, and on the basis of five classifications elements or ‘tests’, as follows:

- saline or other intrusions - this test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions;
- surface water - this test is designed to identify groundwater bodies where groundwater is leading to a significant diminution of the Chemical Status of associated surface water bodies;
- GWDTE - this test is designed to identify groundwater bodies where groundwater is leading to significant damage to associated GWDTE;
- Drinking Water Protected Areas (DrWPA) - this test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future. The aim is no deterioration in quality of waters for human consumption, and

- general quality assessment - this test is designed to identify groundwater bodies where widespread deterioration in quality has, or will, compromise the strategic use of groundwater. The aim is no significant impairment of human use of groundwater and no significant environmental risk from pollutants across a groundwater body. Status is assessed primarily using data collected from the EA monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread diffuse pollution.

A1.1.4 Environmental standards

Under the WFD, a range of environmental standards and condition limits are applied in order to help the classification of water body status and the setting of status objectives via the RBMP process. These environmental standards define the range of environmental conditions that support “healthy” aquatic life. For instance, standards are set for the composition of biological communities, the physicochemical water quality parameters, the concentration of pollutants, and the level of flows in rivers (as described above).

These standards²² inform the EA on the implementation of the RBMP process, including the identification of measures required to support the achievement of the GES / GEP objectives, as well as underpinning efforts to protect the water environment by helping to regulate activities that could cause adverse impacts.

A1.2 WFD Assessment requirements for new developments

To ensure compliance with the WFD, decision makers must consider whether proposals for new developments have the potential to:

- cause a deterioration of a water body from its current status or potential;
- prevent future attainment of good status or potential where not already achieved;
- impact on protected or priority species and habitats; and/or
- provide opportunities to improve the water environment.

A ruling by the European Union Court of Justice on 1 July 2015²³ has significant implications for projects that may impact water bodies, namely:

- consent for development must not be granted by an authorising authority – unless a derogation is granted - where the project may cause a deterioration in the status of a body of surface water or where it jeopardises the attainment of good Ecological Status or of good Ecological Potential and good Chemical Status by the date laid down in the Directive;

²² The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

²³ Case 461/13 Bund für – Umwelt Und Naturschutz Deutschland v Bundesrepublik Deutschland (‘the Bund case’) concerning the interpretation of Article 4(1)(a)(i) to (iii) of the Water Framework Directive 2000/60/EC (WFD)

- that deterioration of the status of the relevant body of surface water includes a fall by one class of any element of the quality elements within the meaning of Annex V of the WFD even if the fall does not result in a fall of the classification of the body of surface water as a whole; and
- if the quality element is already in the lowest class, any deterioration of that element represents deterioration of status within the meaning of Article 4(1)(a)(i).

A1.2.1 Guidance

Whilst there is no established methodology for assessing compliance with WFD legislation, the WFD Compliance Assessment will be based upon expert judgement, established best practice and consultation with the EA and will be undertaken in accordance with relevant EA guidance²⁴ and the recent advisory guidance provided by The Planning Inspectorate²⁵.

²⁴ Environment Agency, (2010), *Assessing new modifications for compliance with WFD: detailed supplementary guidance*.

²⁵ The Planning Inspectorate (2017), *Advice note eighteen: The Water Framework Directive*.

A2 WFD Assessment Process

A2.1 Overview

WFD Compliance Assessment is undertaken as an iterative, stepped process, which typically includes the following:

- Step 1: Baseline assessment (screening);
- Step 2: Preliminary assessment (scoping);
- Step 3: Detailed impact assessment (where required); and
- Step 4: Application of Regulation 19 (where applicable).

These key process steps are described in further detail in the following sections. Consultation with regulatory authority should be undertaken to share the findings of each step, where necessary/applicable.

A2.2 Baseline assessment (screening)

The key objective of the baseline (screening) assessment is to identify the relevant WFD surface water and groundwater bodies (including any undesignated tributary watercourses) potentially affected by the proposed development and to establish their baseline condition.

The water body baseline condition of relevant water bodies has been identified via desk-top assessment, utilising readily available information and environmental, asset and operations data obtained from relevant stakeholders, including the EA, Natural England, and Yorkshire Water.

WFD baseline datasets have been obtained from the EA's Catchment Data Explorer website²⁶. This includes:

- RBMP Cycle 2 current status and status objectives data;
- WFD Protected Areas data;
- Reasons for not achieving good status (RNAG) data;
- Measures data.

The 2015 and 2016 EA WFD water body status data has been used to inform the assessment. These data are considered to provide the current best estimate of status and the formal baseline against which the EA will assess compliance with the 'no deterioration' objective. Where baseline data is limited, professional judgement has been used in the assessment and a precautionary approach taken with regard to screening.

²⁶ See: <http://environment.data.gov.uk/catchment-planning/>

The relevant WFD water bodies present within the potential zone of influence of the proposed development are taken through to the subsequent preliminary assessment (scoping) stage.

A2.3 Preliminary assessment (scoping)

The objective of the preliminary (scoping) assessment is to establish the relevant likely effects of the proposed development on the WFD status elements of the relevant WFD surface water and groundwater bodies. This includes identification of potential impact types and any relevant mitigation measures embedded within the design of proposed development at this stage.

The preliminary assessment considers both the beneficial and adverse effects of the relevant elements of the proposed development and applies a risk-based method in line with existing EA and NRW guidance.

Effects are considered with regard to the risk of the proposed development causing a deterioration in current status and/or a failure to achieve status objectives. The assessment identifies those scheme components / impacts that pose a risk current status or status objectives and thus may require more detailed impact assessment.

The preliminary assessment therefore comprises two parts, as follows:

- likely effects on current status or potential, involving:
 - identification of relevant scheme components with potential to impact upon water body status;
 - identification of likely potential impact and magnitude of effects of the relevant scheme components on the current status of the water body (taking account of any ‘embedded’ mitigation; and
 - identification of potential risks of deterioration in current status and associated requirements for additional mitigation and/or further detailed assessment.
- likely effects on status objectives, involving:
 - scoping of the relevant scheme components to identify where the proposed development may pose a risk of worsening existing pressures responsible for current status failures (RNAGs) and/or prevent the implementation of measures identified by the EA to address existing status failures; and
 - scoping of relevant scheme components against any available EA HMWB/AWB ‘mitigation measure assessment’ outputs, in order to identify where the proposed development may pose a potential risk of inhibiting the implementation of measures derived to mitigate the impacts of existing physical modifications and operational regimes to support the achievement of good Ecological Potential objectives.

A2.4 Detailed impact assessment

Where deemed required, the objective of the detailed impact assessment is to establish the nature and anticipated magnitude of the effects of relevant elements of the proposed development on the WFD quality elements of the surface water and groundwater bodies affected. These effects are considered in terms of the potential for deterioration of current status and/or the prevention of status objectives. This detailed assessment may be based on targeted baseline surveys, monitoring or modelling assessments completed at the impact sites.

As with the preliminary assessment stage, the detailed impact assessment is therefore comprised of two key parts, as follows:

- assessment of effects on current status of quality element; and
- assessment of effects on status objectives, with regards to any water body RNAG or measures/actions identified as potentially being at risk from the proposed development under the preceding preliminary (scoping) assessment. This is done via expert judgement and consultation with the EA, based on the currently available information.

Where significant effects are identified with regard to the risk of status deterioration and/or the prevention of status objectives, the assessment should identify ‘further mitigation’ required in order to avoid and/or minimise risks and the residual effects on quality elements at the water body scale.

The detailed impact assessment will also identify if Regulation 19 tests need to be prepared for affected water bodies, where a residual risk to status deterioration and/or prevention of future status objectives has been identified.

A detailed impact assessment has not been deemed required for the proposed development, based on the information available at this stage.

A2.5 Regulation 19 tests

Regulation 19 of the WFD states that Member States will not be in breach of the Directive when failure to meet its environmental objectives is the result of either new modifications to the physical characteristics of a water body or as a result of new human sustainable development, on the proviso that the modifications or new development proposed are compliant with the four key conditions listed below. In doing so, Regulation 19 provides a means whereby a derogation for a proposed modification or sustainable development may be granted where it meets these four conditions.

1. all practicable steps have been taken to mitigate the adverse impact on the status of the water body;
2. the reasons for the modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development; and

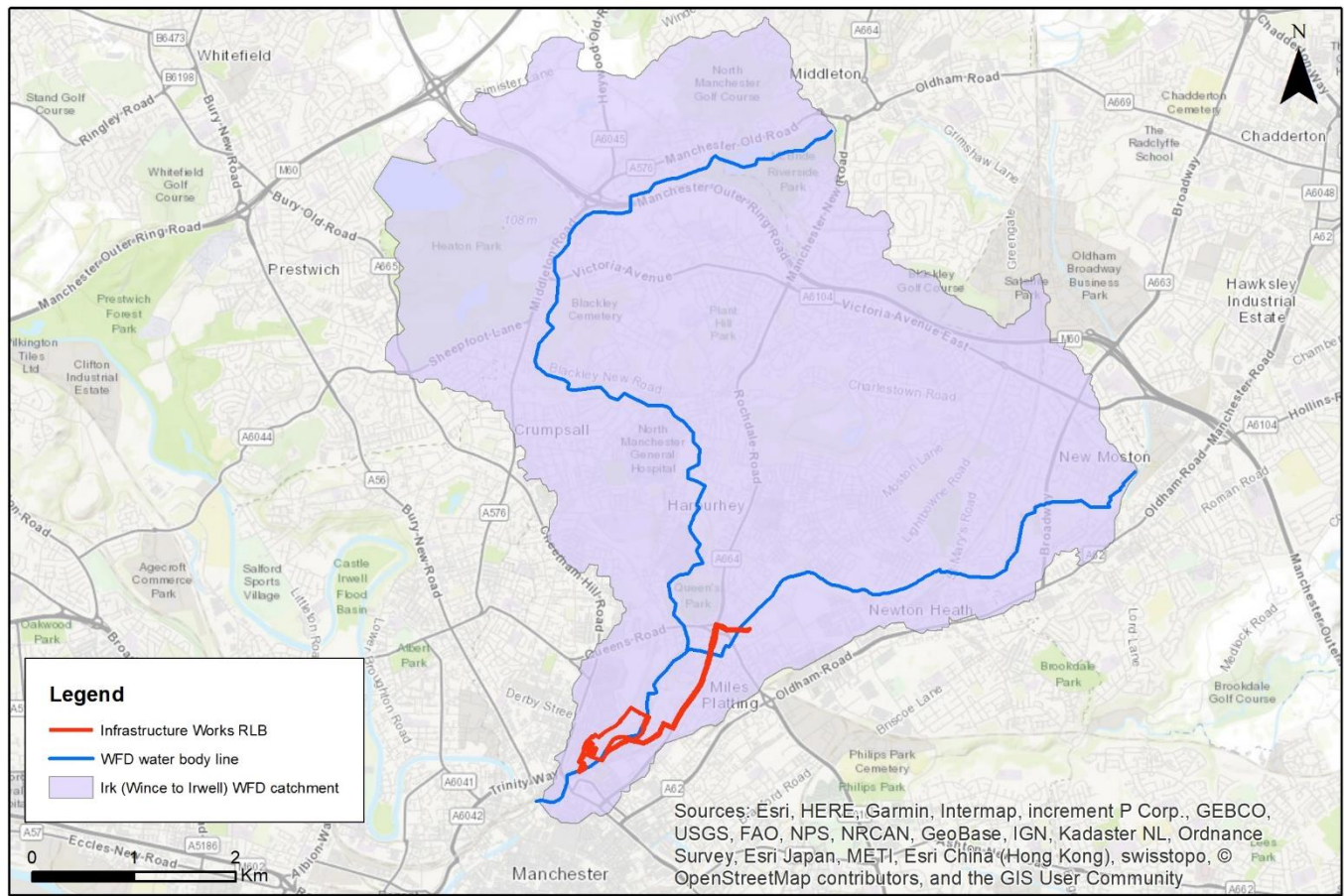
3. the beneficial objectives served by the modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.
4. the reasons for the modifications or alterations are clearly identified to the EA, so that they can be specifically set out and explained in the relevant RBMP (as required under Article 13).

Regulation 19 tests are not deemed required for the proposed development, based on the information available at this stage.

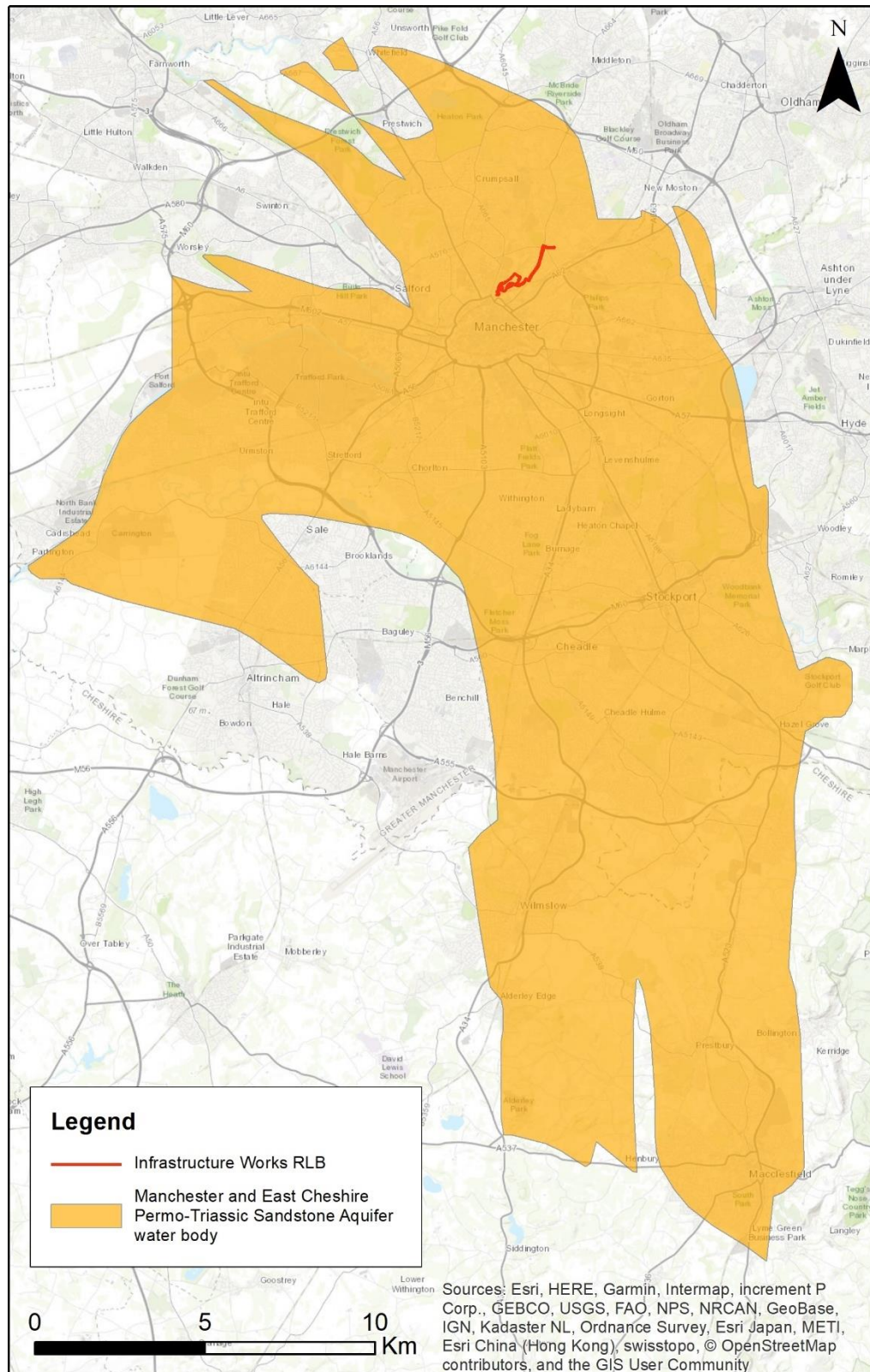
Appendix B

Water body extents

B1 Surface water bodies



B2 Groundwater bodies



Appendix C

EA water body monitoring data

C1 Summary of EA biological monitoring data

The following data were obtained from the Biological Monitoring Data: Ecology & Fish Data Explorer²⁷ and the water quality data archive²⁸ for the vicinity of the scheme to gain an understanding of the baseline quality elements in WFD.

C1.1 Fish

No fish monitoring data is currently available near the site.

C1.2 Invertebrates

Data since 2010 shown.

Site/Station Name	NGR	Sample Date	Sample Method	Analysis ID	BMWP Total	BMWP - ASPT	WHPT - ASPT	Life – Family Index	PSI – Family Score
176487 (IRK)	SJ8486399641	2017-04-21	3 min pond net	743688	48	4	4.66	7.4	56
		2017-09-15		748642	44	3.67	4.35	7.1	50

²⁷ Environment Agency and DEFRA. Ecology and Fish Data Explorer. [Available at: <https://environment.data.gov.uk/ecology/explorer/>]

²⁸ Environment Agency. Water Quality Data Archive. [Available at: <https://environment.data.gov.uk/water-quality/view/landing>]

C1.3 Macrophytes

Data since 2010 shown.

Site/Station Name	NGR	Sample Date	Sample Method	Analysis ID	RMHI	RMNI	RN A TAXA	N RFG	RFA PC
176487 (IRK)	SJ8486399641	2018-06-26	Standard method for macrophytes (WFD compliant)	761483	7.09	7.98	3	3	37.5

C1.4 Diatoms

Data since 2010 shown.

Site/Station Name	NGR	Sample Date	Sample Method	TDI4	Total TDI4 Cells	TDI4 % PTV
68914 (IRK)	SJ8490599755	2014-04-17	STANDARD DIATOM method for lakes and rivers (WFD Compliant)	75.12	303	30.42

C2 Water Quality Data

Determinant	River Irk @ Red Bank Above Scotland Weir	River Irk D/S Moston Brook
	SJ 84124 99197	SJ 84910 99769
	5 Aug 2021 11:57	10 Feb 2014 12:30
pH	8.08	7.9
Temperature of water, °C	16	6.4
Conductivity at 25 C, µs/cm	551	508
BOD: 5 Day ATU	1.9	3.8
Chemical Oxygen Demand:- {COD}, mg/l	-	21
Ammoniacal Nitrogen as N, mg/l	0.088	0.288
Nitrogen, Total Oxidised as N, mg/l	5.3	4.61
Nitrate as N, mg/l	5.25	4.56
Nitrite as N, mg/l	0.053	0.0471
Ammonia un-ionised as N, mg/l	0.00249	-
Alkalinity to pH 4.5 as CaCO ₃ , mg/l	120	118
Orthophosphate, reactive as P, mg/l	1.6	0.278
Oxygen, Dissolved, % Saturation, %	96.4	94
Oxygen, Dissolved as O ₂ , mg/l	9.49	11.6
Solids, Suspended at 105 C, mg/l	7	9.13
Chloride, mg/l	52	40.4