Government Property Agency

AtkinsRéalis



MANCHESTER DIGITAL CAMPUS

Environmental Statement

Volume 4 - Appendix 19.1: Water Framework Directive Assessment

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1. Introduction

The location of the Proposed Development is shown in ES Volume 5 Figure 19.2.1. The Site is bounded to the north-west by the Rochdale Canal, and approximately 30 m to the north-east (at the closest point) is the New Islington Marina which connects the Rochdale Canal and the Aston Canal. The Site was formerly a retail park which has since been demolished and is currently vacant, comprising vacant brownfield land with a disused hardstanding carpark with other hardstanding areas

The proposed works aim to construct two buildings on part of the Former Central Retail Park, as shown within the landscape plans in MDCX-ATR-ZZ-ZZ-DR-L-2310000.

A Water Framework Directive (WFD) compliance assessment is required to understand the impact of the proposed works on the water environment.

Further information on the Proposed Development, in addition to the activities being considered as part of this WFD compliance assessment, is outlined in Section 3.1.

1.1 Aims and objectives

The aim of this document is to provide:

- Background information on WFD legislation;
- Background information on the Proposed Development;
- Screening assessment to identify the study area of the Proposed Development, WFD water bodies that may be affected, and activities associated with Proposed Development that do not require further consideration;
- (If required), scoping of the baseline characteristics of each WFD water body screened in and identification of impact mechanisms to receptors based on the relevant water bodies screened in; and
- (If required), impact assessment to determine whether the Proposed Development will:
  - have a long term effect on the status of one or more WFD 'quality elements' at the water body scale;
  - prevent any of the WFD objectives being reached; and,
  - contribute to the delivery of relevant WFD objectives in respect of any measures that are identified to improve the baseline status of the water body).

1.2 Legislative background

The WFD is a European Union (EU) Directive[1] which was transposed into domestic legislation by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[2]. The Environment Agency (EA) is the lead agency for implementing the WFD in England.

The WFD sets out a strategic planning process for the purposes of managing, protecting and improving the water environment. The main objectives of the WFD are to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;

[1] European Commission. 2024. Water Framework Directive. Available from: https://environment.ec.europa.eu/topics/water/water-framework-directive_en

[2] Legislation.gov.uk. 2017. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available from: https://www.legislation.gov.uk/uksi/2017/407/contents/made

- Aim to achieve at least 'Good Status' for all waters by 2015 (or delayed to 2021 or 2027 where fully justified within an extended deadline);
- Promote sustainable use of water;
- 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 the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Help reduce the effects of floods and droughts.

In order to implement the objectives of the WFD, the EA has divided the water environment into a number of river, canal, lake, estuarine, coastal and groundwater 'water bodies'. The current environmental condition ('status') of each water body, and the measures that are required to improve the water body in order to attain the target condition, are published every six years in the River Basin Management Plans (RBMPs)[3]. The status of each WFD water body is provided with a classification to reflect its current condition with respect to its:

- **Ecological Status** – including hydromorphological supporting elements, physico-chemical quality elements, biological quality elements and specific pollutants.
- **Chemical Status** – including priority substances, priority hazardous substances and other pollutants.

Both ecological and chemical status are combined to provide an overall water body status. The WFD requires all natural river water bodies to achieve both Good Chemical Status (GCS) and Good Ecological Status (GES).

Artificial and Heavily Modified Water Bodies (A/HMWB) are considered unable to attain GES due to the significant physical modifications that are (or were historically) necessary to maintain a 'human use' (e.g. flood risk management, navigation). Accordingly, their target is to achieve Good Ecological Potential (GEP), through the implementation of a series of Mitigation Measures that would improve the ecology of these water bodies as far as practicable without compromising their human use.

New activities and schemes that affect the water environment may adversely impact WFD quality elements and may therefore present a risk to the attainment of the objectives of the WFD in that water body. There are two headline objectives against which the impacts of any Proposed Development activities on a water body must be assessed to determine compliance with overarching WFD objectives:

- **Test 1:** The Proposed Development will not cause a deterioration in any quality element that contributes directly or indirectly to the water body classification.
- **Test 2:** The Proposed Development will not prevent measures being implemented that would deliver the WFD status objectives within the water body or other downstream water bodies.

In addition to these two tests, all Proposed Developments should look for opportunities to contribute, where practicable, to the delivery of measures to attain good status. However, there is no legal requirement for Proposed Developments to do so.

If it is considered that the Proposed Development is likely to cause deterioration in water body status (Test 1) or prevent a water body from meeting its ecological objectives (Test 2), then an assessment would be made against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if "new modifications", specifically in respect to physical modification and/or significant changes in groundwater levels, are of overriding public interest and/or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and, all practicable steps have been taken to mitigate the impacts to an acceptable level.

[3] Environment Agency. 2024. River basin management plans: updated 2022. Available from: https://www.gov.uk/guidance/river-basin-management-plans-updated-2022

2. Methodology

The methodology used for this WFD assessment closely follows The Planning Inspectorate Advice Note 18 on the WFD, supplemented with the Environment Agency Position Statement 488_10 where appropriate[4,5]. Although the Planning Inspectorate guidance is for the assessment of Nationally Significant Infrastructure Projects (NSIPs), which this Proposed Development is not, it is still appropriate guidance to follow for assessing WFD compliance for a range of Proposed Developments. The methodology is split into three stages:

- Stage 1 – WFD screening;
- Stage 2 – WFD scoping; and,
- Stage 3 – WFD impact assessment.

The requirements of each of the three stages of WFD assessment are detailed below. Depending on the outcome of each stage, it is not always appropriate to complete all three stages of assessment (for example, if the screening stage determines that no further steps are required).

2.1 Stage 1 – WFD screening

An initial screening assessment is undertaken to determine the study area of the Proposed Development and the potentially affected WFD water bodies. Assessment is made to determine if there are any activities associated with the Proposed Development that no longer require further consideration; for example, activities which have been ongoing since before the current RBMP cycle and have thus formed part of the baseline. Water bodies where there is a high confidence of no impact are screened out from detailed investigation at this stage.

2.2 Stage 2 – WFD scoping

For the WFD scoping stage, a desk study is undertaken to understand the baseline characteristics of each WFD water body using the Environment Agency's Catchment Data Explorer and the RBMP[6,7]. This includes current classification status for all elements, pressures affecting the water body, its sensitivity to change and identification of watercourses within each water body. A desk study is completed to characterise the water bodies within the surface water bodies potentially affected by the Proposed Development (as identified in Stage 1 screening).

An assessment is also undertaken to identify the mechanisms of impact from the Proposed Development to the surface water and groundwater receptors within the study area based on the relevant water bodies identified during the Stage 1 screening. The mechanisms of impact to the water receptors are identified through a review of the available design information for the Proposed Development.

2.3 Stage 3 – WFD impact assessment

A "Red, Amber, Yellow, Green, Blue" (RAYGB) coding system is used to assign the relative WFD risk of each component of the Proposed Development against each quality element of each water body screened-in during

[4] Environment Agency. 2016. Water Framework Directive risk assessment. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf

[5] Planning Inspectorate. 2017. Nationally Significant Infrastructure Projects - Advice Note Eighteen: the Water Framework Directive. Available from: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/

[6] Environment Agency. 2024. Catchment Data Explorer. Available from: https://environment.data.gov.uk/catchment-planning/

[7] Environment Agency. 2022. North West river basin district river basin management plan: updated 2022. Available from: https://www.gov.uk/guidance/north-west-river-basin-district-river-basin-management-plan-updated-2022

Stage 1. Definitions for the colour coding are assigned to indicate the level of risk of objective non-compliance within each water body and include a) mitigation already "embedded" into the preliminary design and b) additional mitigation to be integrated into later phases of the design. The definitions used are provided in Table 2-1.

Table 2-1 - Definitions of the colour coding system used to determine WFD compliance risks within Stage 3 – WFD impact assessment.

Type of impact	Impact on WFD water body	Outcome
Moderate Beneficial	Impacts in combination with others have the potential to lead to the improvement in the WFD status of the water body.	Increase in status class for that water body.
Minor / localised beneficial	Impacts in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the water body.	Localised improvement, no change in status of WFD water body.
Green (no impact)	No measurable change to any quality elements.	No change
Yellow – Localised/ temporary adverse impact	Impacts in combination with others have the potential to lead to a minor localised or temporary impact on the WFD elements. Consideration will be given to habitat creation measures.	No change in status of WFD water body when balanced against mitigation embedded in the Proposed Development.
Amber – adverse widespread or prolonged impact	Impacts in combination with others have the potential to have an adverse impact on the WFD water body. The current WFD risk category will be considered when assessing these combined impacts. Consideration will be given to habitat creation measures.	Adverse impact but risk of status change needs to be considered with any additional mitigation and considering the level of confidence.
Red – adverse impact on an individual quality element and/or overall status of water body	Impacts in combination with others have the potential to have an adverse impact on the WFD water body and change its status. The current WFD risk category will be considered when assessing these combined impacts. Consideration will be given to habitat creation measures.	Decrease in status of WFD water body when balanced against additional mitigation. Outcome is considered to be certain.

3. Stage 1 – WFD screening

3.1 Proposed Development description

The proposed works which may impact the water environment are summarised below (for a full list of the proposed works see the ES Volume 4 Appendix 6.1[8]), the location of these works in relation to the WFD water bodies are shown in ES Volume 5 Figure 19.1.2 and ES Volume 5 Figure 19.1.3.

- Dewatering, it is assumed that the flows from dewatering, during construction and operation (if required), will be discharged into the combined sewer. Any dewatering consent is outside of the scope of this assessment and will be dealt separately.
- Site strip of existing hard and soft landscape.
- Temporary construction compounds, electrical substation, haul roads, lay down areas are to be in place during construction.

[8] Government Property Agency. May 2024. MDC - Outline Construction & Environmental Management Plan (OCEMP).

- Below ground works such as piling (within the outline structural specification[9] which may vary as design is progressed, the length of piles is proposed between 24.8 and 28.42 m and are likely to be installed within the Chester Formation, piles design is proposed as bored caste in place piles), Site excavations (for new lower floor levels), coring and removal of obstructions, retaining walls, removal/replacement of utilities including drainage (including rainwater attenuation tanks) and ducts.
- Construction of the building superstructure.
- Landscaping which includes but is not limited to, new trees, raised planter beds, green walls, natural stone paving. There will be paving setts and grasscrete paving for vehicle routes into and across the Site.
- Based on the Drainage Strategy see ES (Volume 4) Appendix 19.3, it has been assumed that surface water from the site will outfall into the Shooters Brook culvert, which discharges into the River Medlock downstream of the Proposed Development.
- Sustainable Drainage Systems (SuDS) will be implemented to control surface run off into the adjacent canal which is part of the Rochdale Canal Stott's Lane – Ducie Street Basin SBI (Site of Biological Importance).

3.2 Water body screening

This section identifies the Zone of Influence (ZoI) of the Proposed Development and screens in water bodies which have the potential to be impacted by the Proposed Development.

The ZoI for the Proposed Development is defined as the WFD surface water body catchment in which the Proposed Development area is located, plus (for surface waters) one water body upstream and downstream of the Proposed Development. This is restricted to only one water body upstream and downstream, as professional judgement considered it unlikely that there would be any influence beyond this extent.

For groundwater, only immediately underlying WFD groundwater bodies are included in the screening, as individual groundwater bodies are designated as "hydraulically coherent" systems that do not have interactions with other groundwater bodies.

3.2.1 Surface water bodies

Medlock (Lumb Brook to Irwell)

The Proposed Development is located wholly within the *Medlock (Lumb Brook to Irwell)* WFD river water body catchment, situated within the Roch Irk Medlock operational catchment and North West River Basin District (RBD). The *Medlock (Lumb Brook to Irwell)* water body is designated as Heavily Modified, with a Moderate Ecological status in the most recent WFD classification (Cycle 3, 2022). Prior to the construction of the Rochdale and Ashton Canals, there was a tributary of the River Medlock, Shooters Brook, which itself was fed by Newton Brook. Historical maps indicate that the route of the former Shooters Brook was culverted through the Proposed Development site. It is considered that the brook is now largely a 'lost watercourse' with the upstream section of Newton Brook now having been diverted several kilometres upstream of the Site. CCTV survey of the culverted Shooters Brook indicates that there is no structure beneath the Site. A culvert thought to be the former Shooters Brook is present downstream from the Site underneath Store Street, with CCTV providing evidence of stopping up of the culvert upstream at the junction of Store Street with Great Ancoats Street.

During operation, surface water from the Proposed Development will be discharged to the Shooters Brook Culvert, downstream of Store Street, which discharges into the River Medlock downstream of the Site. Although, this discharge connects the Proposed Development to the *Medlock (Lumb Brook to Irwell),* the impact to the WFD river water body is likely to be **negligible**, as the drainage strategy notes (see ES (Volume 4) Appendix 19.3), the maximum permitted discharge rate from the Site should be limited to the equivalent greenfield runoff rate such that

[9] AtkinsRéalis 2023, Outline Structural Specification, Manchester Digital Campus Building.

there will be negligible change to the flows and velocities within the downstream watercourse. Additionally, SuDS are built into the design which will reduce the pollutants in the surface water from the Proposed Development, resulting in a negligible change to the water quality of the watercourse.

Dewatering will be required as part of the enabling works for the Proposed Development, and potentially during operation (although this is yet to be confirmed). It is assumed that the flows from dewatering, during construction and operation (if required), will be discharged into the combined sewer. However, if the drainage strategy changes in subsequent iterations of design work resulting in the requirement of dewatering to Shooters Brook, this may have the potential to cause temporary changes to the water quality in the *Medlock (Lumb Brook to Irwell)* WFD river water body and this would need to be reconsidered within an updated iteration of this WFD assessment.

There are expected to be **no further impacts** on the *Medlock (Lumb Brook to Irwell)* from the Proposed Development, therefore it has been **screened out** from further assessment.

Rochdale Canal, western section, and Ashton Canal and Peak Forest Canal, lower section

There are two WFD canal water bodies located within the zone of influence: *Rochdale Canal, western section,* and *Ashton Canal and Peak Forest Canal, lower section*. These water bodies are of Moderate Ecological status and are both artificial water bodies. The New Islington Marina (which connects these two canals) also lies within the zone of influence and is within close proximity to the study area (~30 m at the closest point), however this is not designated as a WFD water body. The Rochdale Canal (*Rochdale Canal - Stott's Lane to Ducie Street Basin*) adjacent to the Site and the Ashton Canal (*Ashton Canal (West)*) are both designated Sites of Biological Importance (SBI)[10].

During the construction period, there may be minor impacts on the water environment associated with the construction activities on site – for example, mobilisation of fine sediment, use of chemicals, risk of release of hydrocarbons due to increased plant movement, use of concrete. However, any potential construction impacts are considered likely to be minor, localised and temporary. These impacts associated with construction can be mitigated for by implementing and adhering to a site-specific Construction Environmental Management Plan (CEMP) and following best practice guidance. For example, works should be undertaken in line with the Guidance for Pollution Prevention (GPP)[11] and the Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site Handbook[12] which details good practice measures for undertaking works which may have the potential to cause water pollution.

It is considered highly likely that the proposed works (as detailed in Section 3.1) will have negligible impact on the WFD canal water bodies; *Rochdale Canal, western section* and *Ashton Canal and Peak Forest Canal, lower section.* Whilst there are works which take place in close proximity to the WFD canal water bodies, none of the works take place within the water bodies themselves. It is noted in the Outline Construction and Environmental Management Plan (OCEMP) that Sustainable Drainage Systems (SuDS) will be implemented to control surface run off into the adjacent canal which is part of the Rochdale Canal Stott's Lane – Ducie Street Basin[8]. Additionally, with the appropriate embedded mitigation and following best practice guidelines i.e., GPP (as detailed above) during the construction period, the proposed works are likely to have **negligible impact** on the *Rochdale Canal, western section* and the *Ashton Canal and Peak Forest Canal, lower section* WFD canal water bodies during construction. During operation it is expected that the Proposed Development is likely to have **no impact** on the Rochdale Canal, western section and the Ashton Canal and Peak Forest Canal, lower section WFD canal water bodies. Therefore both Canal Water Bodies have been **screened out** from further assessment.

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[10] Greater Manchester Ecology Unit. 2024. Sites of Biological Importance (SBI / LWS) in Greater Manchester. Available from: Sites of Biological Importance (SBI / LWS) in Greater Manchester - data.gov.uk

[11] Net Regs. 2024. Guidance for Pollution Prevention (GPP) documents. Available from: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/

[12] Ciria. 2024. Environmental good practice on site pocket book (fourth edition) (C762D). Available from: https://www.ciria.org/ItemDetail?iProductCode=C762D&Category=DOWNLOAD&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91

Medlock (Source to Lumb Brook), Wince Brook and Tame (Swineshaw Brook to Mersey)

The WFD water body catchment downstream of the *Medlock (Lumb Brook to Irwell)* is the *Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey* WFD water body catchment. This catchment is approximately 2.8 km downstream of the Proposed Development. The *Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey* is a Heavily Modified water body which currently has a Moderate Ecological status. Due to the nature of the works, the scale and their location, the works are not considered to have an impact on the *Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey* WFD water body classification, therefore it has been **screened out** from further assessment.

Medlock (Source to Lumb Brook), Wince Brook and Tame (Swineshaw Brook to Mersey)

The WFD water body catchments upstream of the *Medlock (Lumb Brook to Irwell)* are the; *Medlock (Source to Lumb Brook), Wince Brook* and *Tame (Swineshaw Brook to Mersey).* These catchments are approximately 5 km, 7.2 km and 8.7 km upstream of the Proposed Development. Due to the nature of the works, the scale and their location, the works are not considered to have an impact on the *Medlock (Source to Lumb Brook), Wince Brook* and *Tame (Swineshaw Brook to Mersey)* WFD water bodies classification, therefore they have been **screened out** from further assessment.

Surface water screening summary

As a result, it is recommended that neither of the two WFD canal water bodies or the WFD river water body should be taken forwards to subsequent stages of this WFD compliance assessment as the Proposed Development is considered likely to have no impact / negligible impact on both the *Rochdale Canal, western section* and the *Ashton Canal, Peak Forest Canal, lower section* WFD canal water bodies and the *Medlock (Lumb Brook to Irwell), Medlock (Source to Lumb Brook), Wince Brook and Tame (Swineshaw Brook to Mersey)* WFD river water bodies. Therefore, these water bodies should be **screened out** from further assessment (i.e. Stage 2 – Scoping, and Stage 3 – WFD Impact Assessment).

3.2.2 Groundwater bodies

The study area is underlain by the *Manchester and East Cheshire Permo-Triassic Sandstone Aquifers* (GB41201G101100) WFD groundwater body, which has a Poor overall status in the most recent WFD classification (Cycle 3, 2019).

The Proposed Development works (as detailed in Section 3.1) include the following activities which may have an impact on groundwater:

- Dewatering;
- Earthworks;
- Piling;
- Temporary stockpiling of materials;
- In-situ reinforced concrete walls or contiguous piles; and
- Construction of new buildings and associated infrastructure.

These activities are likely to have an impact on the WFD groundwater body during construction and operation. Therefore, the **WFD groundwater body is taken forwards to Stage 2 (Scoping)** in the next section of this report.

3.2.3 Lake, transitional, and coastal water bodies

There are no WFD lake water bodies, transitional water bodies, or coastal water bodies within the study area and therefore, they are **screened out** from any further assessment.

3.3 Screening summary

Table 3-1 summarises the screening process providing information on the identified WFD water bodies which have the potential to be impacted by the Proposed Development.

Table 3-1 - Summary of WFD status for identified water bodies and screening outcome

Water body name / ID	Water body type	Ecological status[13]	Screening (in/out)	Justification for screening in/out
Rochdale Canal, western section (GB71210517)	Canal	Moderate	OUT	No anticipated direct or indirect impacts to the water body as a result of the Proposed Development. See Section 3.2.1 for more details.
Ashton Canal and Peak Forest Canal, lower section (GB71210219)	Canal	Moderate	OUT	
Medlock (Lumb Brook to Irwell) (GB112069061152)	River	Moderate	OUT	
Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey) (GB112069061452)	River	Moderate	OUT	
Tame (Swineshaw Brook to Mersey) (GB112069061112)	River	Moderate	OUT	
Medlock (Source to Lumb Brook) (GB112069061151)	River	Moderate	OUT	
Wince Brook (GB112069061120)	River	Bad	OUT	
Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB41201G101100)	Groundwater	Poor	IN	Water body underlies Proposed Development and surrounding study area and therefore has the potential to be impacted by the Proposed Development.

The screening summary (Stage 1) exercise has identified one WFD groundwater body which has been screened in for further assessment:

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

The identified groundwater body is therefore subjected to WFD scoping (Stage 2) in Section 4.

[13] Note Overall status provided for WFD groundwater body.

4. Stage 2 – WFD scoping

4.1 WFD groundwater body baseline

4.1.1 WFD Groundwater bodies

The following WFD groundwater body (as identified in Section 3.2) is included in this scoping:

- Manchester and East Cheshire Permo-Triassic Sandstone Aquifers

The WFD groundwater body is situated within the North-West Groundwater Management Catchment of the North-West RBD.

The current (2019, Cycle 3) WFD classification[14] for this WFD groundwater body is summarised in Table 4-1. The table also summarises the objectives, RNAGs and linked protected areas set by the Environment Agency.

Table 4-1 - Groundwater body WFD summary (2019, Cycle 3).

Water Body Name	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers
Water Body ID	GB1201G101100
Overall Classification	Poor
Objectives	Good (2021)
Quantitative	**Poor**
Quantitative status element	Poor
Saline intrusion	Poor
Water Balance	Good
Groundwater Dependent Terrestrial Ecosystems (GWDTEs) test	Good
Dependant surface water body status	Good
Chemical	**Poor**
Chemical status element	Poor
Drinking water protected area	Good
General chemical test	Good
GWDTEs test	Good
Dependant surface water body status	Good
Saline intrusion	Poor
Supporting elements (Groundwater)	-
Prevent and limit objective	Active

[14] https://environment.data.gov.uk/catchment-planning/WaterBody/GB41201G101100

Trend assessment	Upward trend
RNAG (2019)	Trend Assessment – Unknown (pending investigation) Quantitative Saline Intrusion – Natural Chemical Saline Intrusion – Other pressures
Protected areas	River Weaver (Dane to Frodsham) Nitrate Vulnerable Zone (NVZ) River Glaze NVZ Irwell/ Man. Ship Canal (Kersley to Irlam Locks) NVZ River Irk (Moston Brook to River Irwell) NVZ Rochdale Canal Special Area of Conservation Manchester and East Cheshire Permo-Triassic Sandstone Aquifers Drinking Water Protected Area.

Table 4-2 details that the quantitative saline intrusion and the chemical saline intrusion are the metrics which do not achieve good (both classified as poor in 2019[15]). The reason for not achieving good in both cases is saline or other intrusion, with no sector responsible for this.

Table 4-2 - RNAGs for the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers Groundwater body.

SWMI	Activity	Category	Classification Element
Unknown (pending investigation)	Unknown (pending investigation)	Sector under investigation	Trend Assessment
Natural	Saline or other intrusion	No sector responsible	Quantitative Saline Intrusion
Other pressures	Saline or other intrusion	No sector responsible	Chemical Saline Intrusion

4.1.2 Geology and hydrogeology underlying the Proposed Development Site

A summary of the BGS 1:50 k geology (from the BGS Geoindex[16]) underlying the Proposed Development Site, only, within the context of the groundwater environment is provided in Table 4-3. Further detail, particularly regarding Made Ground, soils and local geology underlying the Proposed Development can be found in ES (Volume 2) Chapter 12 Ground Conditions.

4.1.2.1 Superficial geology and Made Ground

Hardstanding currently covers the Site[17]. Whilst not mapped by the BGS, Made Ground deposits have been proven to overlie the Glacial Till across the Site[17] associated with historical development, including the most recent use as a retail park. The 2023 AtkinsRéalis Ground Investigation[17] found granular Made Ground, to a maximum depth of 3.5

[15] Environment Agency. Catchment Data Explorer. Available from: https://environment.data.gov.uk/catchment-planning/WaterBody/GB41201G101100

[16] British Geological Survey. GeoIndex (onshore). Available from: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

[17] ES (Volume 4) Appendix 12.2

meters below ground level (m bgl), across the locations investigated and comprised either fine to coarse gravel of sandstone and concrete, or fine to coarse sand. Cohesive Made Ground was also encountered across these locations and was generally described as slightly sandy slightly gravelly clay.

Cohesive and granular Glacial Till was encountered directly beneath the Made Ground. The cohesive Glacial Till was encountered between 0.3 m bgl and 26.50 m bgl and generally comprised slightly gravelly, slightly sandy, slightly silty Clay[17]. The granular Glacial Till where not directly beneath the Made Ground was encountered as interbedded bands of variable thickness within the cohesive Glacial Till. These bands granular bands were encountered at depths ranging between 0.18 m bgl and 29.5 m bgl with a maximum thickness of 7.20 m encountered in BH2a. The granular Glacial Till was generally described as either fine to coarse Gravel or fine to coarse Sand[17].

Based on existing borehole logs[17] only isolated bands of granular material were observed at a shallower depth, between 0.18 to 1.5 m bgl, these are potentially in continuity with the Made Ground. Granular Glacial Till was found between 14 to 18 m bgl in three locations, these granular bands are of variable thicknesses (1 to 4 m) and are not considered to represent a continuous band as they were only encountered in limited borehole locations. A further deeper granular layer within the Glacial Till is present in the logs directly overlaying the sandstone bedrock, encountered at an approximate depth of 20 to 29.5 m bgl (20 to 29 m AOD) across the Site ranging in thickness between 4 and 10 m.

4.1.2.2 Bedrock geology

The bedrock geology underlaying the Proposed Development, consists of the Chester Formation, consisting of well sorted, fine to coarse red Sandstone, see Table 4-3. The Chester Formation was encountered from a depth of between 24.4 m to 29.5 m bgl and was proven to a maximum depth of 40.5mbgl (10 m thickness)[17]. The full thickness of the sandstone unit was not proven (BGS lexicon suggests that this formation can exceed 200 m thick) [17].

4.1.2.3 Hydrogeology

The Made Ground has no aquifer classification; however, groundwater has been observed within the permeable layers of this horizon, potentially connected to adjacent water features. It is unlikely that it is providing baseflow to the adjacent canals as these are likely to be lined.

The Environment Agency has designated the Chester Formation Triassic Sandstones which underly the Site as a Principal Aquifer. The Environmental Agency (EA) defines Principal Aquifer as “layers of rock or drift deposits that have high intergranular and/or fracture permeability – (usually provide a high level of water storage). They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.”[18]

Aquifers underlying the Proposed Development are designated by the Environment Agency[19] as having Medium – Low groundwater vulnerability. There are significant soluble rocks likely to be present, there is a soluble rock risk[19]. This highlights that there may be areas where solution features that enable rapid movement of a pollutant may be present.

[18] Environment Agency. 2024. Available from: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution

[19] Environment Agency. 2024. Groundwater Vulnerability Maps (2017) on MAGIC. Available from: https://www.data.gov.uk/dataset/42d7d021-538c-46e2-abbb-644e01c63551/groundwater-vulnerability-maps-2017-on-magic

Within the 2017 e3p[20] ground investigation a shallow groundwater level was identified within the Made Ground and Glacial Till deposits at depths between 0.48 m bgl and 4.20 m bgl. A deeper groundwater level was identified within the Granular Glacial Till overlaying Chester Formation between 20.9 m bgl and 24.4 m bgl. Within the 2023 AtkinsRéalis ground investigation[17] groundwater levels were identified in boreholes monitoring Made Ground and Glacial Till. Groundwater levels ranged between 0.19 m bgl and 4.50 m bgl. Similarly, to the 2017 e3p ground investigation[20], groundwater was also found in the deeper granular Glacial Till overlaying the Chester Formation ranging between 18.33 and 23.56 m bgl. BH03 and BH8a contained erroneous results, with unusually elevated groundwater levels that were not replicated elsewhere, as such these were not considered.

Based on the different groundwater elevations recorded between the boreholes measuring the granular Made Ground and the deeper aquifer of the Chester Formation and overlaying granular Glacial Till, a shallow perched groundwater body is believed to be present within the granular Made Ground. This perched aquifer is hydraulically separated from the deeper aquifer by the cohesive Glacial Till.

The cohesive Glacial Till overlays the deeper aquifer acts as a confining layer. Groundwater levels on several occasions have been recorded above the top of the deeper aquifer indicating confining conditions when this occurs.

The following hydrogeological regime is considered likely to be present:

- Shallow perched groundwater encountered at the base of the Made Ground and top of the cohesive superficial deposits;
- Observed groundwater levels within the Made Ground and granular superficial deposits, where present, (Glacial Till) indicate that a consistent groundwater body is present. This groundwater body was encountered at the Site between 0.2 and 4.5 m bgl. Granular Glacial Till bands within the cohesive Glacial Till were also encountered in several locations at depth, between 14 to 18 m bgl, however, based on the borehole logs these are very unlikely extend laterally and form a water body. A granular layer is present overlaying the bedrock at 20 to 29.5 m bgl, this is physically separated from the upper granular Glacial Till band by cohesive Glacial Till. Groundwater levels have been observed in this lower granular layer and are likely to be in hydraulic continuity with groundwater in the Chester Formation;
- The cohesive Glacial Till acts as a confining layer and the deep aquifer is behaving as a confined aquifer at times as groundwater levels have been measured above (potentiometric surface) the cohesive Glacial Till as well as below;
- Based on groundwater levels encountered in boreholes measuring the granular Glacial Till and Chester Formation, groundwater flow within the deeper aquifer is indicated to be towards the south-west, towards the River Irwell; which is consistent with the regional groundwater flow[21] measured towards the south-west.
- Based on groundwater levels measured in the shallower boreholes, groundwater flow within the Made Ground and superficial granular Glacial Till is towards the south-east following the Site topography.
- As stated in the e3p report[20] “Canals in this area are known to contribute to shallow groundwater through leakage”.

[20] ES (Volume 4) Appendix 12.1

[21] British Geological Survey, 2024, Sheet 19: Hydrogeological Map of Clwyd and the Chesire Basin (1:100,000) – 1989.

Table 4-3 - Generalised geological sequence for the Proposed Development

Type	Period	Formation/ Sub-unit	Lithological Description[22]	Environment Agency Aquifer Designation[23]
Made Ground	N/A	N/A	Cohesive and granular have been found on site. The granular Made Ground was mostly homogenous in composition and was classified on site as[17]: ▪ Orangish brown, sandy, slightly clayey, sometimes silty very angular to rounded, fine to coarse GRAVEL of sandstone and concrete ▪ Yellowish/orangish brown gravelly, slightly clayey, fine to coarse SAND. Cohesive Made Ground was broadly described as soft to stiff grey/black/brown slightly sandy, slightly gravelly clay.	No Classification
SUPERFICIAL GEOLOGY	Quaternary	Till, Devensian	Cohesive Glacial Till with granular layers have been encountered on site[17]. The cohesive Glacial till was described as a firm to very stiff dark brown slightly gravelly slightly sandy, slightly silty CLAY with occasional cobbles. Gravel and cobbles included mudstone, siltstone, sandstone, limestone, quartz with fragments of coal. The granular Glacial Till was described as either: ▪ Medium dense to very dense, orangish/dark brown, sandy slightly silty slightly clayey, very angular to well rounded, fine to coarse GRAVEL. Gravel is of mixed lithologies including sandstone, siltstone, mudstone and limestone; or ▪ Medium dense to very dense, orangish/dark brown, gravelly slightly silty slightly clayey fine to coarse SAND. Gravel is very angular to well rounded, fine to coarse, of mixed lithologies including sandstone, siltstone, mudstone and limestone.	Secondary (undifferentiated)

[22] British Geological Survey. 2024. BGS Lexicon of Named Rock Units. Available from: https://www.bgs.ac.uk/technologies/the-bgs-lexicon-of-named-rock-units/

[23] DEFRA. 2024. Magic Map. Available from: https://magic.defra.gov.uk/

BEDROCK GEOLOGY	Triassic	Chester Formation	The formation shows a progressive change in lithology northwards, from a coarse-grained, typically well-cemented proximal facies to a fine-grained, less well-cemented distal facies. Northwards into the Worcester Basin, West Midlands, Staffordshire (Steel and Thompson, 1983), Cheshire and Leicestershire, the formation comprises conglomerates and reddish brown, cross-bedded, pebbly sandstones with subordinate beds of red-brown mudstone. The conglomerates have a reddish brown sandy matrix and consist mainly of pebbles of brown or purple quartzite, with quartz conglomerate and vein quartz. In these areas the formation generally fines upwards, from dominantly conglomerates at the base, to interbedded conglomerates and sandstones, with sandstone and pebbly sandstone predominant in the upper part, and rare mudstones. West of the Pennines they occur in the Wirral-Liverpool area but disappear farther north in Lancashire, where the formation cannot be distinguished.	Principal

4.1.3 Groundwater abstractions

There are no Source Protections Zones within the outline of the Proposed Development (Defra, 2023a). The Proposed Development is within the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers Drinking Water Protected Area. The Groundsure report[24] shows that there are 6 licenced groundwater abstractions within 1 km of the Proposed Development, none of which are within 800 m of the Proposed Development. Additionally, all of the licenced groundwater abstractions within the study area have a 'historical' status[24].

4.1.4 Groundwater Dependant Terrestrial Ecosystems (GWDTEs)

There are no Groundwater Dependant Terrestrial Ecosystems (GWDTEs) within the zone of influence.

4.2 Proposed Development

4.2.1 Activities

The Proposed Development activities are detailed in Section 3.1. The Proposed Development activities which specifically relate to groundwater are detailed below. The mechanisms of impact to receptors in the WFD water body have been identified along with a scoping conclusion for each activity. This is summarised in Table 4-4 to Table 4-5.

Construction

Enabling works

- Dewatering.
- Removal / replacement / movement of existing utilities across the Site, which will include Site excavations.
- Site strip of existing hard and soft landscape including breaking out of existing concrete slabs and substructure, brick paving, brick planter walls, and scrub vegetation.
- Reduced level dig – site excavations to establish the new lower floor levels and substructure datums across the development.

Substructure

- A piling mat will be formed using suitable granular material (potentially from screened recycled aggregate from previous concretes slabs on site) to create a working platform for piling rigs to construct concrete piles and form concrete pile caps.
- Piling (within the outline structural specification[25] which may vary as design is progressed, the length of piles is proposed between 24.8 and 28.42 m and are likely to be installed within the Chester Formation, piles design is proposed as bored caste in place piles)
- Retaining walls will be formed using in-situ reinforced concrete walls or contiguous piles. These will also have the appropriate waterproofing and groundwater drainage constructed as per latest approved construction drawings.
- New utilities provision including drainage (including rainwater attenuation tanks) and ducts will be laid with associated manholes / draw pits around the Site, and connections to existing utilities off site.

Operation

- Retaining walls will be formed using in-situ reinforced concrete walls or contiguous piles. These will also have the appropriate waterproofing and groundwater drainage.

[24] Groundsure. 2023. Manchester_RLB

[25] AtkinsRéalis 2023, Outline Structural Specification, Manchester Digital Campus Building.

- Piling (within the outline structural specification[26] which may vary as design is progressed, the length of piles is proposed between 24.8 and 28.42 m and are likely to be installed within the Chester Formation, piles design is proposed as bored caste in place piles).

4.2.2 Embedded mitigation and enhancements

Embedded mitigations are defined as measures which have been incorporated into the Proposed Development design. This can include two types of mitigation:

- Measures included as part of the Proposed Development design to mitigate impacts associated with the Proposed Development activities outlined above; and,
- Good practice construction measures which will be incorporated across the Proposed Development during the construction period.

The following mitigation measures are those relevant to the water environment which have been embedded into the outline design of the Proposed Development and will be incorporated into the Construction and Environmental Management Plan when developed. These mitigation measures will be taken into consideration when the impact assessment is conducted.

Construction:

- Guidance for Pollution Prevention (GPPs) guidelines and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites will be always followed.

Operation:

- Sustainable Drainage Systems (SuDS) will be implemented to control surface run off (equivalent greenfield runoff rate will be maintained) into the adjacent canal which is part of the Rochdale Canal Stott's Lane – Ducie Street Basin Site of Biological Importance (SBI) as outlined in ES (Volume 4) Appendix 19.3.

4.3 Scoping assessment

Table 4-4 and Table 4-5 outline the Proposed Development construction and operation activities and the potential mechanisms of impact to surface and groundwater receptors. Activities which are scoped in are those which have been screened in for further assessment of their impact on the receptors (Stage 3 impact assessment).

Definitions of the mechanisms of impact are provided below with examples of potential changes that could arise from Proposed Development activities:

- Groundwater quality:
  - Piling can create groundwater flow pathways.
  - Potential for accidental contamination associated with the spillage or leakage of fuels, lubricants and other chemicals required for construction or post-construction maintenance activities.
  - Potential for contamination associated with the disturbance of contaminated land, if encountered.
- Groundwater flow pathways and levels:

[26] AtkinsRéalis 2023, Outline Structural Specification, Manchester Digital Campus Building.

- Below ground excavations, groundwater drainage and piling can impact the groundwater flow pathways and levels.

Table 4-4 - Construction activities and associated risks to the WFD groundwater body.

**Activities shown are activities relating to groundwater only.*

WFD water body	Receptor	Proposed Development activity	Scoped in (✓) or out (x)			Impact
			GWDTEs[27]	Quantitative status	Chemical status	
Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	Chester Formation – Principal aquifer	Piling (preliminary design noted in Section 3.1)	x	✓	✓	Groundwater level, change to groundwater flow pathways. There is a risk that these activities create vertical flow pathways into the groundwater body, for potentially contaminated runoff.
	Chester Formation – Principal aquifer	A piling mat will be formed using suitable granular material (potentially from screened recycled aggregate from previous concretes slabs on site) to create a working platform for piling rigs to construct concrete piles and form concrete pile caps	x	x	x	Activity is not expected to extend to a depth which would cause it to interact with the WFD groundwater body. Groundwater body is located at minimum depth of approximately 20 m bgl.
		Retaining walls will be formed using in-situ reinforced concrete walls or contiguous piles	x	x	x	
		Removal / replacement / movement of existing utilities across the Site, which will include Site excavations	x	x	x	
		New utilities provision including drainage (including rainwater attenuation tanks) and ducts will be laid with associated manholes / draw pits	x	x	x	

[27] Impact to GWDTEs refers to both Quantitative and Chemical status effects.

WFD water body	Receptor	Proposed Development activity	Scoped in (✓) or out (x)			Impact
			GWDTEs[27]	Quantitative status	Chemical status	
		around the Site, and connections to existing utilities off site				
		De-watering	x	x	x	
		Reduced level dig – Site excavations to establish the new lower floor levels and substructure datums across the development.	x	x	x	
		Site strip of existing hard and soft landscape including breaking out of existing concrete slabs and substructure, brick paving, brick planter walls, and scrub vegetation	x	x	x	

Table 4-5 - Operation activities and associated risks to the WFD groundwater body.

**Activities shown are activities relating to groundwater only.*

WFD water body	Receptor	Proposed Development activity	Scoped in (✓) or out (x)			Impact
			GWDTEs[27]	Quantitative status	Chemical status	
Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	Chester Formation – Principal aquifer	Piling (preliminary design noted in Section 3.1)	x	✓	✓	Groundwater level, change to groundwater flow pathways. There is a risk that these activities create vertical flow pathways into the groundwater body, for potentially contaminated runoff.
		Retaining walls will be formed using in-situ reinforced concrete walls or contiguous piles	x	x	x	Activity is not expected to extend to a depth which would cause it to interact with the WFD groundwater body.

4.3.1 Scoping summary

The scoping exercise has undertaken a review of the baseline information within the ZoI and has outlined the Proposed Development activities which have the potential to impact the water environment.

As shown in Table 4-4 and Table 4-5 the only Proposed Development activity which has been scoped in for further assessment is Piling. Preliminary designs for the depths and design of the piles indicate that they are likely to be installed within the Chester Formation, it is assumed that they will interact with the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body.

Other activities associated with the Proposed Development are scoped out of further assessment as activity is not expected to extend to a depth which would cause it to interact with the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers WFD groundwater body.

5. Stage 3 – WFD impact assessment

This section assesses the relative WFD risk of each component of the Proposed Development on the screened in water bodies, for the scoped in elements.

A WFD impact assessment for both construction and operation activities associated with the Proposed Development on the *Manchester and East Cheshire Permo-Triassic Sandstone Aquifers* WFD groundwater body is summarised in Table 5-1. The impacts are colour-coded according to the methodology outlined in Table 2-1.

The impact assessment for the Proposed Development has concluded that the project activities will not adversely impact WFD quality elements or lead to a deterioration in WFD water body status. There is a potential impact on the groundwater WFD water body caused by the deep foundations/ piling that may cause changes to groundwater flow and levels or introduce a rapid vertical flow pathway into the groundwater body. However, if suitable mitigation is put into place (see Table 5-1) this impact is likely to be minor, localised and temporary.

Table 5-1 - WFD impact assessment for Proposed Development activities on the *Manchester and East Cheshire Permo-Triassic Sandstone Aquifers* groundwater body (GB41201G101100)

WFD Quality Element	Construction	Operation	Suggested mitigation
Quantitative status	▪ For the North and South Buildings the preliminary piling designs and depths are stated above within Section 3.1. ▪ The risk to the groundwater flow is expected to be moderate, as deep foundations / piling may form a barrier to groundwater flow, potentially reducing groundwater contributions to adjacent water courses. This risk may be considered **minor and localised** provided best practice guidelines (i.e., piling and deep foundations risk assessment and Pollution Prevention Guidelines) are followed. A piling and de-watering risk assessment will be completed at the detailed design stage to ensure the selected piling method will not impact the groundwater flow within the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers groundwater body.	The impacts during operation will reflect those for construction.	Best practice guidelines (i.e., piling and deep foundations risk assessment and Pollution Prevention Guidelines) are to be followed.
Chemical status	▪ For North and South Buildings the preliminary piling designs and depths are stated above within Section 3.1. ▪ The risk to groundwater chemical status can be considered moderate, as deep foundations / piling may create rapid vertical flow pathways and introduce contamination into the aquifer. This risk may be considered **minor and localised** provided best practice guidelines (i.e., piling risk assessment and Pollution Prevention Guidelines) are followed. A piling risk assessment will be completed at the detailed design stage to ensure the selected piling method will not introduce contamination into the Manchester and	The impacts during operation will reflect those for construction.	Best practice guidelines (i.e., piling and deep foundations risk assessment and Pollution Prevention Guidelines) are to be followed.

WFD Quality Element	Construction	Operation	Suggested mitigation
	East Cheshire Permo-Triassic Sandstone Aquifers groundwater body		

6. Conclusion

A WFD compliance assessment has been undertaken for the Proposed Development on the Former Central Retail Park at New Islington.

- The WFD screening assessment identified the proposed work activities to be undertaken and the WFD water bodies which may be affected by the Proposed Development.
- One WFD water body was screened in for further assessment: Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB41201G101100).

With respect to the groundwater WFD water body '*Manchester and East Cheshire Permo-Triassic Sandstone Aquifers'*, the impact assessment for the Proposed Development has concluded that the project activities will not adversely impact WFD quality elements or lead to a deterioration in WFD water body status. There is a potential impact on the groundwater WFD water body caused by the deep foundations/ piling that may cause changes to groundwater flow and levels or introduce a rapid vertical flow pathway into the groundwater body. However, if suitable mitigation is put into place this impact is likely to be **minor and localised**.

The assessment concludes, with respect to the main objectives of the WFD assessment, that:

- The Project will not cause a deterioration in any quality element that contributes directly or indirectly to the WFD water body classification.

The Project will not prevent measures being implemented that would deliver the WFD status objectives within the water body or other downstream water bodies as set out in the North West RBMP.

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