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ATLANTIC WHARF, BUTETOWN MASTERPLAN AND CARDIFF ARENA AND HOTEL

WATER FRAMEWORK DIRECTIVE ASSESSMENT

AUGUST 2021

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ATLANTIC WHARF, BUTETOWN MASTERPLAN AND CARDIFF ARENA AND HOTEL

WATER FRAMEWORK DIRECTIVE ASSESSMENT

AUGUST 2021

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1 INTRODUCTION

1.1.1 Wardell Armstrong LLP (hereafter referred to as WA) has been appointed by Turner & Townsend on behalf of Robertson Property Ltd and Cardiff Council (the Applicants) to prepare a Water Framework Directive (WFD) screening assessment for the proposed Atlantic Wharf, Butetown Masterplan and Cardiff Arena and Hotel development (hereafter referred to as the Proposed Development), located in Cardiff.

1.1.2 Directive 2000/60/EC of the European Parliament and Council (the Water Framework Directive) came into force on 22nd December 2000 and established a framework for community action in the field of water policy. The WFD was enacted into UK regulations and requires UK nations to aim to reach good chemical and ecological status in inland and coastal waters by 2015. The WFD is designed to enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands, to promote sustainable water use, to reduce pollution of water and to ensure a progressive reduction in groundwater pollution. The WFD establishes a strategic framework for managing the water environment and requires a management plan for each river basin to be developed every six years. In cases where good ecological status / potential could not be achieved by 2015, a provision is included under Article 4(4) of the WFD, extending the deadline to 2021 or 2027. The date has been extended to 2027 in respect of a large number of waterbodies.

1.1.3 Following the UK's departure from the European Union, the requirements of the WFD have been transposed into legislation in Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

1.1.4 Within Wales, the competent authority for delivering the WFD is Natural Resources Wales (NRW).

1.1.5 The role of a WFD assessment is to evaluate the potential deterioration in the overall status of a water body from a Proposed Development, based on the 2015 River Basin Management Plan (RBMP) for the second WFD Cycle in Wales. It is also to determine whether the Proposed Development may hinder any existing programmes of measures in returning a failing water body to Good status.

1.1.6 There are four key objectives against which the impacts of proposed works on a water body need to be assessed to determine compliance with the overarching objectives of the WFD. However, it is important to note that WFD objectives should be considered

throughout all phases (planning, design, construction, and operation) of the Proposed Development. The four key objectives are as follows:

- Objective 1: The Proposed Development will not cause deterioration in any element of water body classification.
- Objective 2: The Proposed Development will not prevent the WFD status objectives from being reached within the water body or other connected water bodies.
- Objective 3: The Proposed Development will not negatively impact critical or sensitive habitats within the water body.
- Objective 4: The Proposed Development will contribute to the delivery of the relevant RBMP that the assessed water bodies are situated within.

1.1.7 Objectives one, two and four must be met to ensure compliance with the WFD. The delivery of the third objective is central to the implementation of the WFD, where it can be supported through its operational activities.

1.1.8 Guidance is available from Natural Resources Wales called "Guidance for assessing activities and projects for compliance with the Water Framework Directive". NRW must determine an authorisation based on a WFD assessment for a development in order to prevent deterioration of the surface water status or groundwater status of a water body, and otherwise support the achievement of the environmental objectives set for a water body. If the WFD assessment demonstrates that the project may cause deterioration of the status of a water body or the development could jeopardise the attainment of good status (or good ecological potential for a heavily modified water body) by the date specified by the environmental objective for the water body, a derogation must be granted for consent under Article 4(7) for the development to proceed.

1.2 Baseline Description

Site setting

1.2.1 The Site location is at the north side of Cardiff Bay in Butetown in Cardiff, Wales at National Grid Reference (NGR) ST 19364 74980. The Site is located in proximity to the Roath Basin locks to the south east, the west face of the Atlantic Wharf (Bute East Dock), Cardiff Bay Train Station to the west, and residential housing (Schooner Drive) to the north. The Site is 2 kilometres (km) south of the city centre (south side), adjacent

to Lloyd George Avenue and Pierhead Street. The A4232 Site entering the Butetown Tunnel transects the Proposed Development.

1.2.2 The Proposed Development location includes Cardiff Council's County Hall in the east, the Red Dragon Centre in the south and sits adjacent to residences within Halliard Court and Lloyd George Avenue to the north and west. The Site is currently utilised as surface car parking for County Hall and also includes the southern extent of Schooner Way and part of Silurian Park in the north west corner of the proposed Site. The Site also comprises mixed use developments and buildings, with the Red Dragon Centre and its car park, Cardiff Council's County Hall, and a Travelodge hotel. The Site topography is located at an elevation of 8.4m Above Ordnance Datum (AOD) at Cardiff County Hall rising to approximately 10m AOD near the Red Dragon Centre. Soil and ground conditions are Made Ground throughout underlain by Tidal Flat Deposits (clay, silt, and sand).

Hydrological setting

1.2.3 The Site is located in the Severn River Basin District, which includes the South East Valleys WFD River Catchment (ID 10259) and South East Valleys Management Catchment (ID 65), and the Taff downstream Cynon Operational Catchment[1]. The surface water body: the 'River Taff – confluence Rhondda R to Castle Street' (Water Body ID GB109057027270) flows c. 550 metres (m) west of the Proposed Development from north to south into Cardiff Bay. NRW classifies Cardiff Bay as a lake (ID GB30947042) for the purposes of WFD achievements. This water body is located approximately 300m south of the Proposed Development and is also within the South East Valleys catchment.

1.2.4 According to the NRW's Development Advice Map**Error! Bookmark not defined.**, the Proposed Development is within Zone B, an area known to have flooded in the past. The NRW National Flood Hazard and Risk Map[2] for long term flood risk, indicates that the Proposed Development coincides with small, localised areas at high to medium risk of flooding from surface water and small watercourses. Those high-risk pockets are located in the County Hall Car Park, and beyond the Site boundary along Schooner Way, and the Butetown Tunnel. The Atlantic Wharf adjacent to the eastern Site

[1] Waterwatchwales.naturalresourceswales.gov.uk. 2021. Water Watch Wales. [online] Available at: https://waterwatchwales.naturalresourceswales.gov.uk/en/ [Accessed 7 July 2021].
[2] Natural Resources Wales. 2021. Natural Resources Wales / Long term flood risk. [online] Available at: https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en [Accessed 7 July 2021].

boundary is considered at high risk from sea flooding. The Roath Basin (outside of the Site area) is at high risk of sea flooding and high risk of flooding from rivers.

Hydrogeological setting

1.2.5 The superficial geology underlying the Proposed Development comprises Tidal Flat deposits – clay, silt, and sand which are considered a Secondary (Undifferentiated) aquifer by the NRW[3].

1.2.6 The Proposed Development is underlain by the Mercia Mudstone Group[4], which is comprised of red mudstone and siltstones. Widespread Gypsum and anhydrite beds with sandstone have been recorded in this group. The bedrock is classed as a Secondary B aquifer by the NRW**Error! Bookmark not defined.**. A Secondary B aquifer is defined as having '*predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water bearing parts of the former non-aquifers*[5]*'*.

1.2.7 The Site is located within the 'South East Valleys Southern Devonian Old Red Sandstone and Triassic Mercian Mudstone' (ID: GB40902G201500) groundwater body, which is monitored under the WFD and has an area of 236.1km^2.

Ecology and Designated Sites

1.2.8 The Severn Estuary is located 1.6km southeast of the Site and is designated as a Special Area of Conservation (SAC), Site of Specific Scientific Interest (SSSI), Special Protection Area (SPA) and RAMSAR (Wetland of International Importance)[6]. Cardiff Bay Wetland and Hamadryad Park is located 750m southwest of the Site and is designated as a Local Nature Reserve**Error! Bookmark not defined.**.

[3] Maps.cyfoethnaturiolcymru.gov.uk. 2021. Geocortex Viewer for HTML5. [online] Available at: https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer210/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/Sites/External_Map_Browser/viewers/EMB_Address/virtualdirectory/Resources/Config/Default&locale=en-gb [Accessed 7 July 2021].

[4] Mapapps2.bgs.ac.uk. 2021. GeoIndex - British Geological Survey. [online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed 7 July 2021].

[5] Apps.environment-agency.gov.uk. 2021. Environment Agency - Aquifers. [online] Available at: http://apps.environment- agency.gov.uk/wiyby/117020.aspx [Accessed 7 July 2021].

[6] Magic.defra.gov.uk. 2021. *Magic Map Application*. [online] Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed 28 July 2021].

2 REVIEW OF THE RIVER BASIN MANAGEMENT PLAN AND CATCHMENT

2.1 Introduction

2.1.1 The Proposed Development is located within the Severn River Basin District, and the South East Valleys Management Catchment and the Taff downstream Cynon Operational Catchment which is monitored by NRW[7] to meet the requirements of the WFD.

2.1.2 Within the Taff downstream Cynon Operational Catchment, the Proposed Development is 550m east of the surface water body: the 'River Taff – confluence Rhondda R to Castle Street' (Water body ID GB 109057027270). Cardiff Bay (Water body ID GB 30947042) is 300m south of the Proposed Development and is also within the South East Valleys catchment.

2.1.3 The South East Valleys catchment is covered by the Severn River Basin Management Plan[7].

2.2 Surface Water - 'River Taff – Conf Rhondda R to Castle Street' Surface Water Body

2.2.1 The 'River Taff – confluence Rhondda R to Castle Street' surface water body (ID GB 109057027270) has a catchment area of 63.19km^2 and a length of 27.37km. A summary of the WFD status of the surface water body can be found in Table 2-1 .

[7] DEFRA, Llywodraeth Cymru, Natural Resources Wales, and Environment Agency, 2015. Part 1: Severn River Basin District River Basin Management Plan. Environment Agency.

Table 2-1 WFD Status of the Surface Water Body – 'River Taff – Conf Rhondda R to Castle Street'						
Classification Element	**2009 Cycle**	**2015 Cycle 1**	**2015 Cycle 2**	**2018 Cycle**	**Objective**	**Reasons for less stringent objectives**
Overall Water Body						
Overall Water Body	***Moderate***	***Moderate***	***Moderate***	***Moderate***	***Good by 2027***	**Disproportionately expensive. Technically infeasible.**
Overall Ecological	***Moderate***	***Moderate***	***Moderate***	***Moderate***	***Good by 2021***	
Overall Chemical	***Fail***	***Fail***	***Fail***	***Fail***	***Good by 2027***	
Ecological						
Ecological Status Potential	Moderate	Potential	Potential	-		
Ecological Certainty	Quite certain	Uncertain	N/A	-		
Driving Ecological Quality Element	-	Phytobenthos, Mitigation Measures Assessment	Mitigation Measures Assessment	-		
Mitigation Measures Assessment	Moderate	Moderate	-	Moderate		
Biological Status						
Phytobentos	Moderate	Moderate	Good	Good		
Macrophytes	Good	Good		Good		
Invertebrates	Moderate	Good	High	High		
Fish	-	-	-	-		
Hydromorphology	-	-	-	-		
Eco Hydromorphology	Not high	Supports Good	Supports Good	Not High		
Hydrology	Not High	-	-	Not High		
Flow	Pass	Pass	Pass	-		
Hydrological Regime	-	Supports Good	Supports Good	-		
Physio-chemical Quality Elements						

Table 2-1 WFD Status of the Surface Water Body – 'River Taff – Conf Rhondda R to Castle Street'						
Classification Element	**2009 Cycle**	**2015 Cycle 1**	**2015 Cycle 2**	**2018 Cycle**	**Objective**	**Reasons for less stringent objectives**
Ammonia (Phys-Chem)	High	High	High	High		
Biochemical Oxygen Demand (BOD)				High		
Dissolved oxygen	High	High	High	High		
pH	High	High	High	High		
Phosphate	Good	High	Good	High		
Temperature	High	High	High	Good		
Chemical						
Priority Hazardous Substances						
Annex 10 Chemicals	Fail	Fail	Fail	-		
Anthracene	-	-	-	-		
Benzo (a) and (k) fluoranthene	-	-	Fail	Moderate		
Benz_p_i_p	-	Good	Good	High		
Benzo(a)pyrene	-	Good	Fail	Moderate		
Cadmium	-	Good	Good	High		
Endosulfan	-	-	-	-		
Hexachlorobenzene	-	Good	-	-		
Hexachlorobutadiene	-	Good	-	-		
Hexachlorocyclohexane	-	Good	Good	High		
Manganese	-	-	-	High		
Nonylphenol	-	-	-	-		
Tributyltin Compounds	-	Fail	-	-		
Trifluralin	-	-	-	-		
Perfluorooctane sulphonate (PFOS)	-	-	-	-		
Priority Substances						
1,2-dichloroethane.	-	Good	Good	High		
Atrazine.	-	Good	Good	High		

Table 2-1 WFD Status of the Surface Water Body – 'River Taff – Conf Rhondda R to Castle Street'						
Classification Element	**2009 Cycle**	**2015 Cycle 1**	**2015 Cycle 2**	**2018 Cycle**	**Objective**	**Reasons for less stringent objectives**
Benzene	-	-	-	-		
Chlorfenvinphos	-	-	-	-		
Chlorpyrifos	-	-	-	-		
Di(2-ethylhexyl) phthalate	-	-	-	-		
Dichloromethane	-	-	-	-		
Dichlorvos	-	-	-	-		
Diuron	-	-	-	-		
Fluoranthene	-	Good	Fail	Moderate		
Isoproturon	-	-	-	-		
Lead And Its Compounds	-	Good	Good	High		
Mercury And Its Compounds	-	Good	-	-		
Naphthalene	-	-	-	-		
Nickel and Its Compounds	-	Good	Good	High		
Pentachlorophenol	-	Good	Good	High		
Simazine	-	-	-	-		
Trichlorobenzenes	-	Good	Good	High		
Trichloromethane	-	Good	Good	High		
Other Pollutants						
Aldrin, Dieldrin, Endrin, Isodrin	-	Good	Good	High		
Carbon Tetrachloride	-	Good	Good	High		
DDT Total	-	Good	Good	High		
para - para-DDT	-	Good	Good	High		
Tetrachloroethylene	-	Good	Good	High		
Trichloroethylene	-	Good	Good	High		
Other Substances	-	Good	-	-		
Other Pollutants	-	Good	Good	-		
Annex 8 Chemicals	High	High	High	High		

Table 2-1 WFD Status of the Surface Water Body – 'River Taff – Conf Rhondda R to Castle Street'						
Classification Element	**2009 Cycle**	**2015 Cycle 1**	**2015 Cycle 2**	**2018 Cycle**	**Objective**	**Reasons for less stringent objectives**
2,4-dichlorophenol	-	-	-	-		
2,4-dichlorophenoxyacetic acid	-	-	-	-		
Ammonia	-	-	-	-		
Arsenic	-	Good	Good	High		
Copper	-	Good	Good	High		
Cyanide	-	-	-	-		
Cypermethrin		-	-	-		
Diazinon	-	-	-	-		
Dimethoate	-	-	-	-		
Glyphosate	-	-	-	-		
Iron	-	Good	-	High		
Linuron	-	-	-	-		
Mecoprop	-	-	-	-		
Permethrin	-	-	-	-		
Phenol	-	-	-	-		
Toulene	-	-	-	-		
Triclosan	-	-	-	-		
Un-ionised ammonia	-	-	-	-		
Zinc	-	Good	Good	High		
1-1-1-trichloroethane	-	Good	-	-		
1-1-2-trichloroethane	-	-	-	-		
2-chlorophenol	-	-	-	-		
4-chloro-3-methylphenol	-	-	-	-		
Bentazone	-	-	-	-		
Biphenyl	-	-	-	-		
Chloronitrotoluenes	-	-	-	-		

Table 2-1 WFD Status of the Surface Water Body – 'River Taff – Conf Rhondda R to Castle Street'						
Classification Element	**2009 Cycle**	**2015 Cycle 1**	**2015 Cycle 2**	**2018 Cycle**	**Objective**	**Reasons for less stringent objectives**
Dichlorvos	-	-	-	-		
Fenitrothion	-	-	-	-		
Malathion	-	-	-	-		
Xylene	-	-	-	-		
Note: '-': not applicable						

2.2.2 NRW has reported a list of reasons why the – River Taff – Conf Rhondda R to Castle Street' in the Taff downstream Cynon Operational Catchment failed to achieve good WFD status[8]. The reasons for failure within the Conf Rhondda R to Castle Street surface water body are outlined in Table 2-2 R.

Table 2-2 Reasons Why R. Taff Conf Rhondda R to Castle Street is Not Achieving Good WFD Status

Classification Element Affected		Sector	Activity	Pressure
Fish	Navigation	Not applicable	Barriers to fish migration – ecological discontinuity	Physical modification
Benzo (b) and (k) fluoranthene	Unknown (pending investigation)	Sector under investigation	Unknown (pending investigation)	Unknown (pending investigation)
Benzo(a)pyrene	Unknown (pending investigation)	Sector under investigation	Unknown (pending investigation)	Unknown (pending investigation)
Fluoranthene	Unknown (pending investigation)	Sector under investigation	Unknown (pending investigation)	Unknown (pending investigation)

Issues preventing waters reaching good status

2.2.3 NRW's South East Valley Management Catchment Summary includes information on the major issues preventing waters reaching good status. For the majority, physical modifications in the catchment such as weirs, and flood defence structures are contributing to the overall water body status not achieving 'good' status. Likewise, urban diffuse pollution in heavily populated areas has prevented overall good status being achieved. The reason for pollution from urban areas is attributed to sewage, for which the cause is normally a legacy of leaking sewers affecting groundwater beneath the urban area.

[8] Google Docs. 2019. Reasons for Not Achieving Good Cycle 2 Data.xlsx. [online] Available at: https://drive.google.com/file/d/0B2hsDbbdxz1tMmUzY0ZPV093NEk/view?form=MY01SV&OCID=MY01SV&resourcekey=0-bSENvILj4MVTx5PQOh1xIQ [Accessed 28 July 2021].

2.3 Groundwater – 'South East Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' Groundwater Body

2.3.1 The 'SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater body (ID GB 40902G201500) has a groundwater area of 236.11km[1]. A summary of the WFD status of the ground water body can be found in **Error! Reference source not found.**. The Operation Catchment SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone currently has good overall WFD status.

Table 2-1 WFD Status of the Ground Water Body – SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone						
Classification Element	**2009 Cycle**	**2015 Cycle 1**	**2015 Cycle 2**	**2018 Cycle**	**Objective**	**Reasons for less stringent objectives**
Overall Water Body						
Overall Water Body	**-**	***Good***	***Good***	***Good***	***Good by 2015***	**-**
Quantitative	***Good***	***Good***	***Good***	***Good***	**-**	**-**
Chemical	***Good***	***Good***	***Good***	***Good***	***Good by 2015***	**-**
Quantitative						
Quantitative GWDTEs Test	Good	Good	Good	-	-	-
Quantitative Dependent Surface Water Body Status	High	Good	Good	-	-	-
Quantitative Saline Intrusion	Good	Good	Good	-	-	-
Quantitative Water Balance	Good	Good	Good	-	-	-
Chemical (GW)						
Chemical Drinking Water Protected Area	Good	Good	Good	Good	-	-
General Chemical Test	Good	Good	Good	-	-	-
Chemical GWDTEs Test	Good	Good	Good	-	-	-
Chemical Dependent Surface Water Body Status	Good	Good	Good	-	-	-

2.4 Programme of Measures

2.4.1 NRW has 48 confirmed mitigation measures which will be undertaken to improve the quality of 'River Taff – Conf Rhondda R to Castle Street' heavily modified surface water body. Of these, 16 are deemed as 'not currently applicable – not required in this water body', and six are 'not currently applicable – technical infeasibility'. Of the remainder, two mitigation measures are in place and 24 are not in place. These are detailed in **Error! Reference source not found.Error! Reference source not found.**. The two measures in place – fish passes, are to improve the ecological status of the water body as a result of heavy modification from urbanisation and flood management.

Table 1-2 NRW Programmes of Measures for Improvement in River Taff – Conf Rhondda R to Castle Street'

Action	Description	Measure State	Is the Action / Mitigation Measure at Risk of the Proposed Development?
Education	Educate Landowners	Not in place	No – not applicable to Proposed Development. Education would not be impeded by development and it is likely the landowners are farmers upstream.
Operations and Maintenance	Sediment management strategy	Not in place	Applicable to Proposed Development but Proposed Development is not expected to affect this action / mitigation.
Structural Modification	Fish Passes	In place	No – not applicable to Proposed Development and Proposed Development is not expected to affect this action / mitigation. Fish passes are likely to be upstream of Site in narrower area of river.
	Fish Passes	In place	
	Enhance Ecology	Not in place	No – not applicable to Proposed Development and Proposed Development is not expected to affect this action / mitigation. Ecological enhancement will not be impeded by this development as the river is not adjacent or within the Site boundary.
	Changes to locks etc.	Not in place	Applicable to Proposed Development due to close vicinity of locks (Roath Basin). Since it is not in place, and the development does not coincide with the locks, the Proposed Development is not

			expected to affect this action.
Water Management	Align and attenuate flow	Not in place	No – not applicable to Proposed Development and Proposed Development is not expected to affect this action / mitigation. This action is likely an upstream measure, whereas this Site is at the mouth of the river.
Working with physical form and function	Flood Bunds	Not in place	No – not applicable to Proposed Development and Proposed Development is not expected to affect this action / mitigation.
	Alter Culvert Channel Bed		
	In-channel morph diversity		
	Preserve or restore habitats		
	Remove or soften hard bank		
	Remove obsolete structure		
	Flood plain connectivity		

2.4.2 Due to the current status of the 'South East Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' Groundwater Body, no measures are required for the groundwater body.

3 PROPOSED DEVELOPMENT DESCRIPTION

3.1 Introduction

3.1.1 Robertson Property Ltd and Cardiff Council (the Applicants) are seeking to submit a hybrid planning application for a new mixed-use development located in Cardiff. The Proposed Development includes a variety of buildings and associated infrastructure, transport management, and drainage solutions.

3.1.2 The Proposed Development comprises:

- An Arena and Hotel (a new 15,000 capacity indoor arena and 182-bedroom hotel);
- Cultural Quarter: a new cultural quarter adjacent to the Wales Millennium Centre (WMC) including the WMC Academy, Cardiff Story Museum and the Contemporary Art Museum;
- Mixed Use Quarter:
    - a major new event square (Atlantic Square) and family attraction to the south of the arena and west of the new Red Dragon Centre;
    - a new commercial office building fronting onto Atlantic Square;
    - This is Wales visitor attraction,
    - a new Red Dragon Centre – redevelopment to deliver a new leisure offer (relocating Hollywood Bowl, the gym, casino etc.), an Odeon LUX, and a new food and beverage offering; and
    - 150 residential dwellings;
- East Bute Dock Quarter: a new residential quarter on the site of the existing County Hall with the potential to deliver 550 residential dwellings, a 350 bed hotel and a 390 bed hotel;
- Waterfront Quarter: a new quarter adjacent to Bute East Dock with the potential to deliver 350 residential dwellings and a 300 bed and 200 apartment, 26-storey Apart-hotel; and
- Car Parking Quarter: a consolidation of the existing surface car parking into a multi-storey car park (MSCP) comprising a new 1,300 space MSCP between the new Red Dragon Centre and existing Future Inns Hotel.

4 WATER FRAMEWORK DIRECTIVE ASSESSMENT

4.1 Introduction

4.1.1 The NRW *Guidance for assessing activities and projects for compliance with the Water Framework Directive* 2018 document presents a three-stage assessment process of Screening, Scoping, and Detailed Compliance Assessment that should be undertaken as illustrated in Figure 4.1.

4.1.2 The NRW guidance on the WFD Assessment will be quoted at the start of each of the sections that follow that represent a specific stage in the assessment[9].

[9] Natural Resources Wales, 2018. *OGN 72 Guidance for assessing activities and projects for compliance with the Water Framework Directive*. naturalresourceswales.gov.uk, pp.5-21,38-45.

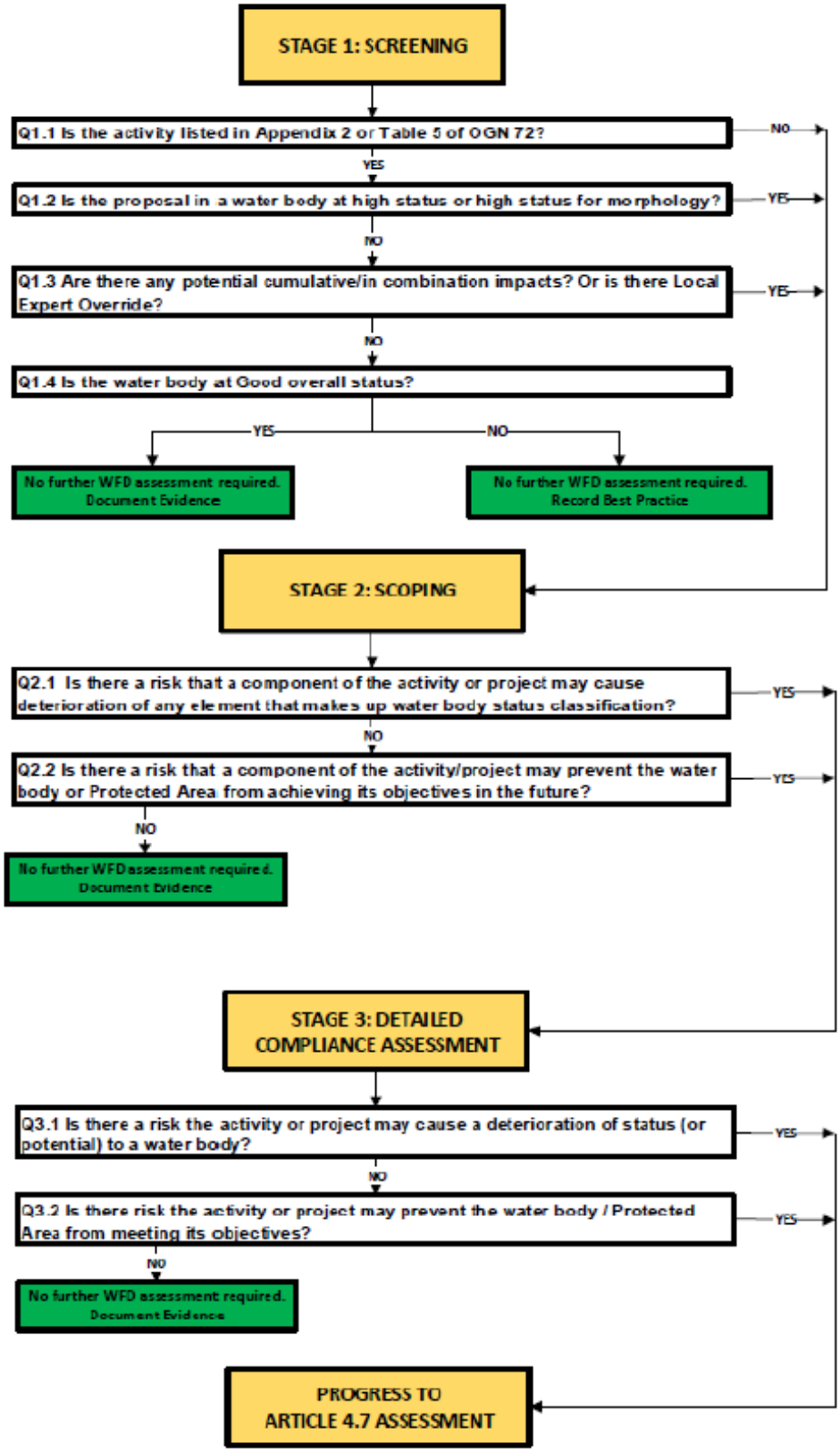

Figure 4.1 WFD Compliance Assessment Process Flowchart (Source: NRW, 2018)

4.2 Stage 1 Screening

The aim of the screening stage is to ensure that only those activities that may cause deterioration or prevent a water body from meeting its objective are assessed further.

4.2.1 With reference to Figure 4.1 (above) the activities associated with construction and operation of the Proposed Development, are not listed in Appendix 2 or Table 5 of the NRW guidance[9]. Appendix 2 and Table 5 of the NRW Guidance list activities that do not require a detailed WFD assessment as NRW consider they do not pose a risk of deterioration of status or to hinder programmes of measures (improvements) under the RBMP. Activities associated with the Proposed Development are not within this list so the assessment should proceed to Stage 2 Scoping.

4.3 Stage 2 Scoping

The aim of this stage is to identify water bodies and classification elements within water bodies that may be impacted as a result of the activity, which will then progress to Stage 3 (detailed compliance assessment). As stated in the NRW guidance, the objective of the scoping stage is to focus on identifying components of the activity or project that have the potential to cause deterioration in water body status or hinder the objective of the RBMP. Water bodies can be scoped out at this stage if it can be robustly demonstrated that there will be no impacts.

4.3.1 The WFD protects the surface water bodies and the groundwater bodies. This assessment covers the following water bodies, which the Proposed Development lies within the water body boundaries of:

- 'Taff – conf Rhondda R to Castle Street' surface water body.
- 'South East Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater body.

4.3.2 Surface water body receptors are the Atlantic Wharf, Cardiff Bay, Cardiff Bay Wetland and Hamadryad Park Local Nature Reserve, and the Severn Estuary designated Site.

4.4 Stage 3 Detailed Compliance Assessment

The aim of this stage is to consider the potential impacts of an activity on bodies of surface and groundwater, and to identify ways to avoid or minimise impacts. Further, to identify if an activity may prevent the water body achieving good status or cause deterioration.

Potential Risks Prior to Planned Mitigation

4.4.1 Table 4-1 and Table 4-2 A provide details of the Proposed Development activities and the potential effects associated with these activities prior to implementation of mitigation measures. These tables provide details of the associated classification elements that may be affected by the Proposed Development in the absence of any pollution prevention measures, and the proposed measures for water body improvement that are at risk from the Proposed Development. A detailed list of the 48 mitigation measures (both in place and not in place) for this water body can be found at Water Watch Wales[10].

4.4.2 Currently, the Proposed Development will not impact the fulfilment of the outlined measures since the water body does not transect the Site and the majority of the mitigation measures are not in place or completely identified.

[10] Google Docs. 2019. HMWB uses and mitigation measures June 2019.xlsx. [online] Available at: https://drive.google.com/file/d/0B2hsDbbdxz1tYXhyV2RHb1lteHM/view?resourcekey=0-uLpqVo4A52tzs-GDSrScUw [Accessed 28 July 2021].

Table 4-1 Activities and Potential Effects of the Proposed Development on Taff – Conf Rhondda R to Castle Street' Surface Water Body – Prior to mitigation

Proposed Development Activity	Potential Effect	Taff – Conf Rhondda R to Castle Street	Associated Classification Element Affected																			Comments
			Supporting Elements (Surface Water)	Biological Quality Elements			Hydro-morphological Supporting Elements		Physio-chemical Quality Elements						Specific Pollutants					Priority Substances	Other Pollutants	Priority Hazardous Substances	
		Measures Affected	*Mitigation Measures Assessment*	*Macrophytes and Phytobenthos Combine*	*Fish*	*Invertebrate*	*Hydrological Regime*	Morphology	*Ammonia (Phys-Chem)*	*Biochemical Oxygen Demand(BOD)*	*Dissolved Oxygen*	*pH*	*Phosphate*	*Temperature*	Arsenic	*Copper*	*Manganese*	*Iron*	*Zinc*				
Construction and Demolition Phases																						
Earthworks including excavation, dewatering, and discharge	Releases of sediment into surface water body receptors	Fish passage Sediment management strategy Align and attenuate flow	✓	✓	×	✓	×	✓	×	×	×	×	×	×	×	×	×	×	×	×	×	×	NRW has identified Macrophytes and Phytobenthos and invertebrates in the 'Taff – Conf Rhondda R to Castle Street'' surface water body. Therefore, any release of significant sediment load would have an impact on any river organisms. Additionally, significant sediment load would change the morphology of the river and could inhibit the efficacy of the fish passage ladder as it would become laden with deposits. Significant sediment contribution would put stress on the sediment management strategy and the flow attenuation measures. However, currently no sediment strategy or flow attenuation measures are in place in this water body.
	Mobilisation of contaminants and release into surface water bodies	Enhance ecology Preserve or restore habitats	×	✓	×	✓	×	×	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	NRW has identified Benzo (b) and (K) fluoranthene, Benzo(a)pyrene and Fluoranthene as being classification elements as a reason why this water body has not achieved Good status. The release of contaminants into the surface water bodies would impact all receptors except the hydrological regime and morphology (and fish, as none have been identified). Pollution prevention measures in a CEMP or equivalent, would reduce the risk of an accidental release from occurring.
Demolition activities	Releases of sediment into surface waters	Fish passage Sediment management strategy Align and attenuate flow	✓	✓	×	✓	×	✓	×	×	×	×	×	×	×	×	×	×	×	×	×	×	Release of sediment and silt into surface waters can cause erosion to riverbeds and banks (morphology). Turbidity can impact invertebrates and macrophytes etc. Significant sediment release will inhibit the efficacy of the fish passage ladder as it would become laden with deposits. Excess release would put stress on the sediment management strategy and the flow attenuation measures. However, currently no sediment strategy or flow attenuation measures are in place in this water body. All other classification elements of surface water bodies would not be impacted.
Construction of impermeable surfaces	Increase run-off to surface water drains leading to flooding	Align and attenuate flow Flood bunds Flood plain connectivity	×	×	×	×	✓	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	NRW has not identified the hydrological regime element to be a reason why the Taff- conf Rhondda R to castle street is not achieving Good WFD status. However, a change in baseline runoff would alter the quantity and frequency of flow in the surface water catchment.
Soil stripping and vegetation removal	Change in baseline runoff characterisation	Align and attenuate flow Flood bunds Flood plain connectivity	×	×	×	×	✓	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	NRW has not identified the hydrological regime element to be a reason why the Taff- conf Rhondda R to castle street is not achieving Good WFD status. However, a change in baseline runoff would alter the quantity and frequency of flow in the surface water catchment.
Soil compaction	Reduced infiltration – change in rainfall runoff response	Align and attenuate flow Flood bunds Flood plain connectivity	×	×	×	×	✓	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	NRW has not identified the hydrological regime element to be a reason why the Taff- conf Rhondda R to castle street is not achieving Good WFD status. However, a change in baseline runoff would alter the quantity and frequency of flow in the surface water catchment.
Construction of sub surface infrastructure	Releases of polluting substances (concrete/cement leachates) into the surface water bodies.	Enhance ecology Preserve or restore habitats	×	✓	×	✓	×	×	×	×	×	✓	✓	×	×	×	×	×	×	×	×	×	The chemicals involved in concrete/cement have the potential to impact the phosphate levels in surface water catchments as well as pH levels. It is likely that cement (once mixed with water) would impact biological elements in the catchment due to the increased levels of iron, silica, aluminium, and calcium. Pollution prevention measures in a CEMP or equivalent, would reduce the risk of an accidental release from occurring.

Table 4-1 Activities and Potential Effects of the Proposed Development on Taff – Conf Rhondda R to Castle Street' Surface Water Body – Prior to mitigation

Proposed Development Activity	Potential Effect	Taff – Conf Rhondda R to Castle Street	Associated Classification Element Affected																			Comments
			Supporting Elements (Surface Water)	Biological Quality Elements			Hydro-morphological Supporting Elements		Physio-chemical Quality Elements						Specific Pollutants					Priority Substances	Other Pollutants	Priority Hazardous Substances	
		Measures Affected	*Mitigation Measures Assessment*	*Macrophytes and Phytobenthos Combine*	*Fish*	*Invertebrate*	*Hydrological Regime*	Morphology	*Ammonia (Phys-Chem)*	*Biochemical Oxygen Demand(BOD)*	*Dissolved Oxygen*	*pH*	*Phosphate*	*Temperature*	Arsenic	*Copper*	*Manganese*	*Iron*	*Zinc*				
Use of concrete / cement	Releases of polluting substances into surface water bodies.	Enhance ecology Preserve or restore habitats	✗	✓	✓	✓	✗	✗	✗		✗	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	The chemicals involved in concrete/cement have the potential to impact the phosphate levels in surface water catchments as well as pH levels. It is likely that cement (once mixed with water) would impact biological elements in the catchment due to the increased levels of iron, silica, aluminium, and calcium. Pollution prevention measures in a CEMP or equivalent, would reduce the risk of an accidental release from occurring.
Operational Phase																							
Use of Impermeable surfaces	Increase run-off to surface water drains leading to flooding	Align and attenuate flow Flood bunds Flood plain connectivity	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	NRW has not identified the hydrological regime element to be a reason why the Taff- conf Rhondda R to castle street is not achieving Good WFD status. However, a change in baseline runoff would alter the quantity and frequency of flow in the surface water catchment.
Alteration of the existing drainage regime	Change to run-off quantity leading to change in flow rate and volume in waterbodies	Align and attenuate flow Flood bunds Flood plain connectivity	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	NRW has not identified the hydrological regime element to be a reason why the Taff- conf Rhondda R to castle street is not achieving Good WFD status. However, a change in baseline runoff would alter the quantity and frequency of flow in the surface water catchment.
Vehicle movement	Releases of polluting substances (oils, hydrocarbons) into surface water bodies	Enhance ecology Preserve or restore habitats	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	Fuel spills from motorised vehicles supplied by petroleum hydrocarbons (diesel/petrol) would be expected to impact the level of priority substances, other pollutants, and priority hazardous elements in the surface water catchments. Hydrocarbon contaminated waters can prevent oxygen uptake by fish, invertebrates, and macrophytes.
Wastewater drainage	Release of foul water into surface watercourse and water bodies	Enhance ecology Preserve or restore habitats	✗	✓	✗	✓	✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓	Foul water release into the surface water body has not been identified as a classification element responsible for the water body not achieving good status. However, in the event of a foul water contamination, this would be expected to impact the biological elements of the water body due to increased levels of ammoniacal nitrogen, phosphate, coliforms, and other harmful bacteria. It is likely the pH, Dissolved Oxygen, BOD would be impacted. No mitigation measures are currently in place in this water body to counter this.

Note
✓ Indicates classification element may be affected by Proposed Development activity and associated effect.
✗ Indicates classification element is unlikely to be affected by Proposed Development activity and associated effect.

Table 4-2 Activities and Potential Effects of the Proposed Development on the 'SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' Ground Water body

Proposed Development Activity	Potential Effect	SE Valleys Southern Devonian Old Redstone & Triassic Mercia Mudstone	Associated Classification Element Affected									Comments
			Chemical (Groundwater)					Quantitative				
		Measures Affected	*Chemical Drinking Water Protected Area*	*General Chemical Test*	*Chemical GWDTEs Test*	*Chemical Dependent Surface Water Body*	Chemical Saline Intrusion	*Quantitative Water Balance*	*Quantitative GWDTEs test*	*Quantitative Saline Intrusion*	*Quantitative Dependent Surface Water Body*	
Construction and Demolition Phases												
Earthworks including excavation, dewatering and discharge	Mobilisation of pollutants leading to release of contaminated waters	None	✓	✓	✗	✗	✗	✗	✗	✗	✗	As a result of excavation works, contaminants released into groundwaters through agitation would impact the chemical makeup of the groundwater. Though this Site is not within a groundwater drinking water protected area, the chemical acceptability of the groundwater would be compromised. Additionally, the chemical status of the groundwater would be altered, and a general chemical test would indicate a change in makeup. No other classification elements are expected to be impacted by this activity.
	Pathway to aquifer reduced due to excavation increasing aquifer vulnerability	None	✗	✗	✗	✗	✗	✓	✗	✗	✓	A reduced pathway would facilitate more readily rainwater recharge thus altering the overall quantitative water balance. Consequently, groundwater supplied surface water bodies would experience a change in their baseline index, flow rate, or level.
Soil stripping and Vegetation removal	Change in runoff affecting groundwater recharge	None	✗	✗	✗	✗	✗	✓	✗	✗	✗	The only impact to the groundwater body as a result of a change in run-off would be a deviation in the quantitative water balance of the catchment. However, it is not expected that this development would require significant vegetation removal and as this area was previously made ground and built-up area, the runoff regime would likely be unchanged. This activity would not impact any other classification elements.
Use of machinery and storage on Site	Releases of polluting substances (e.g., oil & fuel) into groundwater	None	✓	✓	✗	✗	✗	✗	✗	✗	✗	Pollutants involved in plant and machinery are usually hydrocarbons. This contaminant can result in LNAPLs entering the groundwater body and polluting the water. A hydrocarbon spill would not have any impact on quantitative elements, dependent surface water bodies or saline intrusion. Pollution prevention measures in a CEMP or equivalent, would reduce the risk of an accidental release from occurring.
Use of concrete / cement	Releases of polluting substances into groundwater	None	✓	✓	✗	✗	✗	✗	✗	✗	✗	The chemicals involved in concrete/cement have the potential to impact the chemistry in the groundwater body, resulting in a change to the chemical status of the overall groundwater body and effecting the overall water quality.
Construction of impermeable surfaces	Reduction in recharge	None	✗	✗	✗	✗	✗	✓	✓	✓	✓	This effect would have no chemical impact, however a reduction in recharge to the superficial deposits and in turn the SE Valleys Old red sandstone would reduce groundwater levels locally. This would change the overall quantitative water balance and reduce the baseflow index in groundwater dependent ecosystems.
Construction of subsurface infrastructure	Impede shallow GW flow	None	✗	✗	✗	✗	✗	✗	✗	✗	✗	This effect would have no chemical or quantitative impact as it is in a small, localised area and would not affect the quantity of water, merely the placement. This effect is not expected to impact any chemical or quantitative elements.
Operational Phase												
Use of Motorised Vehicles	Releases of polluting substances into groundwater	None	✓	✓	✗	✗	✗	✗	✗	✗	✗	Fuel spills from motorised vehicles supplied by petroleum hydrocarbons (diesel/petrol) would be expected to impact the overall chemistry of the groundwater by introducing contaminants. Contaminated water would compromise the water in local abstractions and a chemical test would reflect the altered composition. Pollution prevention measures in a EMP or equivalent, would reduce the risk of an accidental release from occurring. This effect would have no impact on quantitative classification elements.
Altering the existing drainage regime	Change to groundwater recharge	None	✗	✗	✗	✗	✗	✓	✗	✗	✓	Altering the existing drainage regime may redirect surface water to other outlets which would otherwise recharge the underlying aquifers directly. A reduction of delay in groundwater recharge would affect the overall quantitative water balance and quantitative dependent surface water bodies (either an increase in drainage to surface water bodies or a decrease). No chemical impacts would be affected.
Impermeable surfaces and subsurface structures	Change to groundwater recharge and groundwater flow	None	✗	✗	✗	✗	✗	✓	✗	✗	✗	With less permeable ground surface, groundwater recharge would be impeded (reduced recharge area) which would impact the quantitative water balance negatively. No other elements would be impacted by this operation activity.

Note
✓ Indicates classification element may be affected by Proposed Development activity and associated effect.

Table 4-2 Activities and Potential Effects of the Proposed Development on the 'SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' Ground Water body

Proposed Development Activity	Potential Effect	SE Valleys Southern Devonian Old Redstone & Triassic Mercia Mudstone	Associated Classification Element Affected									Comments
			Chemical (Groundwater)					Quantitative				
		Measures Affected	*Chemical Drinking Water Protected Area*	*General Chemical Test*	*Chemical GWDTEs Test*	*Chemical Dependent Surface Water Body*	Chemical Saline Intrusion	*Quantitative Water Balance*	*Quantitative GWDTEs test*	*Quantitative Saline Intrusion*	*Quantitative Dependent Surface Water Body*	

✘ Indicates classification element is unlikely by Proposed Development activity and associated effect.

Mitigation Measures

4.4.3 The Proposed Development will be undertaken in line with the current guidance and codes of best practice. Table 4-3 GTable 4-3 G lists accepted, best practice industry guidance that is intended to prevent adverse environmental effects during construction. The General Guidance for Pollution Prevention (GPP) provides guidance on environmental legislation in Wales. The GPP documents are based on relevant legislation and reflect current good practice that will limit the potential for disturbance or contamination of water resources, and these will be implemented as part of the Proposed Development.

Table 4-3 Good Practice Guide and Guidance Documents to Protect the Water Environment Documents
CIRIA C750: Groundwater control: design and practice (2nd edition).
CIRIA C753 Sustainable Urban Drainage Systems Manual
CIRIA C768 Guidance on the Construction of SuDS
CIRIA C532 Control of Water Pollution from Construction Sites.
CIRIA C650 Environmental Good Practice on Site (Expansion Of C502).
GPP 1: Understanding your environmental responsibilities – good environmental practices
GPP 2: Above Ground Oil Storage.
GPP 4: Treatment & Disposal Of Wastewater where there is no connection of the public foul sewer.
GGP 5: Works & Maintenance In, Or Near Water.
PPG 6 Working At Construction And Demolition Sites.
GPP 8 Safe Storage & Disposal Of Used Oils.
GPP 18: Managing Firewater and Major Spillages.
GPP 21 Polluting Incident Response Planning.
UK Technical Advisory Group On The WFD, UK Environmental Standards & Conditions (Phase 2), Final, 2008.

4.4.4 A Construction Environmental Management Plan (CEMP) (or equivalent) will be produced that will incorporate the key principles of legislation, good practice and guidance for the demolition and construction phases. The CEMP will provide practical measures to avoid and minimise any effects of the Proposed Development on groundwater and surface waters including the South East Valleys Southern Devonian Old Red Sandstone and Triassic Mercia Mudstone underlying aquifer and the River Taff, as well as providing emergency preparedness and corrective actions.

4.4.5 The key principles of the water-related components of the CEMP will include (but are not limited to) the following:

- Planning and preparation of works to ensure all precautions are taken to provide protection to watercourses, groundwater and attenuation features.

- Permitting of any planned discharges with the appropriate regulator and implementation of any monitoring, self-assurance, maintenance and record keeping required under the approved permit.
- Construction / demolition design to minimise disruption to the natural water flow regime. Also identify all Site drainage in the vicinity of Proposed Development and isolate / divert as appropriate ahead of works commencing.
- Adoption of measures to prevent and control the release of sediment, such as directing surface water through mesh fencing to capture the sediment or active treatment units, as appropriate to achieve the required quality of any water discharges. Sediment traps may be considered if the quantity of sediment laden water is anticipated to be large. The CEMP will specify the maintenance requirements to ensure that sediment control measures, drains and potholes are regularly inspected, cleared, infilled and/or repaired.
- The preparation of pollution incident response plans, identifying the type and location of on-Site resources (spill kits, absorbent materials, oil booms etc.) available for the control of accidental releases of pollution and other environmental incidents. These resources will be available to contractors at all times of operation.
- Securely storing all fuel, oils, and other polluting substances within suitably bunded containers and placed upon impermeable surfaces in accordance with GPP2: Above Ground Oil Storage and GPP8: Safe Storage & Disposal Of Used Oils. The total quantity and range of potential pollutants to be used on Site is anticipated to be small.
- The use of integral drip trays (of 110% of the capacity of the fuel tank) for any static machinery/ plant, where practicable. All plant, vehicles and machinery will also be regularly inspected for leaks.
- Refuelling will be undertaken in a designated refuelling area or preferably off Site and the use of biodegradable oils and lubricants will be considered where possible.
- Cement/concrete mixes will be calculated to ensure that sufficient quantities are supplied without needing disposal of excess and cement/sand mix ratio will be monitored for consistency and suitability.

- Use only designated areas for concrete washout. No concrete contaminated water is permitted to be discharged to the water environment (including the Atlantic Wharf).
- Concrete, bulk and bagged, and concrete additives must be stored a minimum of 10m (increasing to 50m where practical) away from watercourses and in properly secured, covered and bunded areas.
- 'Toolbox talks' will be undertaken by the contractor to implement the environmental management measures and start of shift briefings will be provided each day to alert the workforce of works progressing on a given day and any associated environmental risks and measures that are necessary (such as permitting for dewatering and discharge activities).

4.4.6 During the operational phase, it is anticipated that surface water run-off from the Proposed Development will be directed into the Bute East Dock. For the Site, surface water run-off will be directed to both the Bute East Dock and pre-existing surface water sewers which are adjacent to the west site boundary, and further drainage will be managed by SuDS. Foul discharge will connect into Dŵr Cymru Welsh Water sewer network (details of which will be provided in Appendix 8.3 of the Water Resources Chapter. It is not expected that the operation of the Proposed Development will pose a substantial pollution risk to the identified surface water and groundwater bodies, as the surface water body does not transect the Site area and the water bearing rock is overlain by low permeability unconsolidated material and Made Ground. However it is important to note that the pressure from urban diffuse pollution, sewage and misconnections upon the South East Valleys Management Catchment contributes to reasons for not achieving good status, and as such the drainage strategies should mitigate against this.

4.4.7 Mitigation of effects upon flow rates and volumes of watercourses within the surface water catchments would be achieved through design of a suitable surface water drainage scheme for the Proposed Development, which takes into account climate change (1 in 100 years plus climate change event).

4.4.8 The Proposed Development would have an operation and maintenance management team who, as part of their role, would ensure all drainage systems are fully maintained and managed in accordance with best practice/guidance. In addition, a maintenance and management plan (or equivalent) would include the following: SuDS detention

basin, swales, and features; the inspection and maintenance of road conditions including potholes and drains; foul water pumping stations and sewage pipes. The British Standard: BS 3247:2011+A1:2016 specification for salt for spreading on highways for winter maintenance and the Highways Agency Trunk Road Maintenance Manual: Volume 2 – Routine & Winter Maintenance Code will be followed for the use of de-icing and storage of salts on Site.

Risk of Status Deterioration

4.4.9 Following implementation of the planned mitigation measures for the Proposed Development, the potential risks to classification elements identified in Table 4-1 and Table 4-2 **ATable 4-2 A** would be appropriately mitigated as outlined in paragraphs 4.4.3 to 4.4.8.

4.4.10 Table 4-4 summarises the risk that the Proposed Development may have on the River Taff – Conf Rhondda R to Castle Street' surface water body and whether it will achieve its environmental objectives. Table 4-5 summarises the risk that the Proposed Development may have on the SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater body and whether it will achieve its environmental objectives.

Hinderance of Programmes of Measures

4.4.11 The Proposed Development supports the objectives of the 'Taff – conf Rhondda R to Castle Street' surface water body, and 'South East Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater body (i.e., this scheme would not impede NRW to progress the relevant programme of measures). The construction and demolition phases (including vegetation stripping, cement mixing, impermeable surface construction etc.) will be contained within the footprint of the Proposed Development and will not interfere with fish passes (which are assumed to be upstream). These activities will also be short term and so will not hinder the progress of measures not yet in place, such as ecological enhancement and sediment management. Such measures as the education of landowners will not be impacted by any phase of the Proposed Development as the construction and operation of the Proposed Development will not interfere with the NRW's capacity to hold discussions with landowners. During the operation of the Proposed Development, if stated measures come into place (hydro morphological regime changes, flow attenuation, water management etc.), their success will not be impacted by the development.

Table 4-4 WFD Assessment for the 'Taff – Conf Rhondda R to Castle Street' Surface Water Body

Proposed Development Activities	Potential Effect	Ecological WFD Objective																Chemical WFD Objective			Measure
		Supporting Elements (Surface Water)	Biological Quality Elements			Hydro-morphological Supporting Elements		Physio-chemical Quality Elements						Specific Pollutants					Priority Substances	Other Pollutants	Priority Hazardous Substances	Fish Passage
		N/A	N/A			N/A		N/A						N/A								
		Mitigation Measures Assessment	*Macrophytes and Phytobenthos Combine*	*Fish*	*Invertebrate*	*Hydrological Regime*	*Morphology*	*Ammonia (Phys-Chem)*	*Biochemical Oxygen Demand*	*Dissolved Oxygen*	*pH*	*Phosphate*	*Temperature*	*Arsenic*	*Copper*	*Manganese*	*Iron*	*Zinc*				
Construction and Demolition Phase																						
Earthworks including excavation	Releases of sediment into surface water bodies	L	L	L	L	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	L
	Mobilisation of contaminants and release into surface waters	N/A	L	L	L	N/A	N/A	L	L	L	L	N/A	L						L	L	L	N/A
Demolition activities	Releases of sediment into surface waters	L	L	L	L	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	L
Construction of impermeable surfaces	Increase run-off to surface water drains leading to flooding	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	N/A
Soil stripping and vegetation removal	Change in baseline runoff characterisation	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	N/A
Soil compaction	Reduced infiltration – change in rainfall runoff response	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	N/A
Construction of sub-surface infrastructure	Releases of polluting substances (concrete/cement leachate) into surface water bodies	N/A	L	L	L	N/A		N/A	N/A	L	L	N/A	N/A						N/A	N/A	N/A	N/A
Use of concrete/cement	Releases of polluting substances into surface water bodies	N/A	L	L	L	N/A		N/A	N/A	L	L	N/A	N/A						N/A	N/A	N/A	N/A
Operational Phase																						
Use of impermeable surfaces	Increase run-off to surface water drains leading to flooding	N/A	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	N/A
Alteration of existing drainage regime	Change to run-off quantity leading to change in flow rate and volume in water bodies	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A	N/A	N/A	N/A
Vehicle movement	Release of polluting substances (hydrocarbons, oils) into the surface water bodies	N/A	L	L	L	N/A		N/A	N/A	L	N/A	N/A	N/A						N/A	N/A	N/A	N/A

Wastewater drainage	Release of foul water into surface water course and water bodies	N/A	L	L	L	N/A	L	L	L	L	N/A	N/A	L	L	L	N/A

Note
The WFD assessment table assesses the risk that a WFD objective would not be met due to the Proposed Development.
WFD objective relevance is based on the Proposed Development activities and effects, see **Error! Reference source not found.**.

-	No Objective
^	Indicates Cause of adverse impacts unknown
*****	Indicates Disproportionate burdens
DNRA	Where the NRW have determined that a classification element does not require assessment there is no risk that the objective would not be met therefore DNRA is assigned.
N/A	WFD Element is not applicable to this activity
B	Betterment predicted
L	Low risk of deterioration from current water body WFD status.
M	Medium risk of deterioration from current water body WFD status.
H	High risk of deterioration from current water body WFD status.

Table 4-5 WFD Assessment for the SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater Body

Proposed Development Activities	Potential Effect	Chemical WFD Objective					Quantitative WFD Objective				Measure
		Chemical (GW)					Quantitative				
		Good by 2015					-				None
		Chemical Drinking Water Protected Area	*General Chemical Test*	*Chemical GWDTEs test*	*Chemical Dependent Surface Water Body*	*Chemical Saline Intrusion*	Quantitative Water Balance	Quantitative GWDTEs test	Quantitative saline intrusion	Quantitative Dependent Surface Water Body Status	
Construction and Demolition Phase											
Earthworks including excavation	Mobilisation of pollutants leading to release of contaminated waters.	L	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None
	Pathway to aquifer reduced due to excavation increasing aquifer vulnerability	N/A	N/A	N/A	N/A	N/A	L	N/A	N/A	L	None
Soil stripping and vegetation removal	Change in runoff affecting groundwater recharge.	N/A	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	None
Use of concrete/cement	Releases of polluting substances into groundwater.	L	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None
Construction of impermeable surfaces	Reduction in recharge	N/A	N/A	N/A	N/A	N/A	L	L	L	L	None
Construction of subsurface infrastructure	Impeded shallow groundwater flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Operational Phase											
Use of motorised vehicles	Releases of polluting substances	L	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None

Table 4-5 WFD Assessment for the SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater Body

Proposed Development Activities	Potential Effect	Chemical WFD Objective					Quantitative WFD Objective				Measure
		Chemical (GW)					Quantitative				
		Good by 2015					-				None
		Chemical Drinking Water Protected Area	*General Chemical Test*	*Chemical GWDTEs test*	*Chemical Dependent Surface Water Body*	*Chemical Saline Intrusion*	Quantitative Water Balance	Quantitative GWDTEs test	Quantitative saline intrusion	Quantitative Dependent Surface Water Body Status	
	(e.g., oil & fuel) into the groundwater.										
Altering the existing drainage regime	Change to groundwater recharge	N/A	N/A	N/A	N/A	N/A	L	N/A	N/A	L	None
Impermeable surfaces and subsurfaces	Change to groundwater recharge and groundwater flow.	N/A	N/A	N/A	N/A	N/A	L	N/A	N/A	N/A	None

Note
The WFD assessment table assesses the risk that a WFD objective would not be met due to the Proposed Development.
WFD objective relevance is based on the Proposed Development activities and effects, see Table 4-2 **A**.

-	No Objective
^	Indicates Practical technical constraints prevent implementation of the measure by an earlier deadline
*****	Indicates Groundwater Status recovery time
DNRA	Where the EA have determined that a classification element does not require assessment there is no risk that the objective would not be met therefore DNRA is assigned.
N/A	WFD Element is not applicable to this activity
B	Betterment predicted
L	Low risk of deterioration from current water body WFD status.
M	Medium risk of deterioration from current water body WFD status.
H	High risk of deterioration from current water body WFD status.

5 CONCLUSION

5.1.1 This Water Framework Directive Assessment has assessed the potential for the Proposed Development to cause a deterioration in the status of the River Taff – Conf Rhondda R to Castle Street' surface water body and the SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' groundwater body during the construction and operational phases. With the implementation of the planned mitigation measures, the risk of deterioration of surface water ecological / chemical status or groundwater quantitative / chemical status during the construction and operational phases is assessed as Low.

5.1.2 The assessment has concluded that the Proposed Development will not affect NRW's programmes of measures for the surface water and groundwater bodies. Therefore, the Proposed Development is not considered to conflict with the objectives of the RBMP. Further mitigation and assessment (beyond those presented in this report) are not required.

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