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1 Hydrogeological Setting

1.1.1 The hydrogeology within the three Focus Areas (Sections B, D and F of the Project) described in **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10** is summarised in **Table 1.1**.

Table 1.1 - Hydrogeology at the three Focus Areas

Focus Area[1]	Superficial Aquifer	Bedrock Aquifer	Other designations
Section D: Tadcaster Area	None present	Principal Aquifer (Dolomitic limestone)	Surface water Nitrate Vulnerable Zone (NVZ) – Cock Beck Catchment (trib of Wharfe) Groundwater NVZ – Yorkshire Magnesian Limestone Source Protection Zone 3 (SPZ 3)
Section F: Monk Fryston Substation Area	Secondary undifferentiated Aquifer (Harrogate Till)	Principal Aquifer (Dolomitic limestone)	Surface water NVZ – The Fleet from Source to River Aire Groundwater NVZ – Yorkshire Magnesian Limestone Not in an SPZ
Section B: North-West of York Area including Overton Substation and Shipton CSECs	None present[1]	Principal Aquifer (Triassic Rocks – sandstone)	Not in a NVZ Not in an SPZ

[1] The geographical sections of the Project are shown on **Figure 1.2, Volume 5.4, Document 5.4.1.** Those highlighted as Focus Areas are the sections in which new infrastructure and construction compounds will be located and therefore the construction of the Project will involve greater ground disturbance than elsewhere. Outside these three Focus Areas, the Project primarily involves modifications to existing pylons and overhead lines (approximately 65% of the Project length consists of this activity), as well as near-surface works at Osbaldwick substation (new circuit breaker and isolator).

[2] These locations are underlain by superficial deposits of the Alne Glaciolacustrine Formation (laminated clay with silt and subordinate fine-grained sand beds). This is moderately impermeable geology. Cohesive superficial deposits have been recorded to extend from ground level to at least 9m below ground level (bgl) at both the Shipton

CSEC and proposed Overton Substation sites, effectively confining the bedrock aquifer and lowering the aquifer vulnerability.

2 Review of the River Basin Management Plan and Catchment

2.1.1 The Focus Areas are located within the Humber River Basin District, which is monitored by the EA as a requirement of the Water Framework Directive and the results of the WFD classification are summarises in the Humber River Basin Management Plan (RBMP)[1].

2.1.2 The Focus Areas are all located within the 'Humber' groundwater management catchment.

2.1.3 The Tadcaster Focus Area (Section D) is located within the 'Wharfe Magnesian Limestone' operational catchment, and the 'Wharfe Magnesian Limestone' groundwater body (ID: GB40401G701100)[2]. This groundwater body is 176.22km^2 in area and has an overall classification of Poor. A summary of the WFD Status and environmental objectives can be found in **Table 2.1**.

2.1.4 The Monk Fryston Substation Focus Area (Section F) is located within the 'Aire & Don Magnesian Limestone' operational catchment and the 'Aire & Don Magnesian Limestone' groundwater body (ID: GB40401G700900)[3]. This groundwater body is 221.77km2 in area and has an overall classification of Poor. A summary of the WFD Status and environmental objectives can be found in **Table 2.2**.

2.1.5 The North-West of York Focus Area (Section B) is located within the 'SUNO Sherwood Sandstone' operational catchment and the 'SUNO Sherwood Sandstone groundwater body' (ID: GB40401G702100)[4]. This groundwater body is 703.03km^2 in area and has an overall classification of Poor. A summary the WFD Status and environmental objectives can be found in Table 2.3.

2.1.6 A small part of the Order Limits falls within the 'Wharfe & Lower Ouse Sherwood Sandstone' operational catchment and 'Wharfe & Lower Ouse Sherwood Sandstone' groundwater body (ID: GB40401G702400)[5]. This groundwater body is 397.21km^2 in area and has an overall classification of Poor. This groundwater body will not be assessed at this time as the construction works that fall within this

[1] UK Government (2018). Humber River Basin District River Basin Management Plan. (Online) Available at : https://www.gov.uk/government/publications/humber-river-basin-district-river-basin-management-plan (Accessed 27 July 2022).
[2] Environment Agency (2021). Wharfe Magnesian Limestone Overview. (Online) Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB40401G701100 (Accessed 10 August 2021).
[3] Environment Agency (2021). Aire & Don Magnesian Limestone Overview. (Online) Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB40401G700900 (Accessed 10 August 2021).
[4] Environment Agency (2021). SUNO Sherwood Sandstone Overview. (Online) Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB40401G702100 (Accessed 10 August 2021).
[5] Environment Agency (2021). Wharfe & Lower Ouse Sherwood Sandstone Overview. (Online) Available at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB40401G702400 (Accessed 12 August 2021).

groundwater body boundary will be restricted to modifications to existing pylons. These modifications generally involve painting, vegetation management, steel work repair, overhead line replacement, and near surface concrete repair, so cause minimal/no ground disturbance. Foundations strengthening may be needed in some cases, but the degree and extent of ground disturbance will remain very small in the context of the regional scale of the groundwater bodies.

Table 2.1 - WFD Status of Wharfe Magnesian Limestone Groundwater Body

Classification Element	2013 Cycle	2014 Cycle	2015 Cycle	2016 Cycle	2019 Cycle	Objectives	Reasons
Overall Water body							
Overall Water body	Poor	Poor	Poor	Poor	Poor	Good by 2027	Disproportionately expensive; Disproportionate burdens
Quantitative							
Quantitative Saline Intrusion	Good	Good	Good	Good	Good	Good by 2015	
Quantitative Water Balance	Good	Good	Good	Good	Good	Good by 2015	
Quantitative GWDTEs (Groundwater Dependent Terrestrial Ecosystems) test	Good	Good	Good	Good	Good	Good by 2015	
Quantitative Dependent Surface Water Body Status	Good	Good	Good	Good	Good	Good by 2015	
Chemical (GW)							
Chemical Drinking Water Protected Area	Good	Good	Good	Good	Poor	Good by 2015	
General Chemical Test	Poor	Poor	Poor	Poor	Good	Good by 2027	Disproportionately expensive; Disproportionate burdens

Classification Element	2013 Cycle	2014 Cycle	2015 Cycle	2016 Cycle	2019 Cycle	Objectives	Reasons
Chemical GWDTEs test	Good	Good	Good	Good	Good	Good by 2015	
Chemical Dependent Surface Water Body Status	Good	Good	Good	Good	Good	Good by 2015	
Chemical Saline Intrusion	Good	Good	Good	Good	Good	Good by 2015	

Table 2.2 - WFD Status of Aire & Don Magnesian Limestone Groundwater Body

Classification Element	2013 Cycle	2014 Cycle	2015 Cycle	2016 Cycle	2019 Cycle	Objectives	Reasons
Overall Water body							
Overall Water body	Poor	Poor	Poor	Poor	Poor	Good by 2027	Disproportionately expensive: Disproportionate burdens
Quantitative							
Quantitative Saline Intrusion	Good	Good	Good	Good	Good	Good by 2015	
Quantitative Water Balance	Good	Good	Good	Good	Good	Good by 2015	
Quantitative GWDTEs test	Good	Good	Good	Good	Good	Good by 2015	

Classification Element	2013 Cycle	2014 Cycle	2015 Cycle	2016 Cycle	2019 Cycle	Objectives	Reasons
Quantitative Dependent Surface Water Body Status	Good	Good	Good	Good	Good	Good by 2015	
Chemical (GW)							
Chemical Drinking Water Protected Area	Good	Good	Good	Good	Poor	Good by 2015	
General Chemical Test	Poor	Poor	Poor	Poor	Poor	Good by 2027	Disproportionately expensive: Disproportionate burdens
Chemical GWDTEs test	Good	Good	Good	Good	Good	Good by 2015	
Chemical Dependent Surface Water Body Status	Good	Good	Good	Good	Good	Good by 2015	
Chemical Saline Intrusion	Good	Good	Good	Good	Good	Good by 2015	

Table 2.3 - WFD Status of SUNO Sherwood Sandstone Groundwater Body

Classification Element	2013 Cycle	2014 Cycle	2015 Cycle	2016 Cycle	2019 Cycle	Objectives	Reasons
Overall Water body							
Overall Water body	Poor	Poor	Poor	Poor	Poor	Good by 2021	Disproportionately expensive: Disproportionate burdens
Quantitative							
Quantitative Saline Intrusion	Good	Good	Good	Good	Good	Good by 2015	
Quantitative Water Balance	Good	Good	Good	Good	Good	Good by 2015	
Quantitative GWDTEs test	Good	Good	Good	Good	Good	Good by 2015	
Quantitative Dependent Surface Water body Status	Good	Good	Good	Good	Good	Good by 2015	
Chemical (GW)							
Chemical Drinking Water Protected Area	Poor	Poor	Poor	Poor	Good	Good by 2021	Disproportionately expensive: Disproportionate burdens
General Chemical Test	Good	Good	Good	Good	Good	Good by 2015	
Chemical GWDTEs test	Good	Good	Good	Good	Good	Good by 2015	

Classification Element	2013 Cycle	2014 Cycle	2015 Cycle	2016 Cycle	2019 Cycle	Objectives	Reasons
Chemical Dependent Surface Water body Status	Good	Good	Good	Good	Poor	Good by 2015	
Chemical Saline Intrusion	Good	Good	Good	Good	Good	Good by 2015	

2.1.7 The EA has reported a list of reasons why the Wharfe Magnesian Limestone groundwater body failed to achieve good WFD status and the reasons for deterioration as summarised in **Table 2.4**.

Table 2.4 - Reasons why Wharfe Magnesian Limestone groundwater body failed to achieve Good WFD status

Classification Element Affected	Activity	Sector
Chemical Drinking Water Protected Area	Unknown (pending investigation)	Sector under investigation
Trend Assessment	Unknown (pending investigation)	Sector under investigation

2.1.8 The EA has reported a list of reasons why the Aire and Don Magnesian Limestone groundwater body failed to achieve a good WFD status and the reasons for deterioration as summarised in **Table 2.5.**

Table 2.5 - Reasons why Aire & Don Magnesian groundwater body failed to achieve Good WFD Status

Classification Element Affected	Activity	Sector
General Chemical Test	Private Sewage Treatment	Not applicable
General Chemical Test	Farm/Site Infrastructure	Agriculture - Livestock
General Chemical Test	Poor pesticide management	Agriculture- Arable
General Chemical Test	Poor nutrient management	Agriculture- Arable
Chemical Drinking Water Protected Area	Unknown (pending investigation)	Sector under investigation
Trend Assessment	Unknown (pending investigation)	Sector under investigation

2.1.9 The EA has reported a list of reasons why the SUNO Sherwood Sandstone groundwater body failed to achieve a good WFD status and the reasons for deterioration, see **Table 2.6.**

Table 2.6 - Reasons why the SUNO Sherwood Sandstone groundwater body failed to achieve Good WFD Status

Classification Element Affected	Activity	Sector
Trend Assessment	Poor nutrient management	Agriculture- Arable
Trend Assessment	Poor nutrient management	Agriculture - Livestock
Trend Assessment	Private Sewage Treatment	Domestic General Public
Trend Assessment	Natural Conditions - other	Not applicable
Chemical Dependent Surface Water Body Status	Not applicable	No sector responsible

Issues preventing waters reaching good status

2.1.10 The EA's Catchment Data Explorer website includes information on the issues preventing waters reaching good status and the sectors identified as contributing to these issues. **Table 2.7** presents this information of 'Aire & Don Magnesian water body'. The numbers in the tables are counts of the reasons for not achieving good status in water bodies. The EA has not reported the issues preventing waters reaching good status and the sectors identifies as contributing to these issues for the 'SUNO Sherwood Sandstone' and 'Wharfe Magnesian Limestone' ground water bodies.

Table 2.7 - Issues preventing waters reaching good status for the Aire & Don Magnesian Limestone groundwater body

Issue	Sector													
	Agriculture and rural land management	Industry	Mining and quarrying	Navigation	Urban and transport	Water Industry	Local & central government	Domestic general public	Recreation	Waste treatment and disposal	Other	No sector responsible	Sector under investigation	Total
Physical modifications	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pollution from waste water	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pollution from towns, cities, and transport	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Changes to the natural flow and level of water	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Invasive non-native species	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pollution from rural areas	3	0	0	0	0	0	0	0	0	0	0	0	0	3
Pollution from abandoned mines	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.1.11 As shown in **Table 2.7**, the issues are related to pollutions from towns, cities and transport and pollution from rural areas which are attributed to the agriculture and rural management sector, and the domestic general public sector.

2.1.12 The EA has provided information on the planned Programme of Measures for the water bodies. These are summarised in **Table 2.8.** For the Aire & Don Magnesian Limestone groundwater body, there are six mitigation measures which are related to improving best farming practice in relation of use of fertilisers and pesticides, a

wastewater treatment works discharge and improvement of a direct discharge to groundwater. For the SUNO Sherwood Sandstone groundwater body, there are two mitigation measures related to farming best practice and ensuring compliance of drainage permits. The Wharfe Magnesian Limestone has one mitigation measure which is also related to improving farming best practices.

Table 2.8 - EA Programme of Measures for the Improvement in Status for the Aire & Don Magnesian Limestone, SUNO Sherwood Sandstone, and Wharfe Magnesian Limestone groundwater bodies.

Action ID	Mitigation Measure	Could the Mitigation Measure be at risk of being hindered by the Project?
Aire & Don Magnesian Limestone		
19573	Catchment-based implementation of best practice (nitrate)	No – not applicable to Project and Project is not expected to affect this action/ mitigation
19574	Completion and implementation of actions from a farm infrastructure audit	No – not applicable to Project and Project is not expected to affect this action/ mitigation
19575	Catchment-based implementation of best practice (bentazone)	No – not applicable to Project and Project is not expected to affect this action/ mitigation
19576	Oaklands Hill – ensure that proposals for the treatment plant will ensure that nitrogen discharge will be within acceptable limits	No – not applicable to Project and Project is not expected to affect this action/ mitigation
19577	Barnsdale Bar Services – discharge improvement plan as current discharge is via boreholes directly into groundwater from motel	No – not applicable to Project and Project is not expected to affect this action/ mitigation
40648	Use of best practice for the storage and handling of pesticides	No – not applicable to Project and Project is not expected to affect this action/ mitigation
SUNO Sherwood Sandstone		
19618	Farm manure and slurry management plans and promotion of fertiliser best practice	No – not applicable to Project and Project is not expected to affect this action/ mitigation
19619	Non-mains drainage permit review	No – not applicable to Project and Project is not expected to affect this action/ mitigation
Wharfe Magnesian Limestone		
40637	Farm manure and slurry management plans and promotion of fertiliser best practice	No – not applicable to Project and Project is not expected to affect this action/ mitigation

3 Water Framework Directive Screening Assessment

3.1 Introduction

3.1.1 The Environment Agency's 'Water Framework Directive Risk Assessments: How to Assess the Risk of your Activity'[6] (April 2016) provides guidance as to how to undertake a WFD Assessment. The guidance identifies four stages:

- Make sure that the assessment covers the receptors that are protected by WFD.
- Demonstrate that the activity supports the objectives of the local River Basin Management Plan (RBMP). The wider environmental objectives of the RBMPs that are relevant to physical works are:
  - to prevent deterioration of the status or potential of surface waters and groundwater; and
  - to aim to achieve good status for all water bodies (or for heavily modified water bodies and artificial water bodies, good ecological potential) and good surface water chemical status.
- If a high level of confidence that your activity supports the objectives of your RBMP cannot be reached then you need to carry out more investigation into the risks on WFD receptors and possible ways of managing those risks. After amending the project to avoid, minimise, mitigate, or compensate for the risks to WFD receptors the following questions need to be addressed:
  - could the activity still cause a water body (catchment/sub-catchment) to deteriorate from one WFD status class to another or cause significant localised impacts that could contribute to this happening?
  - could the activity prevent or undermine action to get water bodies to good status?
- If the answer to the above questions is yes and your activity still does not support RBMP objectives, it will need to be demonstrated that the project meets the sustainability criteria set out in Article 4(7) of the WFD. Article 4(7) sets out stringent environmental and socio-economic tests to assess if a scheme meets strict environmental and sustainability criteria.

[6] Environment Agency (2016) Water Framework Directive Risk Assessment: How to Assess the Risks of your Activity (online).. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf (Accessed 15 April 2019).

3.2 Activities included in the assessment

Construction phase

3.2.1 The activities involved in the construction of the Project are described in **Chapter 3: Description of the Project, Volume 5.2, Document 5.2.3**. To clearly assess the impacts on the WFD status of each groundwater body, the construction activities described in **Chapter 3, Volume 5.2, Document 5.2.3** that are most relevant to the WFD assessment are summarised as follows:

- Earthworks including excavations.
- Dewatering of excavations.
- Discharge of groundwater from dewatering.
- Use of machinery and storage of chemicals.
- Soil stripping and vegetation removal.
- Soil compaction.
- Construction of impermeable surfaces such as roads/pavements.
- Construction of subsurface infrastructure such as foundations.
- Use of cement and concrete and lime stabilisation.

3.2.2 The screening of these activities relative to the different WFD classification tests is detailed in **Table 3.1** and a description of possible impacts of these on the capacity for the groundwater bodies to achieve good overalls status is detailed in **Table 3.2.**

Operational phase

3.2.3 The activities involved with the operational phase of the Project are described in **Chapter 3: Description of the Project, Volume 5.2, Document 5.2.3**, with those most relevant to the WFD assessment summarised as follows:

- Presence of impermeable surfaces.
- Use of motorised vehicles and fuel storage/refuelling facilities (including underground fuel storage tanks), which introduces a risk of the spillage/leakage of hydrocarbon fuels.
- De-icing of roads, walkways, and parking areas.
- New drainage regime in hard surfaced areas.

3.2.4 The screening of these activities is detailed in **Table 3.1** and an assessment of the impacts of these on the capacity for the groundwater bodies to achieve good overalls status is detailed in **Table 3.2**.

Table 3.1 - Activities and Potential WFD Effects of the Project on the Wharfe Magnesian Limestone, Aire & Don Magnesian Limestone, and SUNO Sherwood Sandstone Groundwater Bodies

Project Activity	Potential Effect	Measures Affected	Associated Classification Element Affected											Description of Possible WFD Effect
			Chemical (Groundwater)						Quantitative					
			Chemical Status Element	*Chemical Drinking Water Protected Area*	*General Chemical Test*	*Chemical GWDTEs Test*	*Chemical Dependent Surface Water Body*	Chemical Saline Intrusion	*Quantitative Status Element*	*Quantitative Water Balance*	*Quantitative GWDTEs test*	*Quantitative Saline Intrusion*	*Quantitative Dependent Surface Water Body*	
Construction Phase														
Earthworks including excavation	Mobilisation of pollutants leading to release of contaminated waters.	None	✓	✓	✓	×	✓	×	×	×	×	×	×	There is a possibility during construction that hydrocarbons and construction materials, if released to groundwater, could adversely affect groundwater quality within the water body (if unmitigated). The Tadcaster Focus Area is within a SPZ 3, so the status of the Chemical Drinking Water Protected Area should be considered. Transmission of contamination from the aquifer to surface water features via a pathway could alter the status of the chemical dependent surface water body element.
	Pathway to aquifer reduced due to excavation increasing aquifer vulnerability. Potential contaminants released into groundwater body.	None	✓	×	✓	×	✓	×	✓	✓	×	×	✓	Deep excavations can make the pathway through the unsaturated zone shorter, thereby reducing its attenuating capacity and its potential to provide groundwater protection from pollution.
Dewatering of excavations	Lowering of groundwater table and local resource availability	None	×	×	×	×	×	×	×	×	×	×	✓	As a result of limited dewatering from the shallow superficial deposits during construction, the groundwater table (locally) may be temporarily affected. Though excavations are expected during construction, these will be shallow and would not intersect groundwater in the bedrock aquifer and any dewatering would not be from groundwater body ingress (likely perched water and/or rainfall).
Discharge of groundwater from dewatering	Release of silty water into the environment	None	×	×	×	×	×	×	×	✓	×	×	×	This effect would have no chemical impact since the water abstracted will have no intervening use or come into contact with pollutants (provided all Pollution Prevention measures are followed). The discharge, if not back to ground, would impact the flow regime and water levels of receiving surface water bodies. The quantitative water balance of the groundwater bodies would be the only element effected as groundwater abstracted is not being returned to the source of supply.
Use of machinery and storage on site	Releases of polluting substances (e.g., oil & fuel) into groundwater.	None	✓	×	✓	×	✓	×	×	×	×	×	×	Contaminants of concern in this activity are likely to be petroleum hydrocarbons from plant (excavator etc.). These contaminants can result in light non-aqueous phase liquids (LNAPLs) entering the groundwater body and polluting the water. A hydrocarbon spill would not have any impact on quantitative elements or saline intrusion but may enter the groundwater dependent surface water bodies which are in hydraulic connectivity with the superficial geology. Pollution prevention measures (**Code of Construction Practice, Volume 5.3, Document 5.3.3B**) would reduce the risk of an accidental release from occurring.
Soil stripping and vegetation removal	Change in runoff affecting groundwater recharge	None	×	×	×	×	×	×	×	✓	×	×	×	The only possible 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.
Soil compaction	Reduced infiltration – change in rainfall runoff response	None	×	×	×	×	×	×	×	✓	×	×	×	This effect could have no chemical impact, however reduced infiltration could alter the overlying water balance as less water is recharging the underlying superficial. This could alter the quantity and frequency of recharge to the groundwater bodies.
Construction of impermeable surfaces such as roads/pavements	Reduction in recharge	None	×	×	×	×	×	×	✓	✓	×	×	✓	This effect would have no chemical impact, however a reduction in recharge to the superficial deposits and in turn the Magnesian Limestone and Sherwood Sandstones could reduce groundwater levels locally. This could change the overall quantitative water balance and reduce the baseflow index in GWDTE.

Project Activity	Potential Effect	Measures Affected	Associated Classification Element Affected											Description of Possible WFD Effect
			Chemical (Groundwater)						Quantitative					
			Chemical Status Element	*Chemical Drinking Water Protected Area*	*General Chemical Test*	*Chemical GWDTEs Test*	*Chemical Dependent Surface Water Body*	Chemical Saline Intrusion	*Quantitative Status Element*	*Quantitative Water Balance*	*Quantitative GWDTEs test*	*Quantitative Saline Intrusion*	*Quantitative Dependent Surface Water Body*	
Construction of subsurface infrastructure such as foundations	Impede shallow groundwater 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 route of groundwater flow to the underlying aquifer. This effect is not expected to impact any chemical or quantitative elements.
Use of cement and concrete and lime stabilisation	Releases of polluting substances into groundwater. If good practice is not followed, cement bound sand can lead to increase in pH.	None	✓	✓	✓	×	✓	×	×	×	×	×	×	The chemicals involved in concrete/cement have the potential to impact the levels of pH, silica, aluminium and heavy metals in the groundwater body, resulting in a change to the chemical status of the overall groundwater body.
Operational Phase														
Use of Motorised Vehicles during maintenance	Releases of polluting substances into groundwater.	None	✓	×	✓	×	✓	×	×	×	×	×	×	Fuel spills (diesel/petrol) from motorised vehicles could be expected to impact the overall chemistry of the groundwater by introducing contaminants. Pollution prevention measures (**Code of Construction Practice, Volume 5.3, Document 5.3.3B**) would reduce the risk of an accidental release from occurring. This effect would have no impact on quantitative classification elements.
Presence of impermeable surfaces	Change to groundwater recharge and groundwater flow	None	×	×	×	×	×	×	×	×	×	×	✓	Large areas of impermeable surfaces can increase runoff and reduce recharge to the water table. During operation, impermeable surfaces may reduce infiltration into the bedrock, thus affecting the overall water balance. The two substation sites represent the largest areas of proposed new impermeable surface, although it is noted that both are situated on low permeability superficial deposits.
De-icing of roads, walkways, and parking areas	Releases of polluting substances (salts) into the groundwater bodies	None	✓	×	✓	×	✓	✓	×	×	×	×	×	This proposed activity would introduce chloride into the hydrogeological environment which has the potential to impact the quality of water in the groundwater body. Also, this would be considered a form of saline intrusion not associated with sea water. This effect would have no impact on quantitative classification elements and pollution prevention and response measures would reduce the risk of pollution spills.
New drainage regime in hard surfaced areas	Change to groundwater recharge and groundwater flow	None	×	×	×	×	×	×	×	✓	×	×	✓	Altering the existing drainage regime may redirect surface water to other outlets which would otherwise recharge the underlying aquifers directly. A reduction or delay in groundwater recharge could 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.

Note

✓ Indicates classification element may be affected by Project activity and associated effect.

× Indicates classification element is unlikely by Project activity and associated effect.

Table 3.2 - Assessment of Impacts of the Project on WFD Status of Wharfe Magnesian Limestone, Aire & Don Magnesian Limestone, and SUNO Sherwood Sandstone groundwater bodies

WFD Element	Wharfe Magnesian Limestone (Tadcaster Focus Area) Assessment of WFD impacts	Aire & Don Magnesian Limestone (Monk Fryston Focus Area)	SUNO Sherwood Sandstone (North-West of York Focus Area)
Quantitative status element			
Saline Intrusion	N/A It is highly unlikely that the construction and operation of the Project will increase salinity in the groundwater body. This groundwater body currently achieves Good status for quantitative saline intrusion. This status would be compromised by over abstraction or rising sea levels which will not occur as a result of the construction and operation of the Project.	N/A As Wharfe Magnesian Limestone.	N/A As Wharfe Magnesian Limestone.
Water Balance	Low Risk Water balance is anticipated to be at low risk of being impacted significantly during construction and operation. Though excavations are expected during construction, these will be shallow and would not intersect groundwater in the bedrock aquifer, which is expected to be between 37m and 44m bill (below ground level), and any dewatering would not be from groundwater body ingress from the WFD groundwater bodies. During operation, impermeable surfaces may reduce infiltration into the bedrock, thus affecting the overall water balance. However, due to the small size of the impermeable surfaces (40m x 50m) any effects on infiltration will be negligible.	Low Risk Construction excavations at Monk Fryston are expected to be sufficiently shallow as to not encounter the bedrock or groundwater within the bedrock. Groundwater levels here are around 30 m bgl so it is not anticipated that dewatering of the excavations would include groundwater contributions from the limestone aquifer. Any dewatering and subsequent discharge will be perched groundwater, surface water runoff and/or rainfall. As with the Tadcaster Focus Area (Section D), during operation, impermeable surfaces may reduce infiltration into the bedrock aquifer. The proposed permanent drainage solution for this site (surface attenuation and discharge) will also reduce the amount of infiltration to the ground. However, as this location is underlain by a moderately impermeable barrier, recharge is already impeded. Construction and operation activities are unlikely to prevent the groundwater body achieving Good status.	Low Risk The groundwater level within the aquifer is expected to well below the base of any construction excavations required for underground cabling or foundations. Dewatering would be expected to be restricted to perched groundwater, surface water run-off and/or rainwater. During operation, the presence of impermeable surfaces may increase surface runoff so there is a minimal risk that the Project will prevent the groundwater body achieving Good status. As with the Tadcaster Area, the proposed permanent drainage solution for the Overton Substation site (surface attenuation and discharge) will also reduce the amount of infiltration to the ground. However, as this location is underlain by a moderately impermeable barrier, recharge is already impeded.
GWDTEs Test	N/A The impact of the Project on this WFD element can be screened out as the nearest GWDTE is 2.4km south-east and the proposed works at the Tadcaster Focus Area (Section D) are not sufficiently disruptive to cause a potential effect over such a large distance.	N/A A groundwater outlet point arises 1.34km south of the proposed Monk Fryston Substation site, to supply a large pond in Burton Salmon. This is likely supported by the Aire & Don Magnesian Limestone groundwater body, though it is unlikely that the construction or operation of the Project will affect the quantitative element of the GWDTE due to the small scale of the Project activities. Additionally, the groundwater outlet point arises where there are no superficial deposits and thus recharge is uninhibited. The outlet point and pond are likely primarily dependent on that localised recharge and not recharge upstream where there is a confining layer of Harrogate Till.	N/A The nearest GWDTEs are more than 5km away from the Order Limits. The construction and operation of the Project will not affect GWDTEs at this distance.
Dependent Surface Water body Status	Low Risk Within the area, a drain is present to the south-west as well as the Cock Beck to the east. These are not covered in this WFD assessment. No barriers would be installed that would limit water connectivity between the fluvial waterbody and the groundwater body. Therefore, there are no anticipated impacts that could cause deterioration of a dependent surface waterbody.	Low Risk Several drains and ponds are in proximity to the location of the proposed Monk Fryston substation and the Ledsham Beck 2.2km west of the Monk Fryston substation. These are not covered in this WFD assessment. No barriers would be installed that would limit water connectivity between the fluvial waterbody and the groundwater body. Therefore, there are no anticipated impacts that could cause deterioration of a dependent surface waterbody.	Low Risk Moor Gutter leading to Hurns Gutter is present in the locale of the North-West of York Area, as well as some small drains. These are not covered in this WFD assessment. No barriers would be installed that would limit water connectivity between the fluvial waterbody and the groundwater body. Therefore, there are no anticipated impacts that could cause deterioration of a dependent surface waterbody.
Chemical status element			
Chemical drinking water protected area	Low Risk The Tadcaster Focus Area (Section D) does not fall into a drinking water safeguard zone for groundwater or surface water. However, since there is no confining layer and the location is in a NVZ and SPZ3, consideration of the chemical status element cannot be screened out. During the construction and operation of the Project, the embedded environmental measures as laid out in Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10** would be adopted, to prevent deterioration of groundwater and to prevent deterioration of WFD status and the achievement of the WFD objectives of this element. The Code of Construction Practice (CoCP) will provide a compliance mechanism for these measures.	Low Risk The proposed Monk Fryston Substation does not fall into a drinking water safeguard zone for groundwater or surface water. There is a confining, impermeable layer of clay rich Till which will impede / prevent vertical contaminant migration. The risk to the WFD status is low and any impact would be negligible, particularly considering the adoption of the embedded measures in Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**.	Low Risk The Overton Substation site and Shipton CSEC site are located within a drinking water safeguard zone for surface water. Neither location is in a SPZ or NVZ. During the construction and operation of the Project, the embedded environmental measures as laid out in Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10** would be adopted, to prevent deterioration of groundwater and to prevent deterioration of WFD status and the achievement of the WFD objectives of this element. The CoCP will provide a compliance mechanism for these measures.
General chemical test	Low Risk	Low Risk	Low Risk

WFD Element	Wharfe Magnesian Limestone (Tadcaster Focus Area) Assessment of WFD impacts	Aire & Don Magnesian Limestone (Monk Fryston Focus Area)	SUNO Sherwood Sandstone (North-West of York Focus Area)
	During the construction and operation of the Project, the embedded environmental measures as laid out in Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10** would be adopted, to prevent deterioration of groundwater and to prevent deterioration of WFD status and the achievement of the WFD objectives of this element. The CoCP will provide a compliance mechanism for these measures. Therefore, the Project would not be expected to cause meaningful deterioration of the WFD status or prevent achievement of the objectives.	This groundwater body is not achieving Good status due to poor nutrient and pesticide management. The presence of the proposed Monk Fryston Substation may assist with the objective of Good status in this regard, since the (previously agricultural) land used for the new substation will no longer be farmed, and therefore there will be an overall reduction in pesticide and nutrient input into the groundwater body. During construction, pollution prevention measures will be adopted to prevent deterioration of the groundwater body (see Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**).	This groundwater body is not achieving Good status due to poor nutrient and pesticide management, as well as natural conditions and private sewage treatment. Since the Project will be built on agricultural land, this may reduce nutrient and pesticide input, which may assist with the objective of an improvement in the WFD status of this groundwater body during operation. During construction, pollution prevention measures will be adopted to prevent deterioration of the groundwater body (see Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**).
Chemical GWDTEs test	N/A The nearest GWDTE is Stutton Ings approximately 2.4km south-east of the Tadcaster Focus Area (Section D). Due to the large distance between the Focus Area and the GWDTE and embedded measures that will protect groundwater at the Tadcaster Focus Area (see Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**), the risk to the WFD status of the GWDTE can be screened out.	N/A The chemical status of any GWDTEs within proximity of the Order Limits will not be impacted negatively by the Project. The footprint of this substation is relatively small (0.082 km^2), so any groundwater contamination is not likely to effect GWDTEs (the closest of which is 2km south). The risk that the Project will impact the WFD status and achievement of the objectives can be screened out.	N/A The nearest GWDTEs to the Overton Substation and Shipton CSEC sites are more than 5km away from these locations. As such, the risk of the Project impeding the objectives of the WFD for the SUNO Sherwood sandstone are negligible. However, it is important that pollution measures are in place to prevent contaminant migration into nearby surface water courses since these developments are within a drinking water safeguard zone.
Chemical dependent surface water body status	Low Risk During the construction phase, pollution prevention measures will be adopted to prevent deterioration of the groundwater body (see Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**). Provided these measures are included the Project is not expected to cause meaningful deterioration of the chemical dependent surface water body status or prevent achievement of the objectives.	Low Risk During the construction phase, pollution prevention measures will be adopted to prevent deterioration of the groundwater body (see Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**). Provided these measures are included the Project is not expected to cause meaningful deterioration of the WFD chemical status or prevent achievement of the objectives	Low Risk During the construction phase, pollution prevention measures will be adopted to prevent deterioration of the groundwater body (see Table 10.8 of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**). Provided these measures are included the Project is not expected to cause meaningful deterioration of the chemical status of the groundwater body.
Chemical saline intrusion	Low Risk There is no risk that excavations and soil stripping during the construction phase will increase salinity. However, there is low risk that de-icing of walkways, parking areas etc during operation will increase salinity. The Project is not expected to cause meaningful deterioration of the WFD status of the groundwater body or prevent the Wharfe Magnesian Limestone from achieving its objective.	Low Risk There is no risk that excavations and soil stripping during the construction phase will increase salinity. However, there is low risk that de-icing of walkways, parking areas etc during operation will increase salinity. The Project is not expected to cause meaningful deterioration to the WFD status of the Aire & Don Magnesian Limestone groundwater body or prevent achievement of the objectives.	Low Risk There is a no risk that excavations and soil stripping during the construction phase will increase salinity. However, there is low risk that de-icing of walkways, parking areas etc during operation will increase salinity The Project is not expected to have any meaningful impact on the SUNO Sherwood Sandstone groundwater body achieving Good status.

3.3 Stage 1

Make sure that the assessment covers the receptors that are protected by the WFD

3.3.1 The WFD protects surface water bodies and groundwater bodies. This assessment covers the Wharfe Magnesian Limestone groundwater body (ID: GB40401G701100), the Aire and Don Magnesian Limestone groundwater body (ID: GB40401G700900) and the SUNO Sherwood Sandstone groundwater body (ID: GB40401G702100). The assessment does not cover the Wharfe and Lower Ouse groundwater body, for the reasons previously explained, or surface water bodies (these are considered in **Chapter 9: Hydrology, Volume 5.2, Document 5.2.9**). In summary, the assessment covers the appropriate hydrogeological receptors protected by the WFD.

3.4 Stage 2

Demonstrate that the activity supports the objectives of the local River Basin Management Plan (RBMP)

3.4.1 The wider environmental objectives of the RMBP's that are relevant to physical works are:

- To prevent deterioration of the status or potential of surface waters and groundwater; and
- To aim to achieve good status for all water bodies (or for heavily modified water bodies and artificial water bodies, good ecological potential) and good surface water chemical status.

3.4.2 **Table 3.3** summarises the risk that the Project may have on the status of the 'Wharfe Magnesian Limestone' groundwater body, the 'Aire and Don Magnesian Limestone' groundwater body and the 'SUNO Sherwood Sandstone' groundwater body and the likelihood that they will achieve their environmental objectives.

3.4.3 The Project supports the objectives of the 'Wharfe Magnesian Limestone' groundwater body, 'Aire and Don Magnesian Limestone' groundwater body, and the 'SUNO Sherwood Sandstone' groundwater body (i.e this scheme would not impede the Programme of Measures for these water bodies). Due to the nature of the Project, it is unlikely to have any adverse effects on or hinder the Programme of Measures in the RBMP outlined in **Table 2.8**.

3.4.4 The WFD objectives for the Wharfe Magnesian Limestone groundwater body, Aire and Don Magnesian Limestone groundwater body, and the SUNO Sherwood Sandstone groundwater body are summarised in **Table 2.1**, **Table 2.2,** and **Table 2.3** respectively.

3.4.5 There are no reported reasons why the Wharfe Magnesian Limestone groundwater body is not achieving Good WFD status or reasons for deterioration. Reasons for the Aire and Don Magnesian Limestone groundwater body and the SUNO Sherwood Sandstone groundwater body not achieving Good status are summarised in **Table 2.5** and **Table 2.6**, respectively.

Table 3.3 WFD Assessment Summary Table for Wharfe Magnesian Limestone Groundwater Body, Aire & Don Magnesian Limestone Groundwater Body and SUNO Sherwood Sandstone Groundwater Body

Activities	WFD objective*								
	Quantitative				Chemical				
	Quantitative Saline Intrusion	Quantitative Water Balance	Quantitative GWDTEs test	Quantitative Dependent Surface Water body Status	Chemical Drinking Water Protected Area	General Chemical Test	Chemical GWDTEs test	Chemical Dependent Surface Water body Status	Chemical Saline Intrusion
	Good by 2015	Good by 2015	Good by 2015	Good by 2015	Good by 2015	Good by 2021	Good by 2015	Good by 2015	Good by 2015
Construction Phase									
Earthworks including excavations	N/A	L	N/A	L	L	L	N/A	L	N/A
Dewatering of excavations	N/A	L	N/A	L	N/A	N/A	N/A	N/A	N/A
Discharge of groundwater from dewatering	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Use of machinery and storage of chemicals	N/A	N/A	N/A	N/A	N/A	L	N/A	L	N/A
Soil stripping and vegetation removal	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soil compaction	N/A	L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction of impermeable surfaces such as roads / pavements	N/A	L	N/A	L	N/A	N/A	N/A	N/A	N/A
Construction of subsurface infrastructure such as foundations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Use of cement and concrete	N/A	N/A	N/A	N/A	L	L	N/A	L	N/A
Operation Phase									
Presence of impermeable surfaces	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A	N/A
Use of Motorised Vehicles during maintenance	N/A	N/A	N/A	N/A	N/A	L	N/A	L	N/A
De-Icing of roads, walkways, and parking areas	N/A	N/A	N/A	N/A	N/A	L	N/A	L	L
Creation of new drainage regime	N/A	L	N/A	L	N/A	N/A	N/A	N/A	N/A

Note
* From Environment Agency's RBMP.

DNRA	Does not require assessment.
N/A	WFD Element is not applicable to this activity.
L	Low risk of deterioration from current groundwater body WFD status.
M	Medium risk of deterioration from current groundwater body WFD status.
H	High risk of deterioration from current groundwater body WFD status.

Stage 3

3.4.6 If there is a high level of confidence that your activity cannot meet the objectives set out in the RBMP then you need to carry out further investigation into the risks on WFD receptors and possible ways of managing risks. After amending the project to avoid, minimise, mitigate, or compensate for the risks to WFD receptors the follow questions need to be addressed:

- Could the activity still cause a water body (catchment/sub-catchment) to deteriorate from one WFD status class to another or cause significant localised impacts that could contribute to this happening?
- Could the activity prevent or undermine action (WFD Programme of Measures to get water bodies to good status?

3.4.7 There is a high level of confidence that activities associated with the construction and operation of the Project in the three Focus Areas (Sections B, D and F of the Project) will support the objectives of the WFD for the discussed groundwater bodies. Therefore, Stage 3 is not required.

3.4.8 The Project will be designed and constructed in line with relevant guidance and legislation, and encompass the measures detailed in **Table 10.8** of **Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10**. Adherence to these measures will be secured through compliance with the Code of Construction Practice (CoCP), a draft of which is provided in **Appendix 5.3.3B, Volume 5.3, Document 5.3.3B**.

3.4.9 Therefore, the Project is unlikely to cause a deterioration in WFD status class or prevent waterbodies in these catchments from achieving WFD objectives.

3.5 Stage 4

3.5.1 If the answer to the above question is yes and your activity still does not support RBMP objectives, it will need to be demonstrated that the project meets the sustainability criteria set out in Article 4(7) of the WFD. Article 4(7) sets out stringent environmental and socio-economic tests to assess if a scheme meets strict environmental and sustainability criteria.

3.5.2 Stage 4 is not required.

4 Conclusions

4.1.1 The scope of the WFD Screening Assessment presented is limited to groundwater bodies. The WFD Screening Assessment relates to the Wharfe Magnesian Limestone, Aire & Don Magnesian Limestone, and SUNO Sherwood Sandstone groundwater bodies. Groundwater bodies within the WFD have been assessed attributing equal importance, and risks presented in **Table 3.3.**

4.1.2 No effect has been identified that risks causing deterioration in WFD status in any of the three groundwater bodies. Therefore, the Project has been assessed to have no effects that are likely to cause deterioration in WFD status or prevent waterbodies from achieving their WFD objectives, provided that best practice and established guidance is adhered to, in accordance with the embedded measures in **Table 10.8 of Chapter 10: Geology and Hydrogeology, Volume 5.2, Document 5.2.10** and **the draft CoCP, Appendix 5.3.3B, Volume 5.3, Document 5.3.3B.**

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