

# Appendix 10-7: Preliminary Public Water Supply Assessment

## Calderdale Energy Park

PEIR Volume 3

PINS Reference: EN0110023

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations  
2009 – Reg 5 (2) (a).

7 April 2026



## **Appendix 10-7: Public Water Supply Assessment**

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## 1 Introduction

This Public Water Supply Assessment is an Appendix to **Chapter 10: Hydrology, Hydrogeology, Geology and Peat** and has been prepared by Fluid Environmental Consulting (Fluid) on behalf of the Applicant to support the Preliminary Environmental Information Report (PEIR) for Calderdale Energy Park (the 'Proposed Development'). The PEIR Boundary is located to the north of Hebden Bridge and is illustrated within **Figure 10-2: Hydrological Setting** of the PEIR.

As set out in **Chapter 1: Introduction** of the PEIR, the Proposed Development includes a number of components and associated areas, as follows:

- Turbine Area, where the wind turbines and associated infrastructure will be located;
- Eastern Access Route and Western Access Route (collectively referred to as the 'Access Routes'), providing access to the Turbine Area; and
- Bradford West Cable Corridor, where the export cable will run from the Turbine Area to the Bradford West Substation to connect the wind turbines to the grid.

Altogether, these areas are termed the 'PEIR Boundary'. The extent of the PEIR Boundary is shown in **Figure 3-1** of the PEIR.

The Proposed Development will comprise 34 wind turbines, associated infrastructure and ancillary development.

This assessment covers an area including the PEIR Boundary and a surrounding ~1km buffer area (**Figure 10-9: Hydrological Features**) where hydrological connectivity to the PEIR Boundary is possible.

### 1.1 Environmental Context

The majority of the Proposed Development is located on undulating upland moorland and farmland. Upland areas reach heights of 463 m Above Ordnance Datum (AOD) at Heather Hill summit in the northwest of the Turbine Area and 452 m AOD at Withins Heights in the north. Several moors are named within the Turbine Area including Widdop Moor which covers the western portion of the Turbine Area and Wadsworth Moor covering the eastern portion of the Turbine Area. Heather Hill and Withins Heights slope down to the Walshaw Dean Reservoirs which run north south across the centre of the Turbine Area and at levels of between 300 m AOD and 335m AOD. Many of the watercourse draining the Turbine Area are connected to various manmade reservoirs. The hydrological features are presented in **Figure 10-9: Hydrological Features of Chapter 10: Hydrogeology, Hydrology, Geology and Peat** of the PEIR.

The geology across the Turbine Area comprises the Upper Kinderscout Grit, consisting of Sandstone, and the Millstone Grit Group, consisting of Mudstone, Siltstone and Sandstone. In the eastern part of the Turbine Area, these deposits are overlain by the Woodhouse Flags consisting of Sandstone and the Marsden Formation consisting of Mudstone and Siltstone. The Millstone Grit Group generally has low primary permeability due to the fine-grained nature of mudstones and siltstones; however, sandstone layers may allow limited groundwater movement where fractures are present. The coal seams and associated mining legacy within the Coal Measures Formation may create secondary permeability, providing preferential flow pathways for groundwater via historic underground mine workings and fractures.

The Western Access Route is underlain by the Rossendale Formation of mudstone and siltstone from where it joins the A6068, and along the Two Lane Road and Millstone Grit Formation strata to the Turbine Area. The Eastern Access Route is underlain by siltstones, mudstones and sandstones of the Marsden Formation, the Rossendale Formation and the Millstone Grit Formation.

The Bradford West Cable Corridor is underlain by bedrock of the Millstone Grit Formation, and mudstones, siltstones and sandstones of the Rossendale Formation and the Pennine Lower Coal Measures Formation.

Online 1:50K British Geological Survey (BGS) superficial geology mapping shows the majority of the Turbine Area is underlain by superficial peat deposits. Peat deposits are typically of low permeability in deeper, more humified layers, resulting in high surface water retention and limited recharge to the groundwater system. Where peat is shallower or more fibrous, higher permeability may occur locally.

Glacial Till is present along some sections of the Bradford West Cable Corridor. The Eastern Access Route is not underlain by any superficial deposits, however it passes through deep peaty soils, according to Natural England Peaty Soils Location data. A peat depth survey has not yet been carried out in this area and will be carried out before the ES. A section of the Western Access Route runs through areas of peat and Glacial Till is present in the section of the Western Access Route closest to the A6068.

## **1.2 Hydrological Setting**

The PIER Boundary features a drainage network with multiple watercourses flowing towards public supply reservoirs (**Figure 10-9: Hydrological Features**). The overall hydrological setting is presented in **Chapter 10: Hydrogeology, Hydrology, Geology and Peat**.

In the northern part of the Turbine Area, surface water drains towards the Walshaw Dean Reservoirs via Crow Hill Beck and several named and unnamed tributaries through the Walshaw Dean Valley. In the western part of the Turbine Area, water drains via a network of tributaries to Greaves Clough, where it is partially diverted to Widdop Reservoir via an underground conduit. Both the Walshaw Dean Reservoir and Widdop Reservoir discharge to Hebden Water, part of the Hebden Water catchment.

Additionally, in the northern part of the PIER Boundary, along the Western Access Route, surface water drains via an unnamed tributary to the Watersheddles Reservoir. From Watersheddles Reservoir, it drains to the River Worth via Ponden Reservoir before discharging into the River Aire, forming part of the River Aire Catchment.

## **1.3 Scope of Works**

The purpose of this Public Water Supply Assessment is to:

- Identify any Public Water Supplies (reservoirs) that could have a hydrological or hydrogeological link to the Proposed Development;
- Analyse the catchments of these reservoirs in relation to the Proposed Development, including identification of infrastructure located within the catchments;

- Identify areas within each catchment where peatland restoration can be undertaken, and evaluate how such measures may contribute to improving hydrological function and water quality;
- Assess potential effects on the water supply in downstream reservoirs associated with construction, operation and maintenance and decommissioning phases of the Proposed Development, including potential colouration of runoff — a known issue in upland developments such as wind farms;
- Inform the proposed infrastructure layout locations and design and construction planning in relation to catchment sensitivities;
- Recommend appropriate mitigation measures to reduce the likelihood of any adverse impacts; and
- Propose monitoring of key watercourses that contribute to Public Water Supply (reservoirs) to detect any changes in water quality (including colour) or flow throughout the construction, operational and maintenance and decommissioning phases.

#### **1.4 Limitations**

This assessment is based on publicly available data on Public Water Supply reservoirs, consultation with relevant authorities, hydrological and hydrogeological mapping, and peat habitat and condition mapping. While the locations of Public Water Supplies and catchment extents are well established, limitations include:

- Potential gaps in publicly available data regarding specific intake points, abstraction volumes, and flow dynamics within contributing catchments;
- Seasonal variations in water levels and flow conditions that may not be fully captured in the current assessment;
- Limited detail at this preliminary stage on construction methodologies and phasing, which constrains the ability to predict potential short-term effects, such as runoff colouration or sediment mobilisation;
- Uncertainty regarding the effectiveness and implementation timeline of proposed mitigation or peatland restoration measures, particularly where these intersect with sensitive catchments;
- Potential future changes in land use or catchment characteristics that could influence hydrological connectivity and water quality over time.

This assessment reflects the best available understanding at this preliminary stage. Additional information requests, site visits and studies are required to enable a comprehensive assessment, including:

- Further consultation with the respective water companies to understand their concerns, any water quality parameters that are problematic, any flow and water quality information available and to consult on mitigation measures and the specifics of a water quality monitoring plan related to their assets;
- Water monitoring and the development of a site-wide water monitoring plan to protect all sensitive hydrological receptors; and

- Input to design evolution to reduce potential effects and assist mitigation planning in relation to Public Water Supply catchments.

## 1.5 Legislation, Policy and Guidance

The main legislative drivers relevant to the assessment are:

- **The Water Industry Act 1991<sup>1</sup>:**

This Act sets out the responsibilities of water companies in England and Wales, including the duty to provide a secure and wholesome supply of water to the public. It also outlines powers for monitoring, enforcement, and protecting water sources from contamination.

- **The Water Supply (Water Quality) Regulations 2016<sup>2</sup>:**

These regulations set standards for water quality to ensure that water supplied for domestic or food production purposes is wholesome.

They apply to water companies and private suppliers, outlining requirements for sampling, testing, and maintaining water quality.

- **The Environment Agency's Approach to Groundwater Protection<sup>3</sup>:**

This guidance outlines the Environment Agency's (EA) position on protecting groundwater from pollution and over-abstraction.

It serves as a framework for assessing risks to groundwater and provides best practices for managing activities that may impact groundwater quality and quantity.

## 2 Public Water Supplies

The Public Water Supply reservoirs within the vicinity of the PEIR Boundary are in line surface water reservoirs that have been constructed to capture flows directly from surface watercourse.

The locations of these Public Water Supplies and their associated catchments based on the topography and hydrogeological regime are shown in **Figure 10-9**. There are 13 reservoirs within 1km of the PEIR Boundary, including:

- Walshaw Dean Upper Reservoir and the associated lower two reservoirs that are connected;
- Widdop Reservoir;
- Watersheddles Reservoir;
- Laneshaw Reservoir;
- Gorple Lower Reservoir;
- Warley Moor Reservoir;
- Leeming Reservoir;
- Thornton Moor Reservoir;

<sup>1</sup> **The Water Industry Act 1991, c.56**. Available at: <https://www.legislation.gov.uk/ukpga/1991/56/contents> (Accessed January 2026).

<sup>2</sup> **The Water Supply (Water Quality) Regulations 2016** – Available at: <https://www.legislation.gov.uk/uksi/2016/614/contents> (Accessed January 2026).

<sup>3</sup> **Environment Agency (2018). The Environment Agency's Approach to Groundwater Protection** – Available at: <https://assets.publishing.service.gov.uk/media/5ab38864e5274a3dc898e29b/Environment-Agency-approach-to-groundwater-protection.pdf> (Accessed January 2026).

- Hewenden Reservoir;
- Doe Park Reservoir; and
- An unnamed subsurface reservoir.

The majority of the reservoirs are managed by Yorkshire Water. However, Laneshaw Reservoir and the unnamed subsurface reservoir are managed by United Utilities. They are used for potable water supply and are associated with Water Treatment Plants in order to achieve water quality standards.

All the reservoirs are classified as having moderate ecological status. This classification is part of the Water Framework Directive<sup>4,5</sup>(WFD) assessment, which evaluates water bodies based on their ecological health.

A "moderate" ecological status means that the water body is functioning reasonably well but is somewhat impaired by human activities or environmental factors. While it can still support most aquatic life and habitats, certain pressures (such as nutrient enrichment, sedimentation, or pollution) are affecting the ecosystem. In the case of reservoirs, this could involve moderate impacts on aquatic flora and fauna, water chemistry, or sediment levels.

This status indicates that improvements can be made, and the proposed restoration measures, such as peatland restoration, aim to reduce disturbances and improve water quality

### 3 Public Water Supply Assessment Methodology

The Public Water Supply Assessment has been undertaken using a catchment-based approach and draws on the following key steps:

- **Identification of Relevant Catchments:** Public Water Supply reservoirs located within or downstream of catchments intersected by proposed infrastructure locations were identified through review of OS mapping and EA, and consultation with the Applicant.
- **Desktop Hydrological and Hydrogeological Assessment:** Existing mapping and site information were reviewed to understand surface water and groundwater flow paths within each catchment, as well as the proximity and nature of the proposed infrastructure that could interact with water supply routes.
- **Integration of Peat Condition Data:** The results of the peat condition assessment will be used to help characterise each catchment and to inform opportunities for peatland restoration measures, particularly where these could enhance the overall water quality entering supply reservoirs.
- **Catchment Walkovers and Field Observations:** Site visits will be undertaken to observe watercourse locations, assess connectivity between the proposed infrastructure locations and key inflows, and validate assumptions made in the desktop assessment. Particular attention will be given to identifying any locations where construction activities (e.g. watercourse crossings, cut-and-fill near sensitive drains) may influence runoff into reservoir catchments.

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<sup>4</sup> **Water Framework Directive (2000/60/EC)** Available at: <https://eur-lex.europa.eu/eli/dir/2000/60/oj>

<sup>5</sup> **The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.** Available at: <https://www.legislation.gov.uk/ukSI/2017/407>

- **Catchment Analysis and Preliminary Impact Review:** For each reservoir, an assessment was made of the proposed infrastructure present within the contributing catchment, the potential for hydrological or hydrogeological connectivity, the implications of peatland condition and restoration, and any anticipated construction-stage issues (e.g. changes to runoff colour or turbidity from disturbed soils or drainage).
- **Recommendations for Monitoring and Mitigation:** Where catchments include sensitive inflows, recommendations are made for construction phase monitoring of flow and water quality, and for targeted peatland restoration and mitigation where this could improve catchment resilience or reduce the risk of water quality impacts.

This methodology ensures that the assessment considers both the potential risks posed by the Proposed Development and the opportunities for environmental enhancement, particularly within peat-dominated upland catchments that support Public Water Supply reservoirs.

### 3.1 Desk Based Review

The desk-based assessment reviewed a range of secondary data sources to build a detailed understanding of the hydrological, hydrogeological, and peatland context for the Proposed Development. These sources were used to identify the contributing catchments to Public Water Supply reservoirs and evaluate the potential interactions between the proposed infrastructure, peat condition and surface water flow.

The assessment included:

- **Geological and Hydrogeological Information:** Data obtained from the British Geological Survey (BGS) and relevant hydrology and hydrogeology mapping was used to establish baseline conditions and evaluate the potential for subsurface flow pathways.
- **Catchment and Sub-Catchment Mapping:** Surface water catchment boundaries were delineated using OS mapping, topographic analysis, and existing reservoir supply data to determine which areas of the Proposed Development fall within key Public Water Supply catchments.
- **Peatland Habitat, Condition and Restoration Data:** Outputs from the site-specific peat condition assessment will be reviewed to help characterise the baseline state of the contributing catchments. This information will help to inform an understanding of potential improvements in catchment function through restoration and will be incorporated into the ES when available.
- **Assessment of Infrastructure:** The layout of the proposed infrastructure was overlaid with mapped catchments and peat data to evaluate spatial relationships and identify areas of potential interaction.

Further information on baseline hydrological, hydrogeological and peat conditions can be found in **Chapter 10: Hydrology, Hydrogeology, Geology and Peat** and other associated appendices in the PIER.

### 3.2 Consultations

Consultation was undertaken with Yorkshire Water and United Utilities to understand their concerns. Asset plans were provided by Yorkshire Water in November 2025 as GIS shapefiles and were purchased from United Utilities in December 2025. Further responses and information regarding the function of these assets are still awaited.

### 3.3 Site Visits

A site visit will be carried out to assess the Public Water Supplies potentially affected by the Proposed Development. The hydrological features within the catchments associated with the reservoirs will be examined along with the reservoir infrastructure and the location of proposed infrastructure in relation to inflows.

### 3.4 Assessment Method

The methodology for assessment of Public Water Supplies, including reservoirs and their associated tributaries, follows a tailored approach that considers the potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development. The approach is based on established assessment principles and incorporates Fluid's extensive experience in assessing potential effects on Public Water Supplies from large-scale developments such as wind farms.

Unlike private water supplies, which rely on specific, localised supply sources, Public Water Supplies and reservoirs are more complex systems, often involving multiple sources and extensive distribution networks. For this reason, the assessment of effects focuses on potential hydrological and hydrogeological connections between the Proposed Development and these supplies, considering the nature of the reservoirs, their inflows, and their proximity to the proposed infrastructure.

The Source-Pathway-Receptor conceptual model forms the core of the assessment of effects process for Public Water Supplies, as follows:

- **Source:** Refers to the water supply source, such as a reservoir or tributary, and any potential contamination sources related to the activities associated with the Proposed Development.
- **Pathway:** Refers to the mechanisms (e.g., surface water flows, groundwater movement, infrastructure) that could transmit contaminants from the proposed infrastructure locations to the water supply source.
- **Receptor:** Refers to the Public Water Supply system, including the reservoir and any related infrastructure that could be affected by contamination or disruption.

In cases where a hydrological or hydrogeological pathway links a potential contamination source to a Public Water Supply receptor, a pollutant linkage and associated risk are identified. Where there is no direct connection, such as in cases where the water supply is sufficiently distant or separated by natural barriers, there is no risk.

The key factors considered in the assessment include:

- Proximity of the water supply source (reservoir or tributary) to the nearest construction activities associated with the Proposed Development;

- Hydrological connectivity between the Proposed Development and the Public Water Supply system, taking into account surface water and groundwater flow dynamics; and
- Impact potential based on the nature of the works being undertaken, including excavation, construction, operational and maintenance and decommissioning activities, that could result in sedimentation, contamination, or disruption to the water supply.

For the assessment of Public Water Supplies and reservoirs, the assessment methodology assumes a worst-case scenario in terms of impact, considering the greatest potential disruption to water quality and quantity. The topographical and hydrogeological relationships between the Proposed Development and Public Water Supplies are critical in determining the likelihood and severity of potential impacts.

The assessment further takes into account the following:

- Type of water supply system (reservoir or tributary) and the potential for contamination, disruption or reduction of supply from construction;
- Distance and location of the water supply in relation to the construction works, considering both surface water and groundwater connectivity; and
- Catchment and flow dynamics, ensuring that any potential pollutants could be transported from the Proposed Development to the Public Water Supply sources.

This methodology ensures that the risk to Public Water Supplies is assessed in a robust and comprehensive manner, focused on the most likely and significant hazards based on proximity and hydrological connectivity to the Proposed Development. The preliminary findings are set out in **Chapter 10: Hydrogeology, Hydrology, Geology and Peat** of the PIER and will be presented in more detail in the ES.

### 3.5 Receptors

For Public Water Supplies, the receptors are primarily the water supply infrastructure and the populations that rely on the water for various uses, including domestic, commercial, industrial and agricultural purposes. The water supply systems are designed to serve large groups of consumers, often covering entire towns or districts, and providing water for potable drinking purposes, sanitation, irrigation, and industrial processes.

The most sensitive receptor category in this context is the human population that relies on the water supply for drinking and sanitation. As with private water supplies, it is assumed that any Public Water Supply system can be used for domestic potable supply unless specifically stated otherwise. In addition to the domestic consumption of drinking water, the water supply also supports other essential services and activities, including agriculture, livestock watering, and industrial uses, all of which could be impacted by changes to water quality or quantity.

The infrastructure of Public Water Supplies, including reservoirs, pumping stations, distribution networks and treatment plants, also constitutes a receptor. These systems rely on consistent, clean water supplies and could be affected by the construction, operational and maintenance and decommissioning phase activities associated with the Proposed Development. Impacts to these systems may disrupt water supply and treatment processes, potentially leading to service interruptions, changes in water quality, or additional treatment requirements.

As part of a conservative approach, the assumption is made that any Public Water Supply that could be affected by the Proposed Development may impact domestic potable water use, which is considered the most sensitive receptor. While industrial and agricultural uses may have some tolerance for temporary water quality changes, human consumption is the highest priority and most critical receptor in these assessments.

Thus, the assessment of effects for Public Water Supplies focuses primarily on protecting water sources, infrastructure, and human health, ensuring the continued safe delivery of potable water to all users.

### **3.6 Screening of Public Water Supplies**

The initial desk-based review of potential Public Water Supplies identified several reservoirs and associated watercourses potentially linked to the Proposed Development. A screening assessment was completed on these Public Water Supplies based on the available information, including the locations of reservoirs, watercourses and surrounding infrastructure.

The screening assessment focused on the proximity of Public Water Supplies and their associated infrastructure to the areas anticipated to be affected (e.g. disturbed) by the activities associated with the construction, operation and maintenance and decommissioning phases of the Proposed Development, in order to eliminate supplies that would not be hydrologically or hydrogeologically connected.

The screening exercise excluded Public Water Supplies where no potential hydrological or hydrogeological connectivity exists. This was determined through consideration of the following factors:

- Catchment boundaries and river or stream networks that may affect water flow and distribution;
- The properties of the underlying superficial and bedrock geology, which influence groundwater flow and aquifer connectivity;
- Dominant land uses within the area, which can impact both surface and groundwater movement;
- Topographical features, including the natural flow paths of water and elevation changes that could affect drainage and runoff; and
- Proximity to the proposed infrastructure.

Following this screening process, Public Water Supplies that are unlikely to be impacted by the Proposed Development were excluded from further assessment.

## **4 Assessment of Public Water Supplies Potentially Connected to the Proposed Development**

An assessment has been carried out for each identified Public Water Supply (reservoir) potentially connected to the Proposed Development. The following explains the logic for inclusion or exclusion of each reservoir in **Chapter 10: Hydrogeology, Hydrology, Geology and Peat**, based on hydrological and hydrogeological connectivity, as well as the presence of proposed infrastructure within each catchment. The reservoirs identified that are potentially

connected comprise the Walshaw Dean Reservoirs, Widdop Reservoir and Watersheddles Reservoir.

#### **Walshaw Dean Reservoirs:**

Walshaw Dean Upper, Middle and Lower Reservoirs are located centrally but outside of the PEIR Boundary, with the nearest proposed infrastructure 160m away. These three reservoirs are primarily fed by Crow Hill Beck, which originates from the northwest part of the Turbine Area and enters Walshaw Dean Upper Reservoir from the north, along with several smaller tributaries that drain the Walshaw Dean valley. The proposed infrastructure encroaches within 50m of a watercourse connected to this reservoir, indicating potential hydrological connectivity between the proposed infrastructure and the reservoir's water supply network.

The catchment area for the Walshaw Dean Reservoir is approximately 9,730,508 m<sup>2</sup> and within this catchment is the following proposed infrastructure:

- Fourteen Turbines (T05, T10, T11, T12, T13, T17, T19, T20, T21, T22, T23, T25, T28, T33) are fully located.
- Approximately half of the hardstanding for T27 and T32 lies within the catchment
- Approximately half of a construction compound lies within the catchment.
- Internal site access tracks run through the catchment, linking the turbine locations and other infrastructure.

In terms of area:

- The total proposed infrastructure footprint (including both temporary and permanent infrastructure) is approximately 493,211m<sup>2</sup>, representing about **5.07%** of the catchment. This does not include water management structures such as attenuation ponds associated with the drainage strategy.

#### **Widdop Reservoir:**

Widdop Reservoir is located to the southwest, outside the PIER Boundary, and forms part of the Public Water Supply network. The reservoir is primarily fed by Greaves Clough, which originates in northwest area of the Turbine Area, along with several smaller tributaries that feed Greaves Clough and an unnamed tributary to the west of the reservoir, outside of the Turbine area. Flows from Greaves Clough are partially diverted via an underground conduit to the eastern area of Widdop Reservoir.

The proposed infrastructure, including an internal site access track crossing Greaves Clough and infrastructure within 50m of a tributary feeding Greaves Clough, introduces potential hydrological connectivity between the Proposed Development and Widdop Reservoir. However, the distance from the nearest proposed infrastructure to the reservoir is approximately 1.13km, reducing the likelihood of a direct surface water connection.

The catchment area for the Widdop Reservoir is approximately 8,522,208m<sup>2</sup>. Within this catchment is the following proposed infrastructure:

- Nine Turbines (T01, T02, T03, T04, T06, T07, T08, T09, T14, T15);
- Over half of the hardstanding for T26 lies within the catchment;
- Approximately half of a construction compound lies within the catchment; and
- Internal site access tracks run through the catchment, linking the turbine locations and other infrastructure.

In terms of area:

- The total proposed infrastructure footprint (including both temporary and permanent infrastructure) is approximately 308,999m<sup>2</sup>, representing about **3.62%** of the catchment. This does not include water management structures such as attenuation ponds associated with the drainage management strategy.

#### **Watersheddles Reservoir:**

Watersheddles Reservoir is located to the north of the PIER Boundary, approximately 130m from the nearest proposed infrastructure. The reservoir is fed by Watersheddles Clough and several other unnamed tributaries. The Western Access Route, that links the existing road network to the Turbine Area, contains small sections encroaching to within 50m of tributaries that drain to the reservoir, introducing potential pathways for surface runoff or land disturbance that may indirectly affect the reservoir's inflow system.

The catchment area for the Watersheddles Reservoir is approximately 2,369,000m<sup>2</sup>. Within this catchment is the following proposed infrastructure:

- Western Access Route, from A6086 to Laneshaw Moor Road.

In terms of area:

- The total proposed infrastructure footprint (including both temporary and permanent infrastructure) is approximately 20,700m<sup>2</sup>, representing about 0.87% of the catchment. This does not include water management structures, described above, associated with the drainage strategy.

## **5 Hydrological and Water Quality Benefits of Peatland Restoration**

Restoration of degraded peatlands has been widely recognised as an effective nature-based solution for improving catchment health and safeguarding Public Water Supplies. Degraded peatlands, particularly where historic drainage or land use (such as mining or grazing) has led to bare or eroding peat, can contribute significantly to water discolouration and elevated dissolved organic carbon (DOC) levels in watercourses. These impacts can result in increased treatment requirements at downstream reservoirs and water treatment works. In addition to water quality improvements, restoration can deliver broader benefits, including erosion control, flow regulation, and habitat recovery.

Recent UK case studies demonstrate these benefits in comparable upland catchments, as follows:

- **Exmoor Mires Project (Southwest England):** Restoration of drained peatland across 714ha resulted in increased water storage capacity (approx. 260,000m<sup>3</sup>), reduced storm flow production to ~32% of pre-restoration levels, and a shallower groundwater table. While no significant reductions in DOC or colour concentrations were observed, lower peak flows are expected to reduce the overall flux of DOC entering downstream reservoirs, contributing indirectly to improved water quality management<sup>6</sup>.

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<sup>6</sup> NRW (2014). *Exmoor Mires Peatland Restoration*. Available online at: [Exmoor Mires peatland restoration, UK | Natural Water Retention Measures](#)

- **Holcombe Moor, Lancashire:** Restoration on National Trust land reduced peat erosion and helped retain rainfall, improving both water quality and flow buffering in the Irwell catchment<sup>7</sup>.
- **Ben Wyvis, Scotland:** Blocking of artificial drains and re-vegetation of eroded areas resulted in reduced sediment and DOC delivery to the River Peffery, which supplies local reservoirs<sup>8</sup>.

These examples support the wider evidence base that peatland restoration can contribute to reducing water quality pressures on Public Supply Reservoirs, particularly in upland areas with a legacy of land disturbance.

The peatland restoration measures that will be proposed will be included in the assessment of effects for each reservoir and will be detailed in the ES.

## 6 Conclusion

An assessment of hydrological connectivity has been conducted for the identified Public Water Supplies (reservoirs) potentially connected to the Proposed Development. Walshaw Dean, Widdop and Watersheddles Reservoirs have been included in the assessment due to the presence of infrastructure within their catchments and the potential for hydrological connectivity. These reservoirs are assessed further in **Chapter 10: Hydrogeology, Hydrology, Geology and Peat** of the PEIR, where associated likely significant effects and mitigation measures are evaluated in detail.

In addition to the proposed infrastructure, several areas within the reservoir catchments will be subject to peatland restoration. Restoration measures in these catchments potentially include i) areas of cutover peatland where peat has been physically removed over centuries, ii) two large dykes which appear to at least in part be responsible for linear gullying, iii) areas of local quarrying, and iv) potential creation of a peat storage area. Further design refinement will be undertaken post-PEIR and the final peat management solutions will be presented in the Environmental Statement (ES). In any event, the peat restoration measures are expected to enhance natural hydrological function, improve water quality, and contribute positively to the overall environmental condition of the catchments.

This approach ensures that the assessment focuses on all reservoirs with a realistic potential to be affected by the Proposed Development, while also considering areas where beneficial environmental outcomes are anticipated. Evidence from comparable UK catchments suggests that peatland restoration can contribute to improved raw water quality, primarily through reduced runoff rates and sediment transport. While direct reductions in dissolved organic carbon (DOC) and colour are not always consistent, the overall effect of restoration—such as slowing storm flows and increasing water retention—can help moderate the delivery of DOC and particulates to reservoir supplies, supporting long-term water treatment goals<sup>Error! Bookmark not defined.</sup>

<sup>7</sup> National Trust (2021). *Restoring Peat on Holcombe Moor and Stubbins Estate*. Available online at: [Peatland restoration Holcombe Moor | National Trust](#)

<sup>8</sup> NatureScot (2021). *Peatland Action Case Study: Ben Wyvis*. Available online at: [Peatland ACTION - Case studies | NatureScot](#)