Annexe 4 – Hewenden Reservoir, DP2022-NE0270016028

A. Summary of the proposal

Yorkshire Water Services Limited (YW) is applying for drought powers under the Water Resources Act 1991 (as amended by Environment Act 1995) to replace the conditions of Bradford Waterworks Act 1854. The Act requires a compensation release of water from Hewenden Reservoir at Denholme, West Yorkshire.

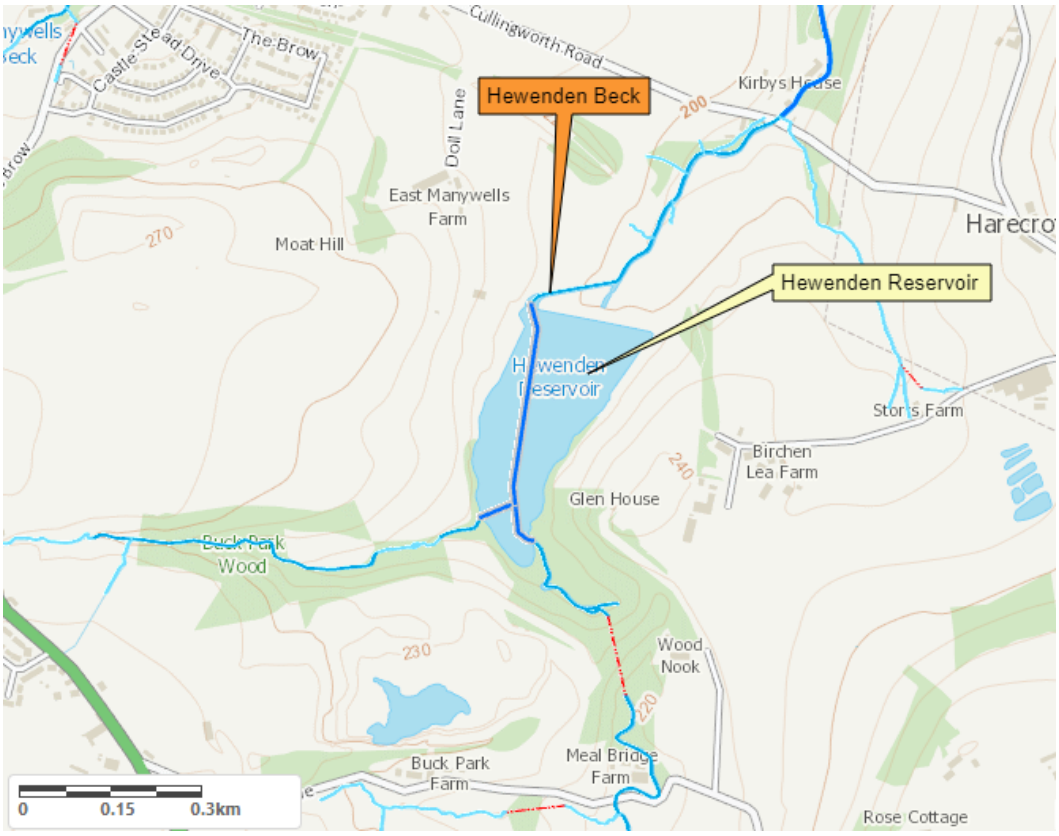

Figure 1: Hewenden Reservoir (Compensation Water Source) and Hewenden Beck (Receiving Watercourse)

Under the conditions of the Bradford Waterworks Act 1854, YW must provide a compensation release from Hewenden Reservoir to the Hewenden Beck. The Act requires the compensation release at the mill owner's discretion. The compensation release is currently operated under a flow trial agreement between YW and the Agency and YW are required to provide a continuous discharge of not less than 6.3 Ml/day.

YW are applying for a drought permit to reduce the compensation release required to 3.15 Ml/d, with a further reduction to 2.10 Ml/d if regional reservoir stocks were below the regional Drought Control Line (DCL) for four consecutive weeks or more as defined in the Yorkshire Water Drought Plan.

The reason for the proposal is to reduce the compensation flow from Hewenden Reservoir to conserve water levels to maintain public water supply during winter 2022–23 and increase the chance of returning to normal reservoir levels by April 2023. The drought permit has been requested until 31 March 2023.

B. Details of proposal

Impoundment details	Existing Licence	New Proposal
Name and/or description of inland water to be impounded	Hewenden Reservoir at Denholme, West Yorkshire	No change
Point of impoundment	SE 07400 35600	No change
Compensation release quantities	6.3 Ml/day	3.15 Ml/day with a possible further reduction to 2.10 Ml/day (if regional reservoir stocks were below the DCL for four consecutive weeks or more).
Other details	N/A	N/A

Drought permit further conditions

See section G for recommendations and monitoring details.

C. QUANTITES

Please see section B above for details of proposed changes to the compensation release quantities.

D. WFD

This application is outside the Abstraction Licensing Strategy process. This is because it relies on drought powers to address exceptional circumstances. However, the proposal still needs to be Water Framework Directive (WFD) compliant. The proposal will be assessed against the WFD statuses, including identifying the risk of any temporary deterioration of status.

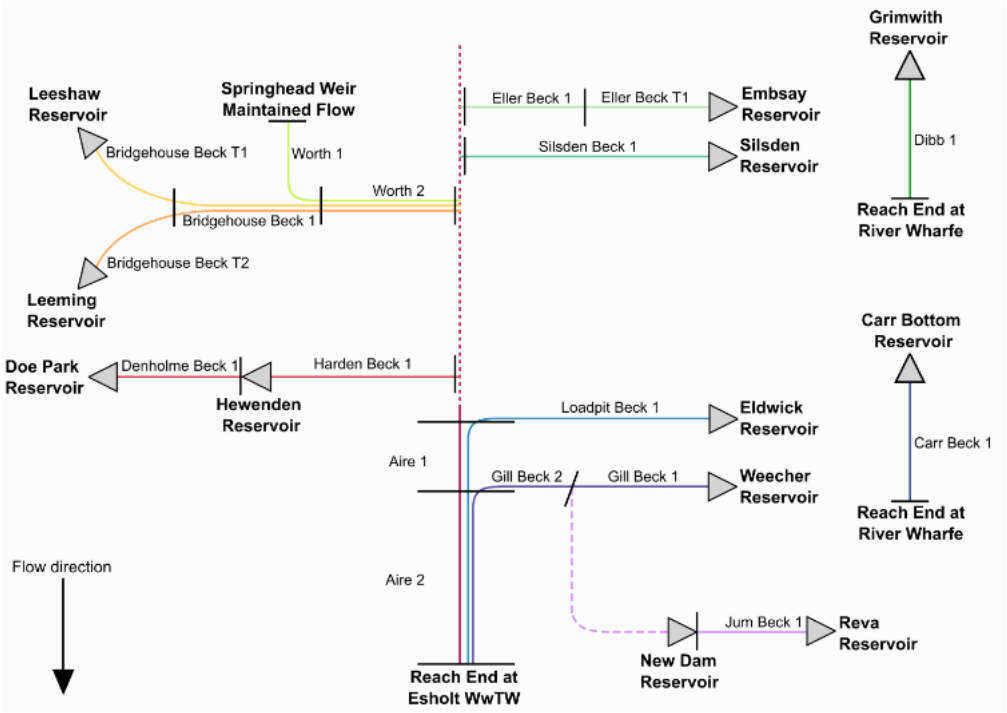

Figure 2: North West Area reservoirs drought permits reach schematic

Hewenden Reservoir is hydrologically linked to the following reaches (as shown above in Figure 2):

- Harden Beck 1 - Harden Beck from Source to River Aire, GB104027062870
- Aire 1 - Aire (R Worth to Gill Beck), GB104027063034
- Aire 2 - Aire from Gill Beck (Baildon) to River Calder, GB104027063032

The corresponding WFD waterbodies have therefore been assessed in relation to the Hewenden Reservoir drought option.

Harden Beck from Source to River Aire, GB104027062870

Harden Beck from Source to River Aire (GB104027062870) is classed as a heavily modified waterbody. These are water bodies where there is a significant risk of failing to achieve a good ecological status because of modifications to their hydro-morphological characteristics. Therefore, they have a target of achieving Good Ecological Potential (GEP) rather than Good Ecological Status (GES). For heavily modified water bodies, flow is the first element assessed as part of the classification. If flow standards are passed, then potential is based on a combination of mitigation measures and ‘non-sensitive’ quality elements. For river water bodies, these consist of the physico-chemical, specific pollutants and phytobenthos elements. If flow standards fail, then potential is based on the worst result of either the mitigation measures assessment or any of the quality element assessments.

Consideration	Status		
	Baseline status (2015)	**Cycle 2 current status (2019)**	**Cycle 2 Objective**
Overall WB status	Moderate (Quite Certain)	Moderate	Moderate by 2015
Ecological potential	Moderate (Quite Certain)	Moderate (Very Certain)	Moderate by 2015
Fish	Moderate (Uncertain)	Good	Good by 2027
Invertebrates	Good	Good	Good by 2015
Macrophytes and Phytobenthos Combined	Good	Moderate (Very Certain)	Good by 2015
Phytobenthos	Good	Moderate (Very Certain)	-
Hydrological regime	No data	Not assessed	Not set
Mitigation measures	Moderate/Less	Moderate/Less (Uncertain)	Moderate/Less by 2015
Physico-chemical	Moderate (Quite Certain)	Moderate (Quite Certain)	Moderate by 2015
Chemical	Good	Fail (Uncertain)	Good by 2015

Table 1: Harden Beck from Source to River Aire, GB104027062870 (Heavily Modified)

Reasons For Not Achieving Good:

Ecological Potential – The ecological potential is at moderate status and does not meet Good WFD status due to several contributing factors explained below.

Macrophytes and Phytobenthos – Macrophytes and Phytobenthos are currently at Moderate in this waterbody. This is due to nutrient and phosphate inputs. There is probable point source pollution from continuous discharge and poor nutrient management by the water industry and the agricultural sector respectively. Additionally, this status is also due to physical modification (probable) by an impoundment in position for the water industry.

Hydrological Regime – The hydrological regime element is not assessed for this surface water body, and therefore classification follows the pathway of flow conditions fail. Certain heavily modified waterbodies are no longer classified for hydrological regime where the hydrological regime test is not sufficient due to the nature of the waterbody. In this instance, ecological potential is based on the worst result of either the mitigation measures assessment or any of the quality elements.

Mitigation Measures – Hydrological Regime is currently at Moderate/Less, which is caused by the water industry by physical modification for the purpose of both drinking water supply and water regulation.

Physico-chemical - Physico-chemical is measured at Moderate at present. This is caused by phosphates, both from the water industry by confirmed point source pollution (continuous sewage discharge), and from the agricultural industry by probable diffuse source (poor nutrient management.

Chemical – The chemical status of this waterbody is Fail. This is due to Polybrominated diphenyl ethers (PBDE) (measures delivered to address the reason).

WFD objectives assessment:

- The objective for hydrology regime has not been set has the waterbody has not been assessed for flow.
- The objectives of Good by 2027 indicates the long-term ambition for the waterbodies as it is technically feasible to fix the issues, but these were not funded in the Cycle 2 plan. In the Cycle 3 plan these objectives will be revised and if the required fixes are still not funded the deadline could be extended again.
- Where we have a baseline (2015) status of 'Good' then our objective has been set as Good by 2015. This is because the waterbody is already meeting its default objectives, and nothing less than good can be predicted as this would go against the directive.
- Where we have an objective of 'Moderate by 2015' this particular waterbody cannot reach good status, only moderate. As the objective is already at moderate for physico-chemical it has an objective of 'Moderate by 2015'. This means the Ecological Potential and Overall Waterbody objectives are 'Moderate by 2015' as, because of the physico-chemical status, they cannot achieve higher than moderate.

Risk of deterioration of elements:

Harden Beck 1 - Harden Beck from Source to River Aire, GB104027062870

Fish – There are multiple risks to the fish status due to this drought option. Reduced flow and wetted width in the reach could damage or destroy important habitats used for spawning, nurseries and resting. Reduced flows could also impact the migration of species, particularly to spawning and nursery areas. Increased stress and competition could result in decreased growth, morphological change and/or alteration to feeding and migration. There is also the risk of stranding events due to potential decreases in longitudinal connectivity. Increased predation due to lower flows could increase mortality of fish species. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a moderate risk to the WFD status in waterbody GB104027062870 Harden Beck from Source to River Aire (associated with Harden Beck 1). The duration of impacts could be up to 6 months. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be moderate.

Invertebrates – YW's EAR explains that there are multiple ways this drought permit could impact upon invertebrates within this waterbody. Reductions in river flow will

cause a reduction in wetted width and depth, reducing habitat availability for the invertebrates. Some species are sensitive to changes in velocity and a loss of flow velocity could reduce habitats within the waterbody that require high flow velocities. Furthermore, invertebrates are sensitive to water quality pressures. Water quality deterioration as a result of the drought option may potentially have a medium-term chronic, regular, temporary water quality pressures downstream of Harecroft wastewater treatment works. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a major risk to the macroinvertebrate component of the GB104027062870 Harden Beck from Source to River Aire waterbody (associated with Harden Beck 1). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be moderate.

Macrophytes and Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.

Hydrological Regime – Not assessed.

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Physico-chemical – There are 3 water quality monitoring points in Harden Beck 1, as such the location with the highest data quality, Harden Beck at Harden has been used. There is one continuous discharge YWSL Harecroft WwTW, which could cause a significant risk to dissolved oxygen and total ammonia in this reach (acute toxicity of ammonia, suffocation from oxygen sags). There are no intermittent discharges in the reach. There is a moderate risk from drought options associated with reduction in dilution of WwTW. There is a minor risk from this drought option in relation to phosphates.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a risk to physico-chemical parameters then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

Aire (R Worth to Gill Beck), GB104027063034

Aire (River Worth to Gill Beck) GB104027063034 is classed as a heavily modified waterbody. The implications of this in relation to the waterbody's ecological status are explained above in 'Harden Beck from Source to River Aire, GB104027062870'.

Consideration	Status		
	Baseline status (2015)	**Cycle 2 current status (2019)**	**Cycle 2 Objective**
Overall WB status	Moderate (Very Certain)	Moderate	Moderate by 2015
Ecological potential	Moderate (Very Certain)	Moderate (Very Certain)	Moderate by 2015
Fish	Moderate (Very Certain)	Moderate (Very Certain)	Good by 2027
Invertebrates	Moderate (Quite Certain)	Good	Good by 2027
Macrophytes	No data	No data	Not set
Phytobenthos	No data	No data	Not set
Hydrological regime	No data	Not assessed	Not set
Mitigation measures	Moderate/Less	Moderate/Less (Uncertain)	Good by 2027
Physico-chemical	Moderate (Very Certain)	Moderate (Very Certain)	Moderate by 2015
Chemical	Good	Fail (Uncertain)	Good by 2015

Table 2: Aire (R Worth to Gill Beck), GB104027063034 (Heavily modified)

Reasons For Not Achieving Good

Ecological Potential – The ecological potential is at Moderate status and does not meet Good WFD status due to several contributing factors explained below.

Fish – The fish status is currently at 'Moderate' (very certain)' due to morphology changes from urban development, sediment issues due to poor soil management from agriculture and organic point source pollution (sewage discharge) from the water industry. Nutrients/phosphates which can mostly likely be attributed to continuous discharge from the water industry.

Macrophytes and Phytobenthos – The Macrophytes/Phytobenthos statuses currently have no data. This is due to them not being suitable parameters for this waterbody to assess ecological potential.

Hydrological regime – The hydrological regime element is not assessed for this surface water body, and therefore classification follows the pathway of flow conditions fail. Certain heavily modified waterbodies are no longer classified for hydrological regime where the hydrological regime test is not sufficient due to the nature of the waterbody. In this instance, ecological potential is based on the worst result of either the mitigation measures assessment or any of the quality elements.

Mitigation Measures Assessment – Mitigation measures are Moderate/Less due to physical modification for public water supply and water regulation by the water industry and due to urbanisation by the urban and transport industry.

Physico-chemical –The physico-chemical status is Moderate (very certain) due to phosphate pollution. This is attributed to point source pollution from the water industry (sewage discharge) and diffuse pollution from poor soil management in the agriculture sector.

Chemical – The chemical status is Fail. This is due to levels of PFOS, Perfluorooctane sulphonate (PFOS) Polybrominated diphenyl ethers (PBDE), Mercury. No pressure has been defined for this in Cycle 2.

WFD objectives assessment:

- The objective for hydrology regime has not been set has the waterbody has not been assessed for flow.

- The objective for macrophytes and phytobenthos has not been set.

- The objectives of Good by 2027 indicates the long-term ambition for the waterbodies as it is technically feasible to fix the issues, but these were not funded in the Cycle 2 plan. In the Cycle 3 plan these objectives will be revised and if the required fixes are still not funded the deadline could be extended again.

- Where we have a baseline (2015) status of 'Good' then our objective has been set as Good by 2015. This is because the waterbody is already meeting its default objectives, and nothing less than good can be predicted as this would go against the directive.

- Where we have an objective of 'Moderate by 2015' this particular waterbody cannot reach good status, only moderate. As the objective is already at moderate for physico-chemical it has an objective of 'Moderate by 2015'. This means the Ecological Potential and Overall Waterbody objectives are 'Moderate by 2015' as, because of the physico-chemical status, they cannot achieve higher than moderate.

Risk of deterioration of elements:

Aire 1 - Aire (River Worth to Gill Beck) GB104027063034

This WFD waterbody is downstream of several waterbodies that will be impacted by the reduction in compensation flow due to the drought permits in the North West area. The EAR produced by YW has assessed the impact on this waterbody in terms of all these drought permits being in place and utilised together. Thus, the assessment in this annex is for the combined flow reduction on the River Aire with all drought permits in place. This would represent the worst-case scenario for WFD.

The maximum combined flow reduction on the River Aire at this WFD waterbody downstream of the Loadpit Beck 1 confluence, with all seven drought permits in place, is 16.64Ml/d.

Fish – The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a moderate risk in summer/autumn and a minor risk in winter to the WFD status in waterbody WFD GB104027063034 Aire (River Worth to Gill Beck) (associated with Aire 1). The duration of impacts could be up to 6 months.

Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be minor.

Invertebrates – The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a moderate risk in summer/autumn and a minor risk in winter to the macroinvertebrate component of the GB104027063034 Aire (River Worth to Gill Beck) waterbody (associated with Aire 1). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be minor.

Macrophytes and Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.

Hydrological Regime – Not assessed.

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Physico-chemical – Risk of short term acute, infrequent, temporary water quality pressures locally downstream of three listed CSOs during rainfall events. There are no continuous water quality pressures identified as presenting increased risk with drought options implemented. There is a moderate risk from drought options associated with change in dilution of diffuse pollution pressures and the CSO discharges.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a moderate risk to physico-chemical parameters associated with a reduction in dilution then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

Aire from Gill Beck (Baildon) to River Calder, GB104027063032

Aire from Gill Beck (Baildon) to River Calder GB104027063032 is classed as a heavily modified waterbody. The implications of this in relation to the waterbody's ecological status are explained above in 'Harden Beck from Source to River Aire, GB104027062870'.

Consideration	Status		
	Baseline status (2015)	**Cycle 2 current status (2019)**	**Cycle 2 Objective**
Overall WB status	Moderate (Very Certain)	Moderate	Moderate by 2015

Consideration	Status		
	Baseline status (2015)	**Cycle 2 current status (2019)**	**Cycle 2 Objective**
Ecological potential	Moderate (Very Certain)	Moderate (Very Certain)	Moderate by 2015
Fish	No Data	No Data	Not set
Invertebrates	Moderate (Very Certain)	Moderate (Very Certain)	Good by 2027
Macrophytes & Phytobenthos Combined	Poor (Very Certain)	Poor (Very Certain)	Not assessed
Hydrological regime	Supports Good	Supports Good	Supports Good by 2015
Mitigation measures	Moderate/Less	Moderate/Less (Uncertain)	Good by 2027
Physico-chemical	Moderate (Very Certain)	Moderate (Very Certain)	Moderate by 2015
Chemical	Good	Fail (Certain)	Good by 2015

Table 3: Aire from Gill Beck (Baildon) to River Calder, GB104027063032 (Heavily Modified)

Reasons For Not Achieving Good:

Ecological Potential – The ecological potential is at moderate status and does not meet Good WFD status due to several contributing factors explained below.

Fish – The fish status has no data. This is due to uncertainties relating to the fish community within the waterbody as limited survey data is available.

Invertebrates – The invertebrate status is Moderate (very certain). This is due to point source pollution (ammonia) from sewage discharge from the water industry. It is also due to changes in morphology as a result of urban development.

Macrophytes and Phytobenthos –The Macrophytes/Phytobenthos status is Poor (very certain). No pressure has been identified in Cycle 2 for this status.

Mitigation Measures Assessment – Mitigation measures are Moderate/Less due to physical modification for public water supply and water regulation by the water industry and due to urbanisation by the urban and transport industry.

Physico-chemical – The physico-chemical status is Moderate (very certain) due to phosphate pollution. This is attributed to point source pollution from the water industry (sewage discharge) and diffuse pollution from poor soil management in the agriculture sector.

Chemical – The chemical status is Fail. This is due to levels of Diazinon due to the water industry and mercury, PFOS, PBDE with no pressure defined in Cycle 2.

WFD objectives assessment:

- The objective for fish was not set.
- The objective for macrophytes and phytobenthos was not assessed.
- The objectives of Good by 2027 indicates the long-term ambition for the waterbodies as it is technically feasible to fix the issues, but these were not funded in the Cycle 2 plan. In the Cycle 3 plan these objectives will be revised and if the required fixes are still not funded the deadline could be extended again.
- Where we have a baseline (2015) status of 'Good' then our objective has been set as Good by 2015. This is because the waterbody is already meeting its default objectives, and nothing less than good can be predicted as this would go against the directive.
- Where we have an objective of 'Moderate by 2015' this particular waterbody cannot reach good status, only moderate. As the objective is already at moderate for physico-chemical it has an objective of 'Moderate by 2015'. This means the Ecological Potential and Overall Waterbody objectives are 'Moderate by 2015' as, because of the physico-chemical status, they cannot achieve higher than moderate.

Risk of deterioration of elements:

Aire 2 - Aire from Gill Beck (Baildon) to River Calder, GB104027063032

Fish – The fish community element of GB104027063032 Aire from Gill Beck (Baildon) to River Calder (associated with Aire 2) is not classified, the risk to deterioration of the WFD status of the waterbody is considered to be minor.

Invertebrates – The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a minor risk to the macroinvertebrate component of the GB104027063032 Aire from Gill Beck (Baildon) to River Calder waterbody (associated with Aire 2). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be minor.

Macrophytes and Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.

Hydrological Regime – The maximum combined flow reduction on the River Aire downstream of the Gill Beck 1 confluence, with all eight drought permits in place, is therefore 16.64 Ml/d. Based on the estimated flow statistics for this reach, this represents a reduction of 12% and 17% in the summer Q95 and Q99 flow statistics, which is assessed as a moderate hydrological impact on this reach in summer and

autumn months. The reduction in year-round Q95 and Q50 is 11% and 2.8% respectively, which is assessed as a minor hydrological impact during winter months associated with winter refill periods.

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Physico-chemical – There are no sampling locations in Aire 2, the next sample downstream of this reach, Aire at Apperley (NE-49400676), has been used. There are no significant continuous or intermittent discharges into Aire 2. The EAR reports minor risk from drought options to total ammonia, oxygen and phosphates.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a risk to physico-chemical parameters then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

Risk of Deterioration: A summary for all Reaches

Although YW EAR identifies that there is a possible moderate or major risk to certain WFD elements as a result of this drought option (Fish, Invertebrates, Physico-chemical, Chemical), we are satisfied that the monitoring and mitigation conditions included within the drought permit mitigates any possible risk of deterioration in the status of WFD elements (Fish, Invertebrates, Physico-chemical, Chemical). If the monitoring schedule identifies any impacts to the WFD elements as a result of this drought permit, then reactive mitigation will be carried out, dependent on the problems identified. Additionally, should any environmental problems be identified, YW will increase their compensation flows as laid out in the relevant permit.

E. Impact on ecology and conservation sites

Conservation sites

The sites, species and habitats listed in the table below are within the 6.7 km reach from the point of the compensation release at Hewenden Reservoir to the cumulative reach of the River Aire.

The River Aire downstream of that confluence has potential to be cumulatively affected by reservoirs in YW's North West area reservoir group. Please refer to the main determination report for this group of reservoirs for further details.

Nearest conservation sites (distance searched – 6.7 km downstream)			
Designation types	**Name of site**	**Distance downstream**	**Potential Impact**
Special Areas of Conservation (SACs)	None	N/A	N/A
Ramsar sites	None	N/A	N/A

Special Protection Areas (SPAs)	None	N/A	N/A
Sites of Special Scientific Interest (SSSIs)	None	N/A	N/A
Groundwater Dependent Terrestrial Ecosystems (GWDTEs) that are not designated as SSSIs	None	N/A	N/A
National Nature Reserves (NNRs)	None	N/A	N/A
Local Nature Reserves (LNRs)	None	N/A	N/A
Ancient Woodland	Goitstock, Crag, Lt and Gt Ridge Woods	0.7 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors.
	Cottingley Wood	4.6 km	
Scheduled Ancient Monuments (SAMs)	None	N/A	N/A
Local Wildlife Sites (LWS)	Hewenden Wood, Cullingworth	0.8 km	The sites are unlikely to be in hydrological connectivity with impacted reach or support aquatic receptors.
	Goistock Woods and Grasslands	1.2 km	
	Cottingley Woods – Black Hills	3.5 km	
National Parks	None	N/A	N/A
Areas of Outstanding Natural Beauty (AONBs)	None	N/A	N/A
Heritage Coast	None	N/A	N/A
Restoring Sustainable Abstraction (RSA) Programmes	None	N/A	N/A
Protected Species	Bullhead *	3.5 km	Impact on this species has been assessed in YW's Environmental Assessment Report (EAR) and appropriate monitoring and mitigation has been

			included in Appendix A.2.
	Brown/sea trout *	4.7 km	Impact on this species has been assessed in YW's EAR and appropriate monitoring and mitigation has been included in Appendix A.2.
Protected Habitats	Deciduous woodland *	0.3 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors.
Invasive Non-native Species	Himalayan balsam	At site	The implementation of this drought option is not anticipated to increase the spread of Invasive non-native species.
	Japanese knotweed *	1.3 km	
	Rhododendron ponticum ponticum	1.4 km	

Table 4: Conservation screening results
* There are several records within the screening distance for this feature, but only the closest record to the discharge point has been recorded in this table.

Protected fish species
There is a pathway for the drought permit to impact on fish species in the identified impacted reach. This has been assessed in YWs EAR and we agree with this assessment and the proposed monitoring and mitigation plan. Mitigation is set out in YW's EAR Appendix A.2 and this will be included on the drought permit.

Monitoring and mitigation
YW will be required to carry out the following monitoring and mitigation measures (which will be included in Appendix 1 and 2 of the Drought Permit):

Monitoring:
- IDMON_1: Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems at the following locations, as per YW's "EMP North West Area Appendix":
  - Hewenden /Harden Beck between SE 10100 38598 and SE 10500 38455
  - Between SE 131233 8376 and SE 13675 38239 (Aire 1)
  - Between SE 17481 39782 to SE 18025 40113 (Aire 2).
- IDMON_2: Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows at 2 sites:
  - Harden Beck, 10m upstream; and
  - at least 100m downstream of the Harecroft WwTW discharge outfall at SE 07800 35900.
- Upon finding any signs of environmental problems the water company shall:
  i) notify the Agency in writing and by telephone on 0800 80 70 60 and shall provide details of the signs of distress and the location;

ii) the water company shall undertake a remedial course of action to address the signs of environmental problems, as directed in writing by the Agency.

- IDMON_3: The additional monitoring and maintenance activities, specified in the Combined Sewer Overflows (CSO's) Optimisation and Maintenance for Drought Plan 2022, shall be applied by the Water Company to the following combined sewer outfall assets, in accordance with Appendix A of the same plan;
    i) Buck Mill Lane CSO, at discharges into Brackendale Beck at National Grid Reference SE 16893 38881.
    ii) Dock Lane CSO, discharges to Bradford Beck at National Grid Reference SE 15161 37590
    iii) Coach Road CSO, discharges into River Aire at National Grid Reference SE 14449 38149.

  As agreed in writing by the Agency, any combined sewer overflow assets not identified in Appendix A, but subsequently deemed by the Water Company or the Agency to risk adverse impact to a watercourse while compensations flows are reduced.

Mitigation:

- If, upon being notified of any signs of environmental problems, the Agency gives written notice that there is a disruption to the ecology, the water company shall increase compensation flow from Hewenden Reservoir to Hewenden Beck at National Grid Reference SE 07456 35732 to a rate of not less than 6,300 cubic metres per day, or a lesser quantity if agreed in writing by the Agency.
- The increase in compensation flow to Hewenden Beck shall continue until the Agency serves a subsequent written notice stating that the reduction in compensation flow in accordance with conditions of this drought permit may be resumed.
- The changes to the compensation water specified in the conditions of this drought permit shall be made in a steady and controlled manner at a rate so as not to cause any flooding of land or disturbance to water users downstream or any adverse effects on the quality of water in the inland water or any adverse impacts on the ecology of the inland water or dependent ecosystems, as specified in measures IDMIT_6 and IDMIT_7 in the water company's "EMP North West Area Appendix".
- ***Freshet flows condition:***
  The water company shall make a release of compensation water for 24 continuous hours each week if the Agency notifies them in writing that additional flow is needed to support spawning for trout and salmon species. These releases of compensation water are referred to here as "freshet flows" IDMIT_9 in the water company's "EMP North West Area Appendix". The freshet flows shall take place between 1 October 2022 and 27 March 2023 inclusive or shorter period if notified in writing by the Agency. The Agency may agree a lesser duration and frequency for each freshet flow. The freshet flow shall be not less than 6,300 cubic metres per day, from Hewenden Reservoir to Hewenden Beck at National Grid Reference SE 07456 35732.

F. Measurement

The impoundment and discharge from Hewenden Reservoir is authorised under the Bradford Waterworks Act 1854. There will be no change to the way the discharge is measured as part of this drought permit.

G. Recommendations

Based on the conclusions of the main determination report (section 14), the Agency has decided to grant a drought permit under section 79A of the Water Resources Act 1991 subject to conditions, as drafted and attached to this report. The drought permit will suspend the provisions under the Bradford Waterworks Act 1854 during any period in which YW can abstract under the conditions of the drought permit.

The drought permit will be time limited to 31 March 2023 and will include the following conditions along with appendices detailing the monitoring and mitigation requirements.

Condition	**Source of the condition wording**
1.1 (i) Compensation Flow	Compensation flow reduced. Condition has been legally approved.
1.2 (ii) Compensation Flow	Compensation flow when regional reservoir stocks are below the Drought Control Line (as defined in YW Drought Plan 2022) for more than four consecutive weeks. Condition has been legally approved.
The following conditions will be included for environmental monitoring and mitigation. They have all been legally approved.	
2.1	Condition requiring YW to follow the monitoring set out in Appendix 1 of drought permit.
2.2	Mitigation actions to be undertaken by YW if environmental problems identified.
2.2.1 (i)	YW must notify Agency of any environmental problems.
2.2.1 (ii)	YW must formulate remedial course of action to address problems.
2.2.2	YW must increase compensation flow.
2.3	All changes to compensation flow must be made in a steady and controlled manner.
2.4	Freshet flows condition.
2.5	Combined Sewers Overflow condition.
3.1	Drought permit only relied upon if Temporary Use Ban restrictions imposed and in force.

Table 5. Recommendations for permit conditions.