

River Flow Regime 2 10 8 Q50 = Q95 = Q95 = Qs95 = Qs95

-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	6.30	2.08	67	Summer
Q _s 99	6.30	2.08	67	Major
Q95	6.30	2.08	67	Winter
Q50	6.30	2.08	67	Major

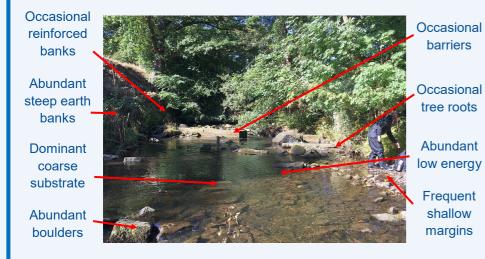
There are no significant flow additions/ reductions associated with this reach

Reach Setting Information:

The superficial geology is composed of alluvium in the lower sections of the channel and surrounded by glacial till with some scattered hummocky glacial deposits. River terrace deposits are present prior to the confluence with the River Aire. Soil types are composed of freely draining, slightly acid loamy soils in the upper section of the reach and slowly permeable, seasonally wet acid loamy and clayey soils to the confluence with the River Aire. Urbanisation is limited.

	Supplementary Information
Catchment Area at Assessment Point	12.0km ²
Mean Slope Gradient	1.1°
Length of Reach	6.3km
Additional Catchment Area	21.9km ²
Upstream Reach	N/A
Downstream Reach	N/A

River Habitats



Dominant riparian **Abundant** shading relatively steep earth Frequent tree banks roots requent **Dominant** boulders coarse substrate Occasional bars **Dominant low**

River Water Quality

There are no significant water quality pressures associated with this reach

There are 3 water quality monitoring points in Harden Beck 1, as such the location with the highest data quality, Harden Beck at Harden (NE-49400457), has been used. The average pH between 2014-2023 was 8.0 with a maximum temperature of 16.9°C for the same period.

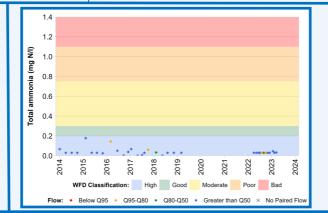




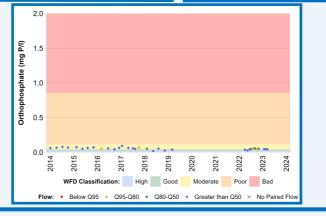
Figure A4.14

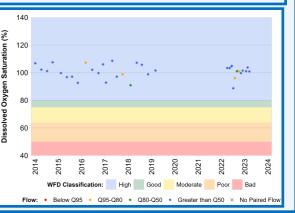
Harden Beck 1

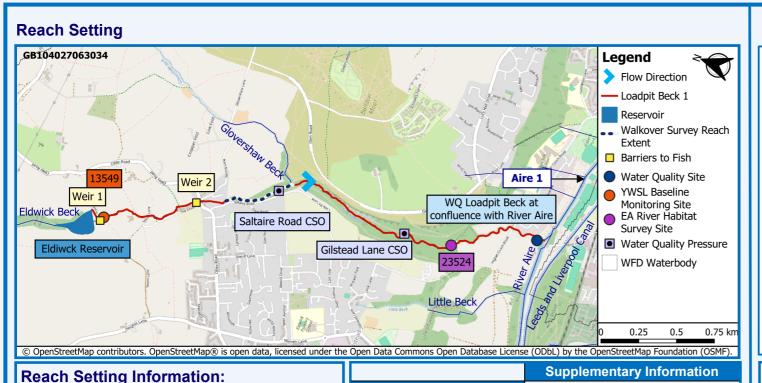
Physical Environment Information



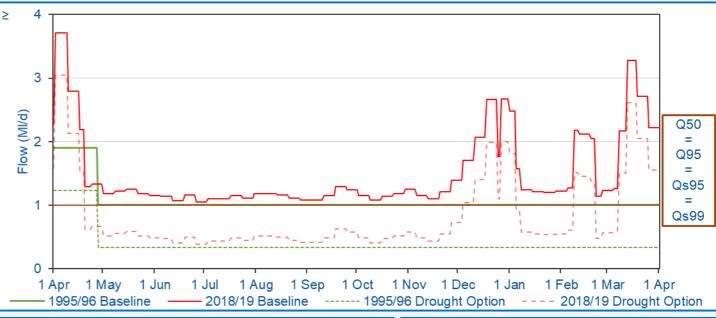
energy flows







River Flow Regime

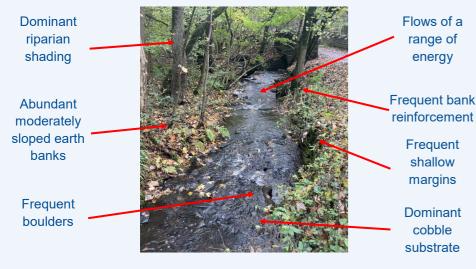


-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	1.00	0.33	67	Summer
Q _s 99	1.00	0.33	67	Major
Q95	1.00	0.33	67	Winter
Q50	1.00	0.33	67	Major

There are no significant flow additions/ reductions associated with this reach

River Habitats

confluence with the River Aire.



The superficial geology is composed of glacial till with some

confluence with the River Aire. Soil types in the reach are

composed of slowly permeable, seasonally wet acid loamy

and clayey soils. Urbanisation is very limited throughout

the reach with the reach passing through Eldwick and a

small urban development on the left bank prior to the

scattered hummocky glacial deposits around the

Frequent shallow

Catchment Area at

Assessment Point

Mean Slope Gradient

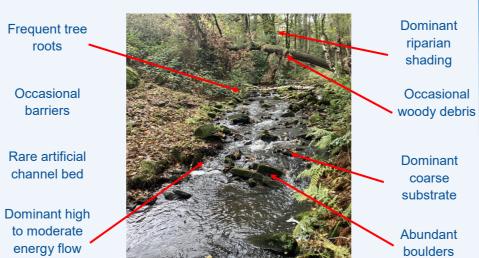
Length of Reach

Additional Catchment Area

Upstream Reach

Downstream Reach

Dominant cobble substrate



 3.5km^2

2.1°

3.4km

5.3km²

N/A

River Aire 1

River Water Quality

Significant Water Quality Pressures	Permit Conditions
Gilstead Lane 128/CSO	Intermittent discharge
Saltaire Road /NO 2 CSO	Intermittent discharge

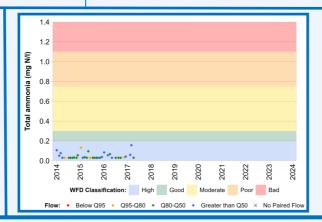
There is one water quality monitoring site, Loadpit Beck at Confluence with River Aire (NE49400555), has been used. The average pH between 2014-2023 was 7.9 with a maximum temperature of 16.6°C for the same period. This site does not include any samples for phosphate or ammonia. As such, a water quality site from the neighbouring Gill Beck (Baildon) At Otley Road Bridge (NE49405107), has been used as a representative example for these determinands, due to its similarities in catchment characteristics

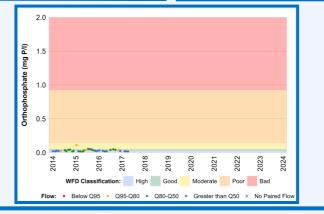


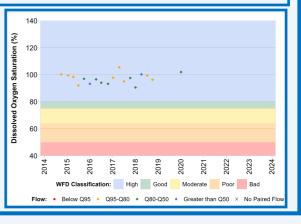


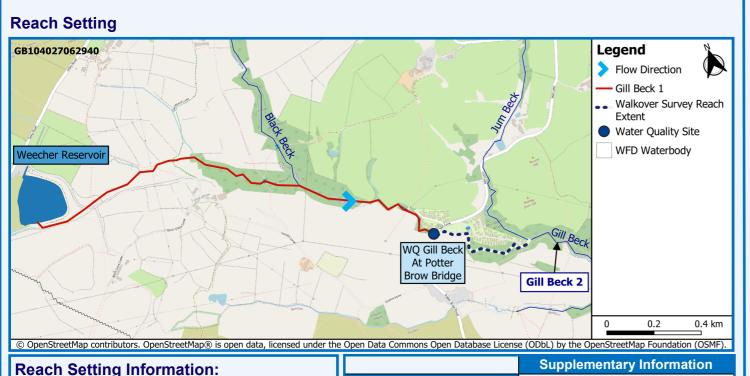
Figure A4.15

Loadpit Beck 1

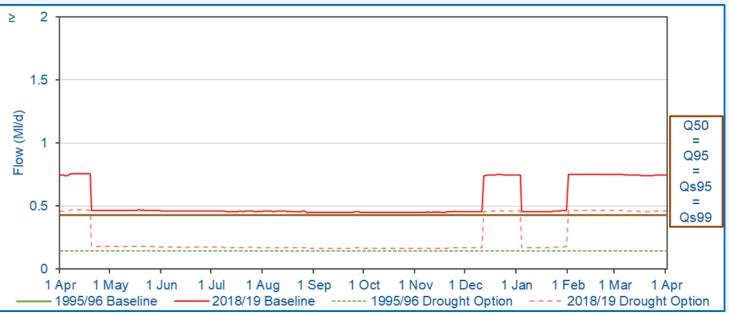








River Flow Regime



-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	0.43	0.14	67	Summer
Q _s 99	0.43	0.14	67	Major
Q95	0.43	0.14	67	Winter
Q50	0.43	0.14	67	Major

There are no significant flow additions/ reductions associated with this reach

River Habitats

Abundant riparian vegetation
Abundant steep banks
Occasional high energy flows
Free to the second steep to

The superficial geology is composed of glacial till with some

alluvium beneath the reach and scattered hummocky

glacial deposits. Soil types in the reach are composed of

slowly permeable, seasonally wet acid loamy and clayey

soils adjacent to the reservoir outflow and freely draining,

slightly acid loamy soils to the end of the reach. There is

very limited urbanisation along the reach.

Occasional anthropogenic features

Step-pool

Catchment Area at

Assessment Point

Mean Slope Gradient

Length of Reach

Additional Catchment Area

Upstream Reach

Downstream Reach

Abundant

moderate energy flows

Frequent bars



1.3km²

3.1°

2.4km

5.8km²

N/A

Gill Beck 2

River Water Quality

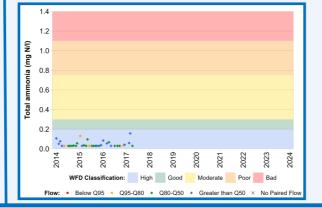
There are no significant water quality pressures associated with this reach

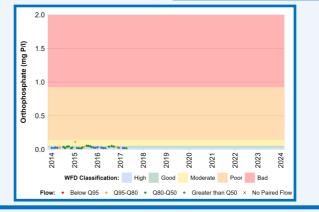
There is one sample point in this reach, Gill Beck at Potter Brow Bridge (NE49405107), however the data is highly limited, as such the first location in the downstream reach (Gill Beck 2), Gill Beck (Baildon) At Otley Road Bridge (NE49400999), has been used. The average pH between 2014-2023 was 7.9 with a maximum temperature of 15.1°C for the same period.

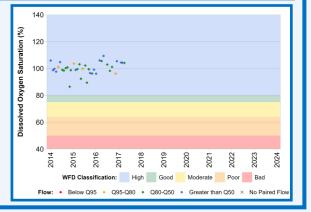


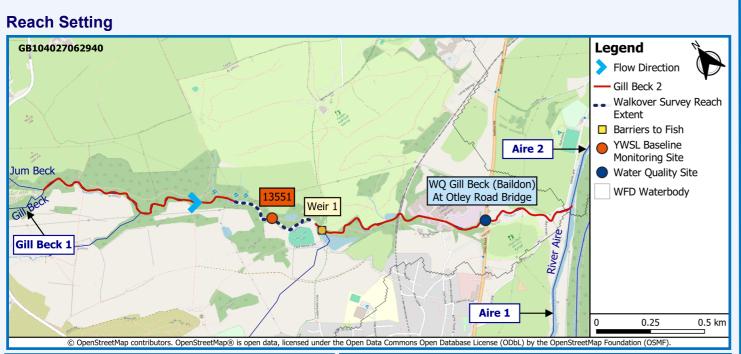


Figure A4.16
Gill Beck 1









Catchment Area at

Assessment Point

Mean Slope Gradient

Length of Reach

Additional Catchment Area

Upstream Reach

Downstream Reach

River Flow Regime 2 20 15 Q50 Q95 Q95 Q 99 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr 1995/96 Baseline — 2018/19 Baseline ————1995/96 Drought Option ———2018/19 Drought Option

-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	2.06	1.77	14	Summer
Q _s 99	1.64	1.35	17	Moderate
Q95	2.26	1.97	13	Winter
Q50	8.08	7.79	3.5	Minor

There are no significant flow additions/ reductions associated with this reach





Supplementary Information

 8.3km^2

1.5°

4.0km

5.6km²

Gill Beck 1

River Aire 2

River Water Quality

There are no significant water quality pressures associated with this reach

There is water quality monitoring site in Gill Beck 2: Gill Beck (Baildon) At Otley Road Bridge (NE49405107). The average pH between 2014-2023 was 7.9 with a maximum temperature of 15.1°C for the same period.



Reach Setting Information:

downstream

The superficial geology is composed of glacial till with some

alluvium beneath the reach and scattered hummocky glacial deposits. Soil types in the reach are composed of

permeable, seasonally wet acid loamy and clayey soils

around the confluence with the River Aire. Suburban/urban

~1.0km downstream and an industrial complex at ~3.2km

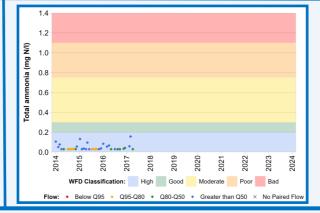
freely draining, slightly acid loamy soils with slowly

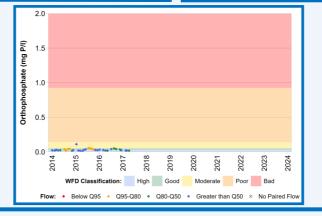
land use is limited to a caravan park on the left bank,

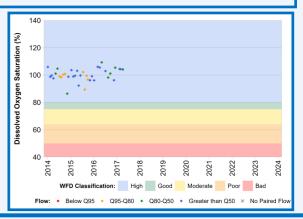


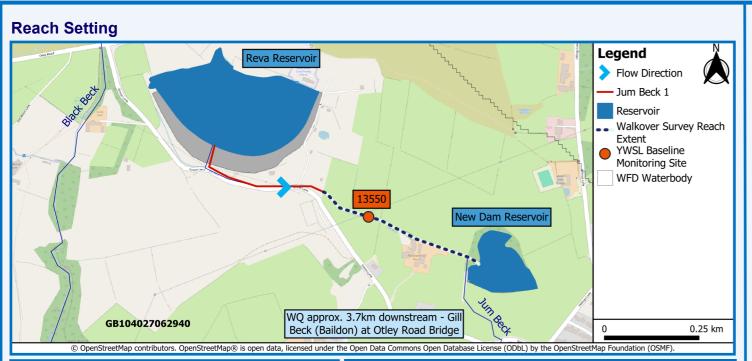
Figure A4.17

Gill Beck 2







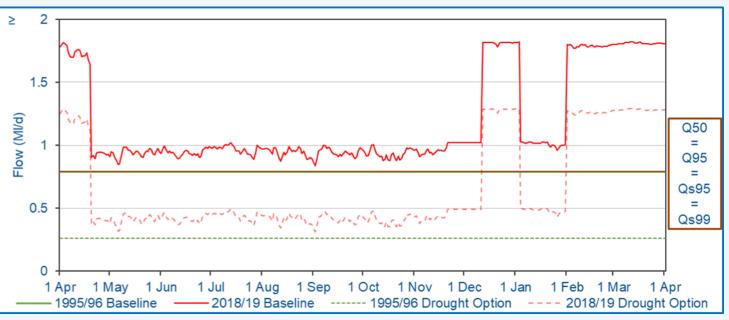


Reach Setting Information:

The superficial geology around the reservoir is composed of glacial till and some hummocky glacial deposits. Soils in the reservoir catchment are predominantly composed of slowly permeable, seasonally wet, acid loamy and clayey soils. Suburban/urban development is limited to a farm located ~0.9km downstream on the right bank.

	Supplementary Information
Catchment Area at Assessment Point	Unavailable on FEH
Mean Slope Gradient	1.0°
Length of Reach	1.0km
Additional Catchment Area	Unavailable on FEH
Upstream Reach	N/A
Downstream Reach	N/A

River Flow Regime



-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	0.79	0.26	67	Summer
Q _s 99	0.79	0.26	67	Major
Q95	0.79	0.26	67	Winter
Q50	0.79	0.26	67	Major

There are no significant flow additions/ reductions associated with this reach

River Habitats



Abundant riparian grassland

Dominant low energy flows

Abundant poaching



River Water Quality

There are no significant water quality pressures associated with this reach

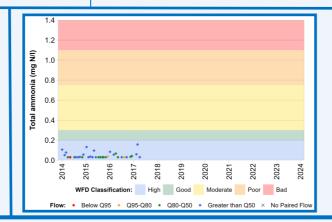
There are no sampling locations in Jum Beck 1, as such the next downstream sampling located in Gill Beck 2, Gill Beck (Baildon) At Otley Road Bridge (NE49400999), has been used as a representative example. The average pH between 2014-2023 was 7.9 with a maximum temperature of 15.1°C for the same period.

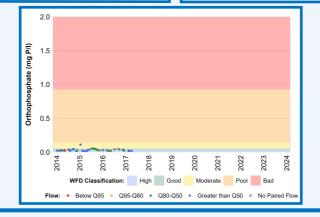


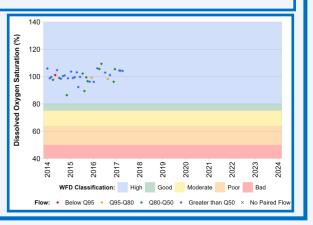


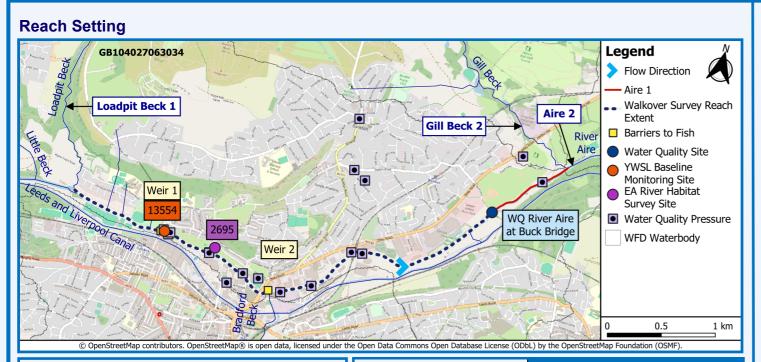
Figure A4.18

Jum Beck 1









River Flow Regime ≥1000 900 800 700 600 Q50 500 400 300 Q95 200 Qs 95 100 Qs 99 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr — 2018/19 Baseline ------ 1995/96 Drought Option ---- 2018/19 Drought Option

-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	126	109	13	Summer
Q _s 99	90.7	74.1	18	Moderate
Q95	143	126	12	Winter
Q50	565	548	2.9	Minor

There are no significant flow additions/ reductions associated with this reach

Reach Setting Information:

The superficial geology of the reach is dominated by alluvium and hummocky glacial deposits beneath the channel. Soils in the reservoir catchment are predominantly composed of loamy and clayey floodplain soils directly beneath and around the reach. Parts of the surrounding land use of along the reach is a mixture of suburban/urban land use as the reach flows through

	Supplementary Information
Catchment Area at Assessment Point	521.1km ²
Mean Slope Gradient	0.1°
Length of Reach	4.7km
Additional Catchment Area	69.6km ²
Upstream Reach	Loadpit Beck 1
Downstream Reach	River Aire 2

River Habitats



Dominant anthropogenic features

reinforcement Occasional

Dominant low energy flow types



River Water Quality Dominant bank reinforcement

Rare

features

Significant Water Quality Pressures

Permit Conditions

There are 18 CSOs that could be considered intermittent water quality pressures in this reach, each with descriptive consents.

Intermittent discharges

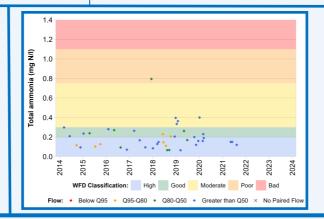
There are three sample locations in Aire 1, the third location, Aire at Buck Bridge (NE49400710), has been used due to its data quality. The average pH between 2014-2023 was 7.9 with a maximum temperature of 20.6°C for the same period.

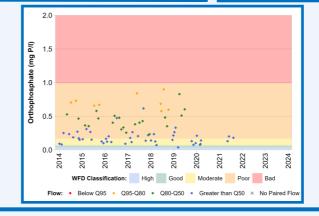


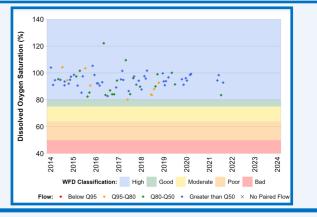


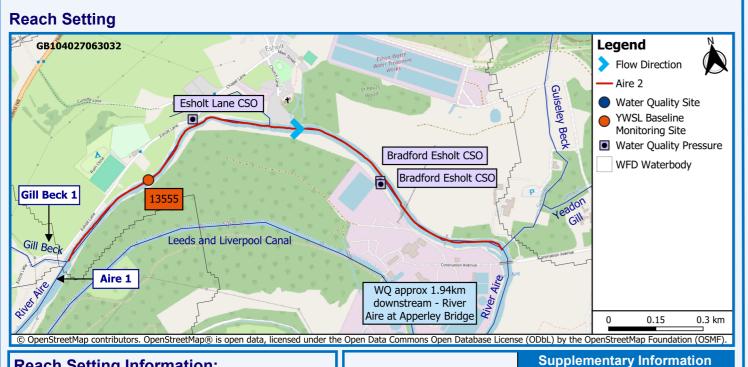
Figure A4.19

River Aire 1









Catchment Area at

Assessment Point

Frequent

shallow earth

banks

Occasional

ponding

River Flow Regime ≥ 1000 900 800 700 Q50 600 500 400 300 Q95 200 Qs 95 100 Qs 99 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr 1 Apr 1 May 1 Jun 1 Jul . 1995/96 Baseline ——— 2018/19 Baseline ------ 1995/96 Drought Option ---- 2018/19 Drought Option

-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	143	127	12	Summer
Q _s 99	100	82.9	17	Moderate
Q95	163	146	10	Winter
Q50	613	596	2.8	Minor

There are no significant flow additions/ reductions associated with this reach

deposits around the channel towards the end of the reach. 0.06° **Mean Slope Gradient** Soils in the reservoir catchment are predominantly Length of Reach 1.8km composed of loamy and clayey floodplain soils directly beneath and around the reach. There is some suburban/ 1.6km² **Additional Catchment Area** urban land use along the reach, particularly at the end of River Aire 1. Gill Beck 2 the reach where Esholt WwTW is located. **Upstream Reach** N/A **Downstream Reach River Habitats** Dominant Frequent riparian tree **Dominant** nthropogenic cover riparian features

shading vegetation Occasional einforcement pebble/gravel substrate Rare bank **Dominant low** energy flows

604.6km²

Frequent **River Water Quality** riparian

Significant Water Quality Pressures	Permit Conditions
Esholt Lane 291/CSO	Intermittent discharge
Bradford Esholt/NO 2 STW	Intermittent discharge
Bradford Esholt/NO 2 STW	Intermittent discharge

There are no sampling locations in Aire 2, so the next sample downstream of this reach, Aire at Apperley (NE49400676), has been used. The average pH between 2014-2023 was 7.9 with a maximum temperature of 18.3°C for the same period.



Reach Setting Information:

The superficial geology of the reach is dominated by

alluvium beneath the channel with some river terrace



Figure A4.20

River Aire 2

Dominant low

energy flows

Dominant ^{*}

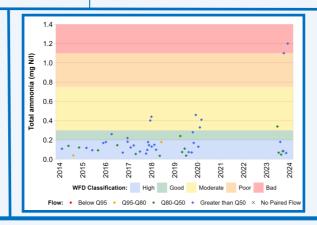
deep channel

Occasional in

channel

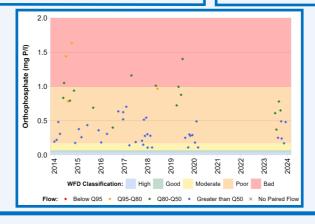
features

Physical Environment Information



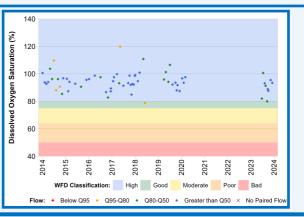
Cobble,

boulder.



bank

erosion



Reach Setting GB104027064120 Legend Sandbed Beck > Flow Direction Dibb 1 Reservoir Walkover Survey Reach Extent ■ Barriers to Fish Water Quality Site Significant Flow WQ River Dibb at Grimwith Reservoir Reduction Hartlington Bridge EA River Habitat Survey Site 21048 WFD Waterbody NE/027/0019/005/R01 Weir 0.5 © OpenStreetMap contributors. OpenStreetMap® is open data, licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF).

River Flow Regime 2 30 25 20 20 10 10 10 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr 1995/96 Baseline 2018/19 Baseline ------ 1995/96 Drought Option --- 2018/19 Drought Option

-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	3.80	1.25	67	Summer
Q _s 99	3.80	1.25	67	Major
Q95	3.80	1.25	67	Winter
Q50	15.1	4.98	67	Major

* the regulation regime in 1995/96 is not available and that the line is only a representation of the compensation flow (if it had been in place at that time).

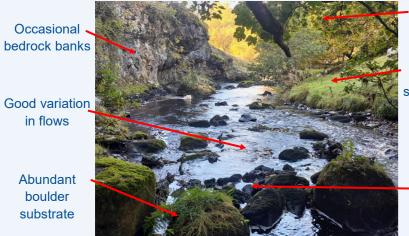
There are no significant flow additions/ reductions associated with this reach

Reach Setting Information:

The bedrock geology of the upstream part of the reach is dominated by the Millstone Grit Group, and downstream is dominate by the Craven Group. The superficial geology is composed predominantly of glacial till. Soils are predominantly composed of very acidic, upland soils with a peat surface, acid loam and clay soils and slightly acid but base rich freely draining soils. At the downstream end of this reach, the River Dibb joins the River Wharfe. Urbanisation is very limited along this reach.

	Supplementary Information
Catchment Area at Assessment Point	25.8km ²
Mean Slope Gradient	1.23°
Length of Reach	5.2km
Additional Catchment Area	9.1km ²
Upstream Reach	N/A
Downstream Reach	N/A

River Habitats



Frequent riparian shading

Abundant shallow loped earth banks

Dominant coarse substrate



River Water Quality

There are no significant water quality pressures associated with this reach

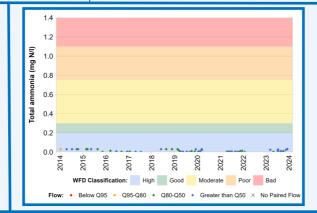
There are two sampling locations in Dibb 1, however the most upstream location, River Dibb at Dibbles Bridge (NE49700222), has limited data, as such, the next sample downstream, River Dibb At Hartlington Bridge (NE49400676), has been used. The average pH between 2014-2023 was 7.9 with a maximum temperature of 17.5°C for the same period.

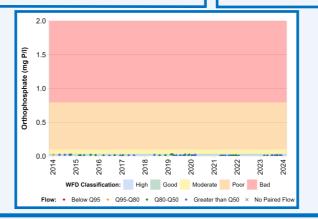
YorkshireWater

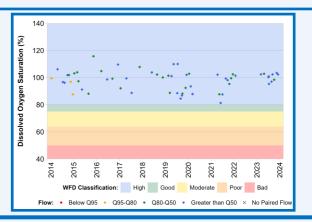


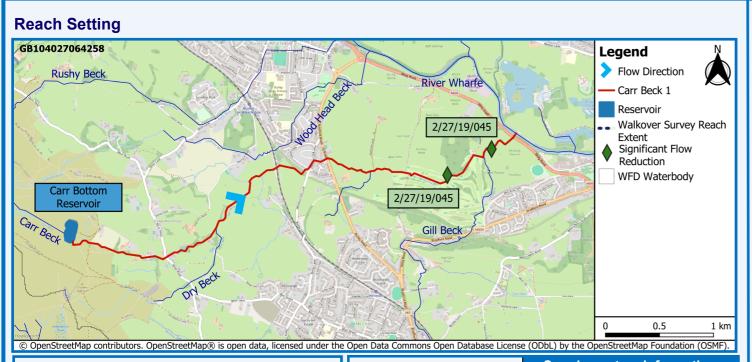
Figure A4.22

River Dibb 1









-	Reference Conditions (MI/d)	Drought Plan Conditions (MI/d)	% Reduction	Impact
Q _s 95	0.09	0.03	67	Summer
Q _s 99	0.09	0.03	67	Major
Q95	0.09	0.03	67	Winter
Q50	0.09	0.03	67	Major

River Flow Regime

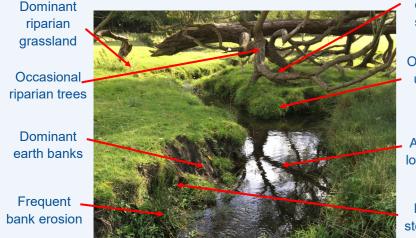
Significant Flow Additions/Reductions	Flow Rate (MI/d)	Abstraction / Discharge
Otley Golf Course 2/27/19/045	0.025	Abstraction

Reach Setting Information:

The bedrock geology underlying the reach is composed of sandstones and mudstones of the Carboniferous Millstone Grit Group. The superficial geology of the reach is predominantly underlain by glacial till with localised hummocky glacial deposits near the River Wharfe confluence. Soil types along the reach are characterised mostly by seasonally wet base-rich loamy and clay soils. Surrounding land use is characterised by upland heath and improved grassland and some urban land use around the Wharfe confluence.

	Supplementary Information
Catchment Area at Assessment Point	0.5km ²
Mean Slope Gradient	2.36°
Length of Reach	5.1km
Additional Catchment Area	7.0km ²
Upstream Reach	N/A
Downstream Reach	N/A

River Habitats

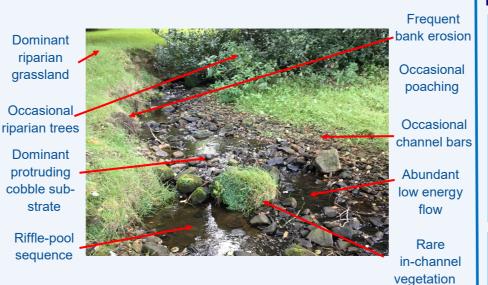


Occasional channel shading

Occasional undercut banks

Abundant low energy flow

Frequent steep banks



River Water Quality

There are no significant water quality pressures associated with this reach

There are no monitoring points in this reach. In the comparable Gill Beck 2 catchment the Gill Beck (Baildon) At Otley Road Bridge (NE49400999), has been used. The average pH between 2014-2023 was 7.9 with an maximum temperature of 15.1°C

YorkshireWater



Figure A4.23

Carr Beck 1

