Carbon & Environment Solutions

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Training & Consultancy

Flaxley Mill, Mitcheldean

Waterwheel Environmental and Ecological Assessment

CES

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1. Project Summary

1.1. This report outlines the Environmental and Ecological impact for the proposed reinstatement of a 4m diameter overshot waterwheel for power generation purposes that will use water from Westbury Brook located at Flaxley Mill, a former textile and corn mill in the Abenhall - Flaxley Valley near Mitcheldean.

1.2. The waterwheel installation will utilise the existing legacy infrastructure at the property that includes two mill ponds linked by the Brook. The proposal does not require any changes to the pond, leat or flows and shall utilise 100% of the flow currently passing through the leat into the former wheel pit.

Wheel Location : OS Grid Reference SO 67802 15929
Wheel Diameter : 4m
Max Abstraction : 0.2 m^3/sec
Maximum power generation after losses : 6kWh

1.3. Flow calculations are based on spot gauging undertaken at the site and interpreted flow data applied to the site using nearby Environment Agency catchment and flow measurements.

1.4. The Interpreted flows suggest a mean flow of 0.125 m^3/sec. Given that the waterwheel will be immediately below lower pond outfall and that the discharge from the wheel will be into the existing "wear pool" 100% of the flow will be utilised.

1.5. The proposal is consistent with National commitments for the reduction of green house gases and shall contribute to such reductions. The installation of the waterwheel in the context of the existing infrastructure is considered to have a negligible impact on water resources and ecology at the site.

2. Statutory Considerations and Report Constraints

2.1. The scale and type of the proposed scheme is below the threshold and out-with developments requiring an Environmental Impact Assessment under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. However, in support of applications to the Planning Authority and Environment Agency, an environmental review has been undertaken to assess potential impacts from the proposed hydro-electric power scheme. This review encompasses geomorphology, conservation, water quality, biodiversity and hydrology for the proposed development. This assessment gives due consideration to the requirements of the Water Framework Directive and River Basin Management Plans for the connected watercourses associated with this development.

2.2. This environmental review has been compiled from an initial desk top study utilising information held by statutory and Non Government Organisations and a baseline field assessment site walk over. In addition to the site walk over a number of visits were undertaken to obtain spot gauging data in order to determine the flow within the beck.

3. Background

3.1. Flaxley Mill is a former textile and corn mill dating back beyond the 18th Century. It is located immediately downstream of the famous Gunns Mills armaments factory and paper mill.

3.2. Both Gun's Mill and Flaxley Mill were fed by Westbury Brook and its tributaries, spring fed watercourses taking their head about 1km upstream and to the West of Guns Mill.

3.3. Whilst the waterwheel is no longer present at Flaxley Mill, Westbury Brook continues to flow through the upper and lower ponds before flowing into the former wheel pit where it flows in a easterly direction towards the River Severn.

3.4. The proposal is to reinstate the 4m diameter overshot waterwheel in order to generate electricity for the property.

4. Location and Geographical Setting

4.1. Flaxley Mill is located at the North West fringe of the Forest of Dean in Gloucestershire approximately 2.5km to the North East of Cinderford and 3km due South of Mitcheldean as detailed in Figure 1 and is set between Welshbury Woods to the South and Flaxley Woods to the North.

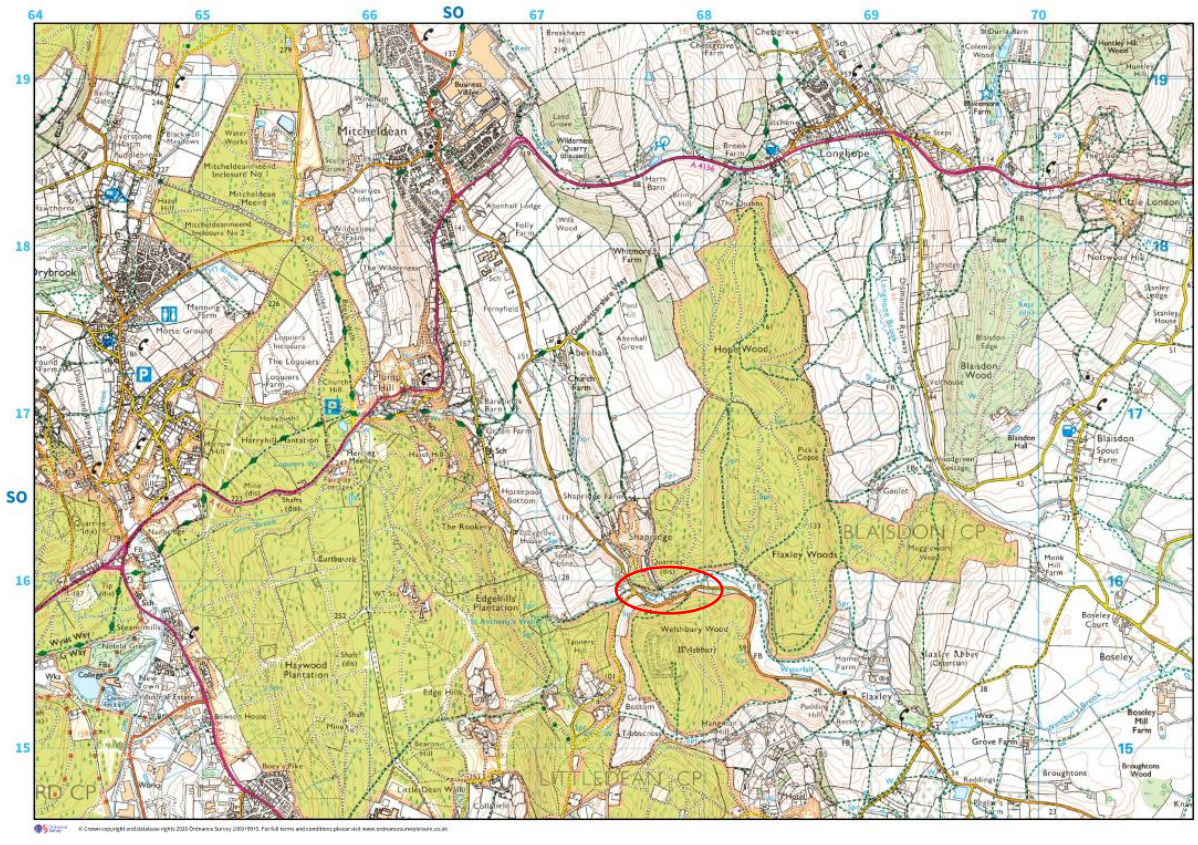


Figure: 1	Flaxley Mill General Location Map

4.2. As can be seen in Figures 2 and 3, Westbury Brook enters the property from the West and flows Eastward supplying two mill ponds. From the upper Mill Pond the Brook flows eastward to a second smaller concrete lined pond directly before the former waterwheel and wheel pit.

4.3. A bypass channel runs parallel to the main watercourse from the upper pond to the confluence between it and the Brook downstream of the former Mill Buildings. The flow in the bypass channel is composed of slight groundwater seepage from the upper pond along with flow from ephemeral streams from Shapridge and spring/groundwater seepage from the slopes of Flaxley Woods.

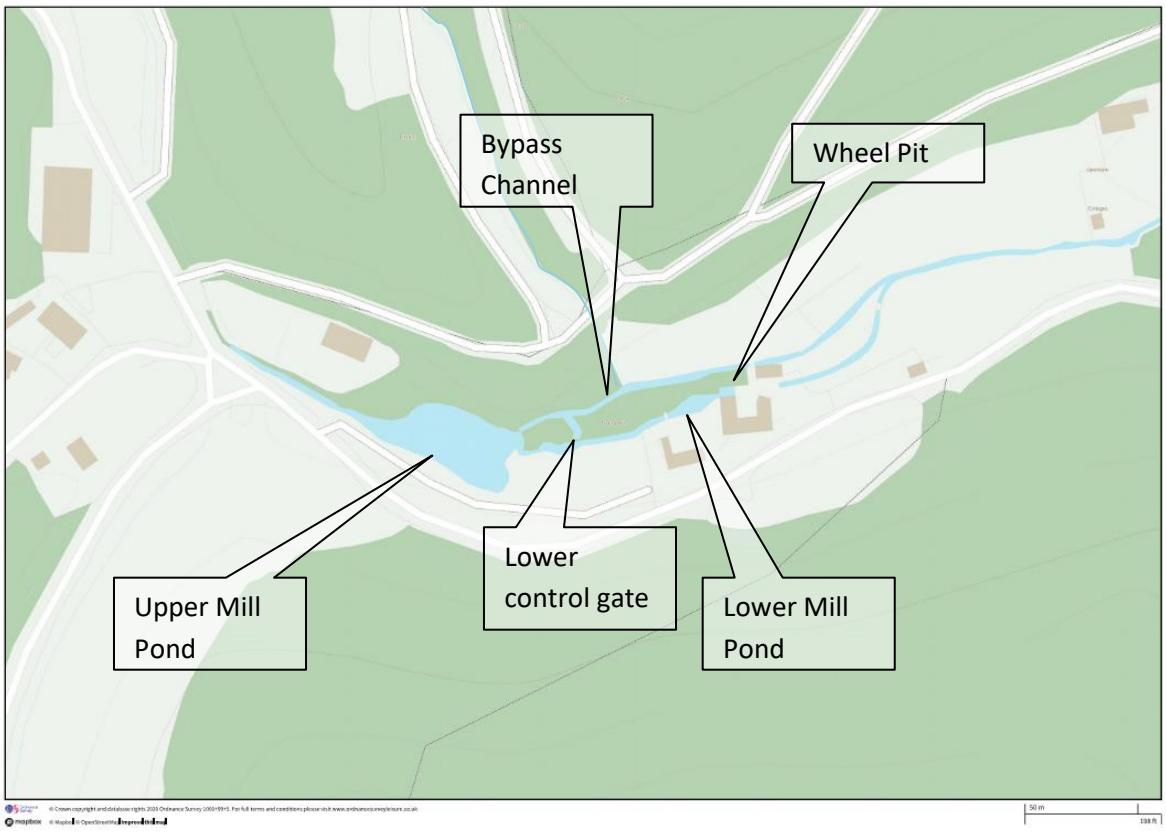


Figure: 2	Flaxley Mill Site Map

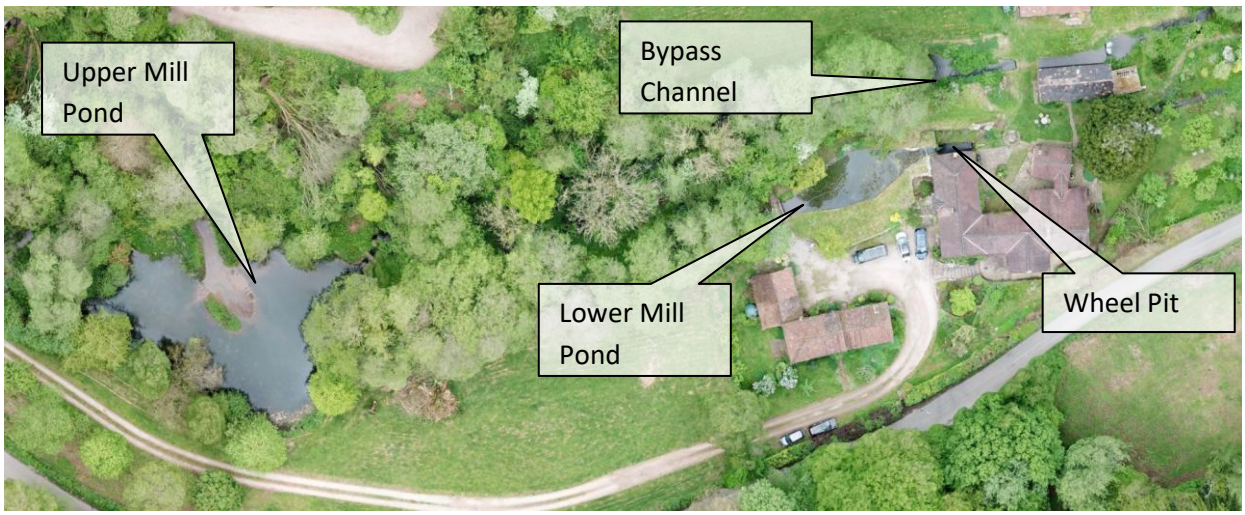


Figure: 3	Flaxley Mill Features Map

4.4. The Mill is located in the floor of a valley with moderately inclined slopes having timber plantations to the North and South and with agricultural grazing land to the West. Set within the moderately inclined slopes there are steeper valley sections that increase the potential for flashy river conditions due to increased surface run off in these steeper sloped zones. From Figure 4 the valley floor can be seen extending to the East typified with a similar mosaic of agricultural land in the valley bottom before opening out beyond the village of Flaxley onto the open plains of the Severn Valley and beyond to the Vale of Berekley to the South East.

Figure: 4	Flaxley Mill Site Map

4.5. Westbury Brook is classified as an Ordinary Watercourse with flood risk management responsibility resting with lead local flood authorities, district councils and internal drainage boards. Westbury Brook remains non main river until reaching its confluence with the River Severn south of Westbury on Severn, detailed in Figure 5, where responsibility for main river management falls to the Environment Agency to carry out maintenance, improvement or construction work.

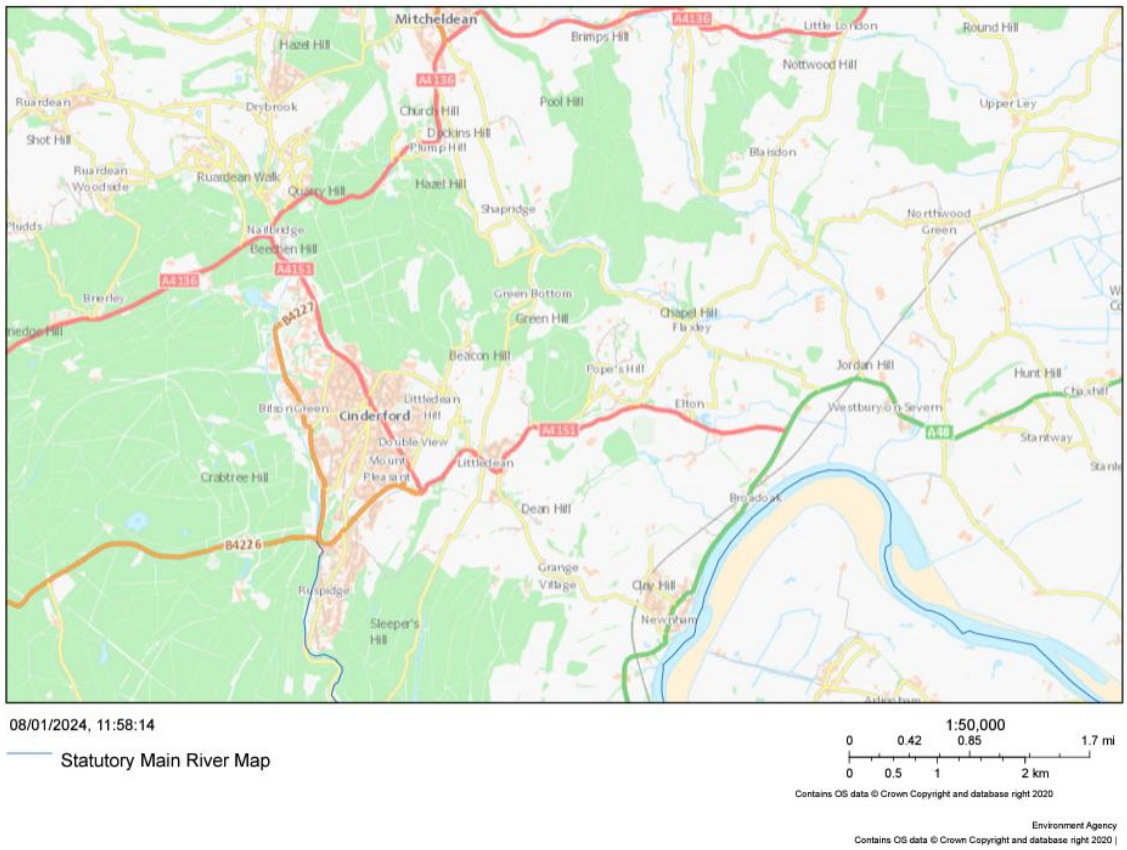


Figure: 5	Main River Map

4.6. From the various sources of Westbury Brook that include springs at St Anthony's Well, Plump Hill and Beacon Hill, bed gradients increase steadily in its upper reaches as they form well defined channels within an early mature topographic valley setting where there is little lateral erosion and meander. Westbury Brook is characteristic of a graded stream where flow is within a well defined mature channel. The ephemeral origins maintain a moderate gradient until reaching the valley floor where the Brook flows under the unclassified road prior to entering the grounds of Flaxley Mill where decreasing slope in the downstream direction is signified by increased accumulations of silt where the stream transitions from a bedrock, boulder and gravel-bed to a mix of silt fine sands and some gravels.

5. Historical and Archaeological Considerations

5.1. A search of the Historic England Archive datasets have identified statutory archaeological and historical features in proximity to the site as outlined in Figure 6 and Table 1, however the heritage assessment has revealed that there are no designations applying to or influencing Flaxley Mill.

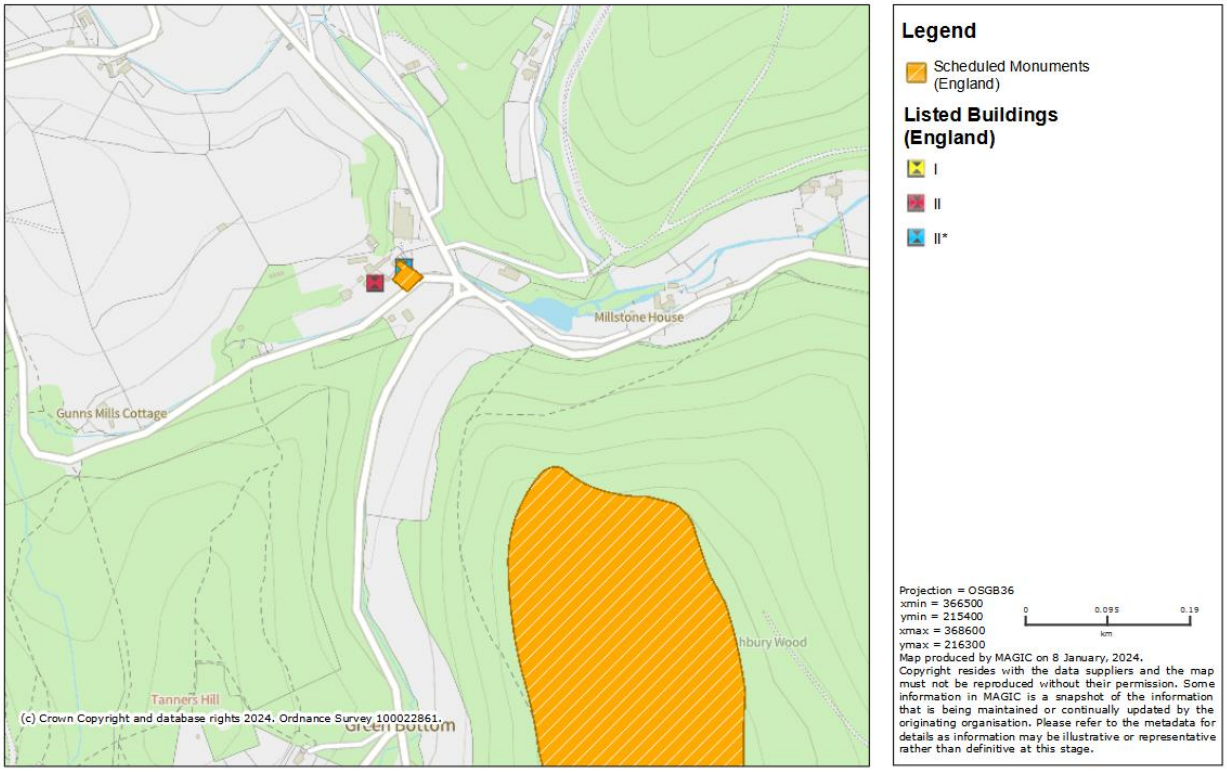


Figure: 6	Scheduled Monuments and Listed Buildings Location Map

Location	Heritage Category	Grade	Entry Number
Gunns Mills furnace	Scheduled Monument		1002080
Mill at Gunns Mills	Listed Building	II*	1186479
Gunns Mills House	Listed Building	II	1186868
Welshbury hillfort and associated earthworks	Scheduled Monument		1018158

Table 1	DEFRA site check results – Flaxley Mill

5.2. Gunns Mills, at Flaxley, in the Forest of Dean was a major industrial site from the 17th Century. Originally built as an armaments factory with associated blast furnace in 1629, it was converted into a paper mill in the 18th century and operated as such until the late 19th century.

5.3. The historic catalogue indicates that Flaxley Mill was a former textile mill from the mid 17th Century and is shown as an operational mill in the 1881 Ordnance Survey extract, Figure 7. The Mill is noted to be disused by the 1922 Ordnance Survey edition. The Mill and its associated buildings are now given over to residential use. The wheel pit now missing its waterwheel, contained an overshot wheel approximately 4.5m in diameter.

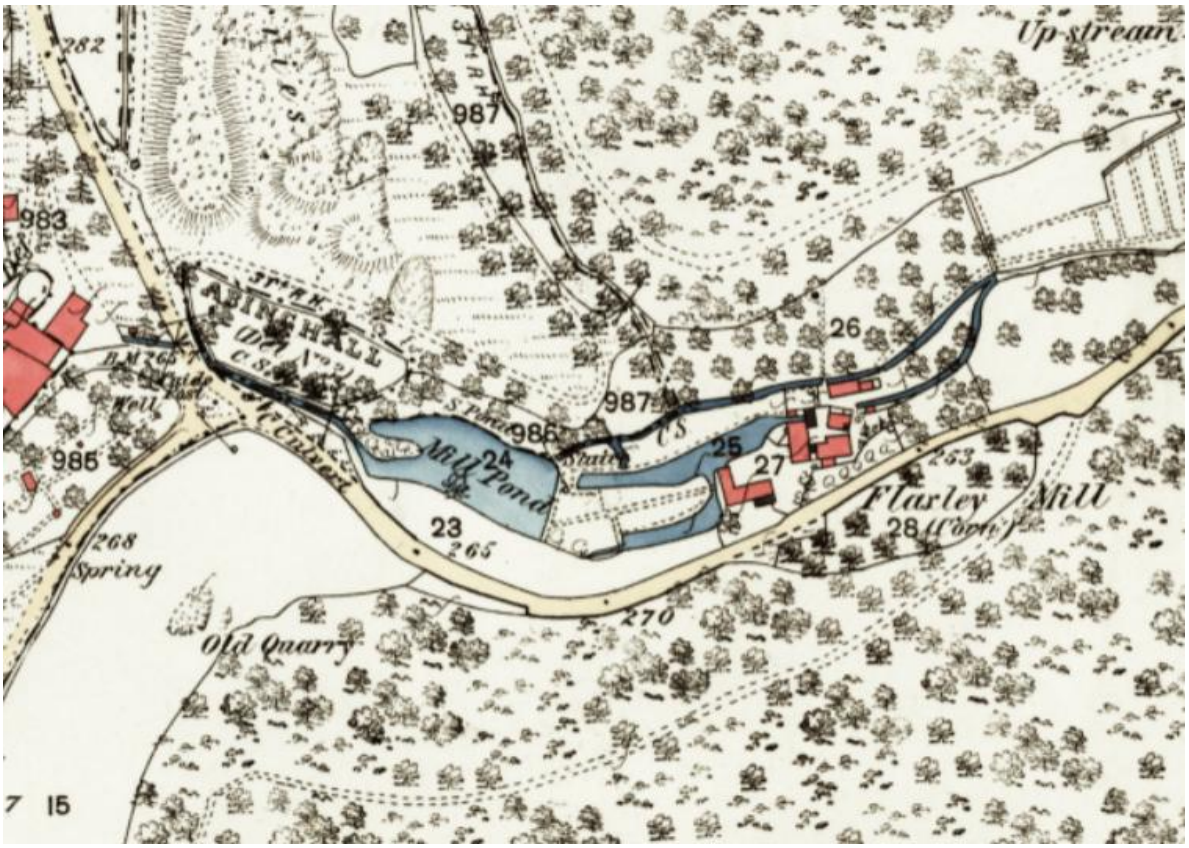


Figure: 7	Extract From Ordnance Survey, 25 inch Surveyed: 1878 to 1879

6. Geology and Geomorphology

6.1. Geology

6.1.1. The Forest of Dean is an elevated mass of disturbed sandstones and limestones sandwiched between the Rivers Wye and Severn. The area is dominated by three main components: the Devonian and Carboniferous rocks of the Forest of Dean, the Triassic and Early Jurassic mudstones and clays of the Severn Vale.

6.1.2. The rocks of the Forest of Dean are situated in a large shallow basin and comprise sandstones and mudstones of the Devonian Old Red Sandstone around the edge of the Forest, overlain by Carboniferous Limestone and Upper Carboniferous Coal Measures that have been economically important since Roman times yielding both iron ore and coal.

6.1.3. To the east of the Forest of Dean, the wide floodplain of the Severn is formed in Triassic mudstones belonging to the Mercia Mudstone Group. These are overlain by the clays and thin limestones of the Lower Jurassic Lias Group.

6.1.4. Devonian age rocks outcrop in the Forest of Dean area and on the other side of the Severn in a narrow band running from Sharpness to near Thornbury. The lower part of this thick sequence comprises red and green shales that form the solid geology along the eastern edge of the Forest of Dean at Newnham and Blakeney, and then across the Severn to Sharpness.

6.1.5. On the eastern side of the Forest of Dean, the succeeding grey-brown sandstones of the Brownstones form a series of prominent north-south ridges from Mitcheldean southwards past Blakeney to Lydney.

6.1.6. The Brownstones are overlain by the Quartz Conglomerate, which contains large amounts of pebbles made of quartz and igneous rocks. This, together with the overlying yellow-brown sandstones of the Tintern Sandstone Group outcrop on either side of the Wye Valley where it forms a more upland tract of land with poor sandy soil. These latter rocks form the Upper Old Red Sandstone succession in the area and also occur as a narrow band around the northern rim of the Forest of Dean.

6.1.7. The underlying solid geology at Flaxley Mill is identified as rocks forming the Brownstones Formation. These are sandstone and argillaceous rocks and are a interbedded sedimentary bedrock formed during the Devonian period. Figure 8.

6.1.8. In many of the valleys in the surrounding area mining along with quarrying and farming has been an integral part of the local economy for centuries.

6.1.9. The solid geology is overlain by Alluvium deposits of Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

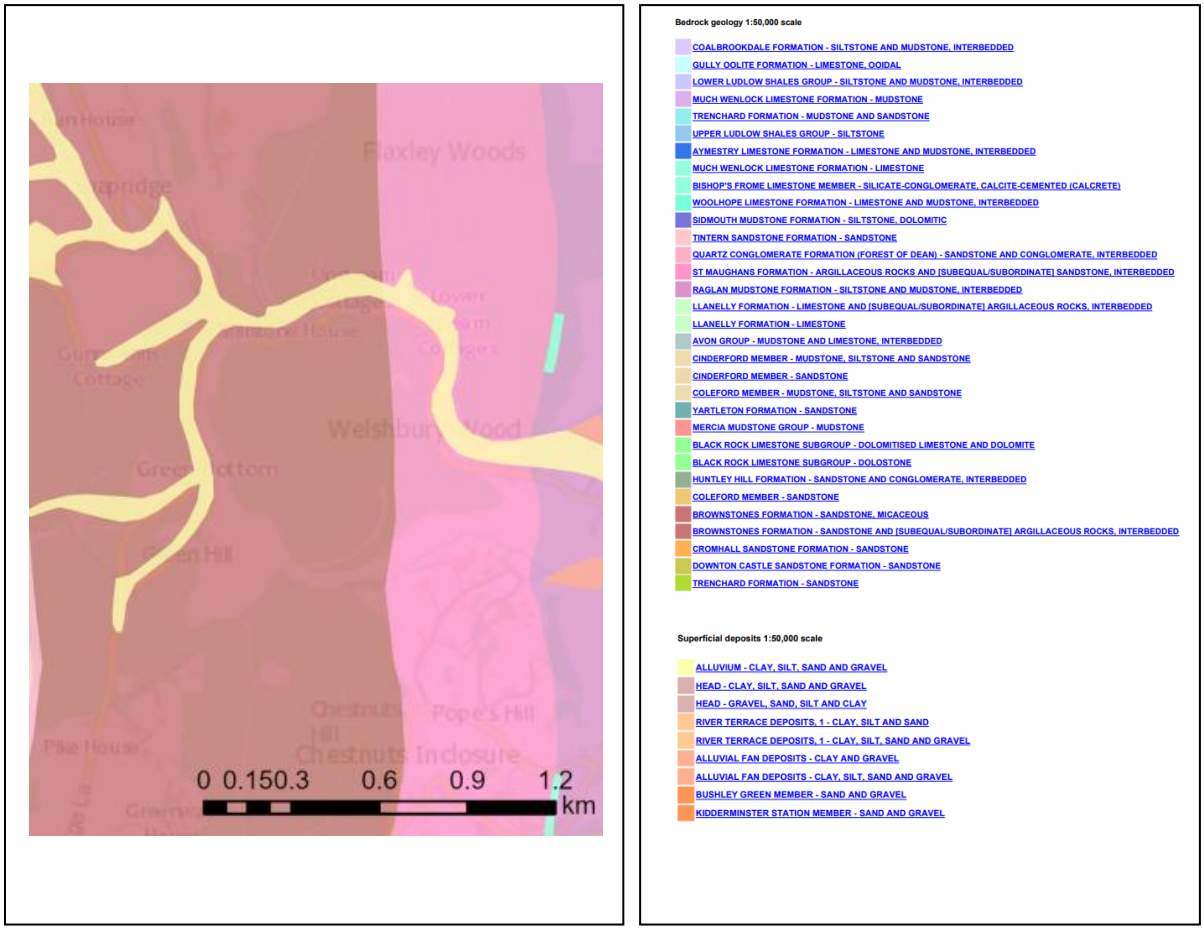


Figure: 8	Solid and Superficial Geology

6.2. **Stream Geomorphology**

6.2.1. In general, stream bed morphology is a mix of outcropping bedrock, boulder and coarse gravels in the steeper gradients combined with cascade and pool features. Contrasting the steeper grade morphology, sections of the brook through the valley floor experience less severe gradients resulting in short sections of gravel bed and slack water. Low banked terracing is evident where the topographic gradient shallows and the valley widens.

6.2.2. From its origins, Westbury Brook is characterised by a cobble and gravel step pool morphology interspersed with shallow boulder and bedrock cascades consistent with a valley side topography. The relatively short headwaters are interrupted by Gunns Mills from which flow is directed via a culvert that passes beneath an unclassified road before entering an open channel at the boundary of Flaxley Mill, Figure 9.

Figure: 9	Boulder, Cobble and Gravel Morphology With Shallow Terracing

6.2.3. The depth of water in the short section of channel between the road and upper pond is relatively shallow. The stream bed displays accumulations of silt where velocities have slowed sufficiently for deposition to occur, these are interspersed with sections of stream bed where the velocity of the flow has increased and is sufficiently high enough to prevent deposition of finer silt and clay. The higher velocities are due to ridges of sands and gravels deposited in flood conditions these

in turn have reduced water depth and in dry weather flow create a sufficiently small amount of scour that maintains short sections of clean sands and fine gravels that have accumulated.

6.2.4. For the most part Westbury Brook has very little bed load and waters are consistent with the clear spring waters emanating upstream. However the geographic position and surrounding topography result in high levels of sediment transfer during heavy rainfall as clays and silt are washed from surrounding fields and quickly mobilised by the road and ditch network.

6.2.5. As the Brook enters the upper pond at Flaxley Mill it takes a meandering route through an area of deposition where a grove of Alder has become established. In addition to the Alder other broad leaved trees and bushes such as Hawthorne, Willow and Oak have set around the fringes of the pond.

Figure: 10	Flaxley Mill Upper Pond

6.2.6. The high levels of deposited silt from storm conditions are clearly visible in Figure 10, the accumulation occurs where water velocity decreases at the point where the Brook enters the pond. The deposition has resulted in the overall area of the pond decreasing and a silt island accumulating close to where the Brook discharges into the pond.

Figure: 11	Flaxley Mill Upper Pond

Figure: 12	Upper Pond Outlet

6.2.7. There is a variety of pond vegetation giving rise to a healthy ecological balance and habitat within and skirting the upper mill pond.

6.2.8. The Brook continues through a notch in the pond stone retaining wall as can be seen in Figure 12, the clear water is typical of normal flow conditions in the Brook.

6.2.9. The Brook then passes through a series of step pools with cobble and gravel bed that removes high velocity energy as it descends a short slope before reaching a shallow gradient channel leading to the lower pond, Figure 13.

Figure: 13	Step Pool Cascade From Upper Pond Outlet

6.2.10. The image in Figure 13 also provides an indication of the high concentrations of suspended solids transported by the Brook following a period of intense rainfall. It can also be seen that the velocity decreases as it flows into the deeper shallow gradient channel.

6.2.11. As the flow velocity decreases and water depth increases the stream bed morphology transitions into a channel characterised by a silt bed where suspended solids are precipitated during storm flow conditions, Figure 14.

Figure: 14	Shallow Gradient Channel Leading To Lower Pond	

Figure: 15	Aerial View of Westbury Brook, By-Pass Channel and Lower Pond	

6.2.12. The Brook flows into a trapezoidal shaped concrete lined lower pond before discharging into the original wheel pit, Figures 15 & 16.

Figure: 16	Culvert Linking Ponds

6.2.13. From the pond the Brook falls vertically into the wheel pit as shown in Figure 17. Constructed with a stone slab bed and walled sides the bed shows accumulations of historic silt and gravel. From the wheel pit, the Brook passes through a short culvert beneath a paved area to the rear of the property. From the culvert the Brook continues through the garden in an open channel with grasses and ornamental plants along its banks until it reaches its confluence with the bypass channel.

6.2.14. A geomorphology impact assessment has been undertaken assessing any potential risks to river morphology by the development and is detailed in Table 2. There is considered to be little or no impact from the waterwheel as it does not change any of the existing infrastructure or flow dynamics within the Brook.

Figure: 17	Lower Pond Discharge

6.3. Geomorphology Impact Assessment

Assessment	Environmental Aspect	Environmental Risk	Mitigation	Risk Rating (H/M/L)
Flows	The installation of a hydropower scheme can significantly affect water levels and flow characteristics within a watercourse.	Concerns that hydropower projects will divert water from the watercourses reducing water levels so that they affect the look and ecology of the watercourse. Water Levels – The flow data for this particular watercourse indicates a reach with a relatively small catchment.	The base flow is seasonally variable and increases significantly during the wetter months of the year. The waterwheel does not require any changes to the existing infrastructure or flows as it is "an in-line" system taking water from the lower pond discharge and returning it into the same weir pool. The scheme will take 100% of the discharge from the lower pond up to a max take of $0.2m^3$/Sec. Any excess water from the lower pool will discharge into the weir pool or over the lower control gate.	LOW
Sediment	This can affect habitat, physical features and potentially increase the risk of flooding.	Diversion of water to hydropower schemes can affect the mechanical dynamic of the water body. Decreased flow can reduce transport of sediment important to habitat in lower reaches.	The base and mean lows of the Brook are often sediment free taking their source from nearby springs. However, the Brook is susceptible to high levels of suspended solids during periods of heavy rainfall. The ponds and shallower gradient channels allow the precipitation of suspended solids. The waterwheel will not affect the dynamics of the Brook as there will be no change to flows or infrastructure. The transport of sediment will remain unchanged.	LOW
Bed/Bank Erosion	Stream bed and bank erosion may be affected within a depleted reach and connected waters.	Increased or decreased water levels can cause bank erosion. Diversion of water to hydropower schemes can affect the mechanical dynamic of the water body. Sediment transport can be reduced with the installation of weirs. Potential bank and bed erosion at	The proposal utilises the existing infrastructure and will not change or influence the flow dynamics at the site. There will be no changes to Brook morphology as the waterwheel will be in-line with flow at the discharge of the lower pond. There will be no changes to flow or the existing infrastructure. There will be no changes to the existing infrastructure, turbidity and sediment transport shall remain the same. No additional structures or modifications shall	LOW LOW

		outfall.	be carried out that will impact flow. The introduction of the waterwheel will reduce the potential of bed erosion within the wheel pit, flows remain the same and bed and bank erosion shall be unaffected by the installation	
Riparian Zone	Riparian zones are important natural biofilters, protecting aquatic environments from excessive sedimentation, polluted surface runoff and erosion.	Changes to flow can increase or decrease water levels changing erosion characteristics within the watercourse which can impact riparian zones.	The waterwheel will have no impact on the riparian zones of the Brook.	LOW
Scale of Geomorphological Impacts	There is concern that hydropower developments may result in changes beyond the development area and affect connected watercourses.	There is a minor risk that sedimentation and erosion could be affected both locally and within connected watercourses from hydropower developments.	The in line nature of the waterwheel does not affect stream morphology and the transportation of sediment within the channel.	LOW
WFD Impact	Hydropower schemes may compromise WFD objectives set out in the River Basin Management Plan	Westbury Brook is located within the Severn Vale Catchment River Basin Management Plan (RBMP). There is a potential risk that hydropower can affect the river dynamic and nutrient availability within the catchment. There is a potential risk that designated BAP species habitat may be affected by hydropower schemes. Construction activities may result in pollution of	Abstraction of existing in-line flows will only occur. The sediment loading and transportation in Westbury Brook is largely unaffected by the development, high flows required for mobilisation of detritus will be maintained. It is unlikely that the introduction of a waterwheel scheme within Westbury Brook will have a detrimental impact on the WFD objectives and BAP species detailed in the Severn Vale Catchment River Basin Management Plan. The development requires the installation of a waterwheel and will maintain the existing flow. Construction shall be undertaken in accordance with GPP 5 guidance covering	LOW LOW

		connected watercourses.	construction and maintenance works in, near or liable to affect surface waters and ground waters.	

Table 2 - Geomorphology Impact Assessment

7. Hydrological Assessment

7.1. Catcment Characteristics

7.1.1. The Severn Tidal Tributaries Catchment extends across the south west of England, it covers an area of over 1,000km2 and is made up of six sub-catchments each draining into the tidal River Severn downstream of Gloucester. These sub-catchments are: Avonmouth, the Little Avon and River Cam, the River Frome, the Gloucester streams (including the Dimore Brook, Sud Brook, River Twyver, Daniels Brook and Wotton Brook), Westbury Brook and Walmore Common and the Forest of Dean (including the River Lyd and Cinderford Streams).

7.1.2. The topography of the catchment can be divided into three areas: the wide, low-lying Severn Valley floodplain, the ridges and valleys of the Forest of Dean and the steep sided valleys of the Cotswolds.

7.1.3. Forest of Dean and Cinderford Streams sub area is characterised by steep sided valleys with fast flowing streams. It has numerous groundwater springs which make a significant contribution to the flow in many streams. The Westbury Brook catchment, Figure 18, is one of seven catchments in the River Severn and Tributaries operational catchment and covers an area of 31.7km^2. The Westbury Brook catchment at Flaxley Mill, Figure 19, covers an area of 5.3km^2.

7.1.4. The Severn Vale Abstraction Licensing Strategy sets out the Environment Agency approach to managing new and existing abstractions and impoundments within the River Severn operational catchment. The approach ensures that River Basin Management Plan objectives for water resources activities are met and avoid deterioration within the catchment and is applied to the water body in which the abstraction is located.

7.1.5. It also applies to all downstream surface water bodies that may be affected by any reduction in abstraction-related flow, or adjacent Groundwater bodies affected by any reduction in groundwater level.

Figure: 18	Westbury Brook Source to Mouth Water Body Catchment

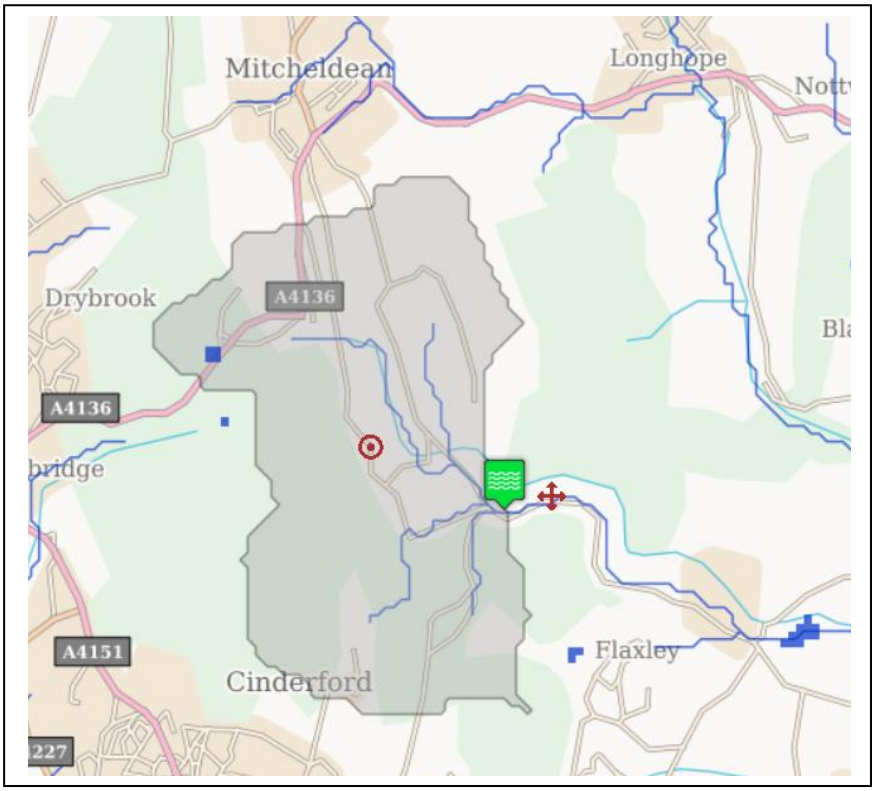


Figure: 19	Westbury Brook Catchment at Flaxley Mill

7.1.6. The strategy is focused on consumptive abstractions but may influence non consumptive abstractions such as Hydropower. Abstraction licensing strategies (ALS) use the environmental flow indicator to indicate where and when water is available for new abstractions. It sets different percentages of flow that can be abstracted, depending on the sensitivity of an area to abstraction.

7.1.7. The Environment Agency published Abstraction Licensing Strategy indicates resource availability for the Westbury Brook catchment and resource applications within the River Severn catchment. New non-consumptive abstraction licences or those with net environmental benefit may be permitted, but may be subject to restrictions to protect local features and any bypassed reach. Restrictions will be determined on a case-by-case basis and applications will be subject to the normal licence determination process.

7.1.8. It is not considered likely that there will be any significant restrictions applied to a waterwheel at Flaxley Mill.

7.1.9. We have undertaken an assessment of flow using the on site data from spot gauging carried out on Westbury Brook as it enters the property and also from a nearby or similar catchment that contains an Environment Agency gauging station for comparison.

7.1.10. Rudhall Brook at Sandford Bridge gauging station provides one of the closest representative Environment Agency catchment data points. Rudhall Brook forms a tributary of the River Wye and with its close proximity and size provides representative data for correlation purposes with that of Westbury Brook at Flaxley Mill, the catchment is outlined in Figure 20.

Station details and identifiers:

Rudhall Brook at Sandford Bridge

Grid Reference	SO6406525717
River Name	Rudhall Brook
Station Reference	055027_TG 328
Station ID (WISKI)	055027
Catchment Area	13.2km^2

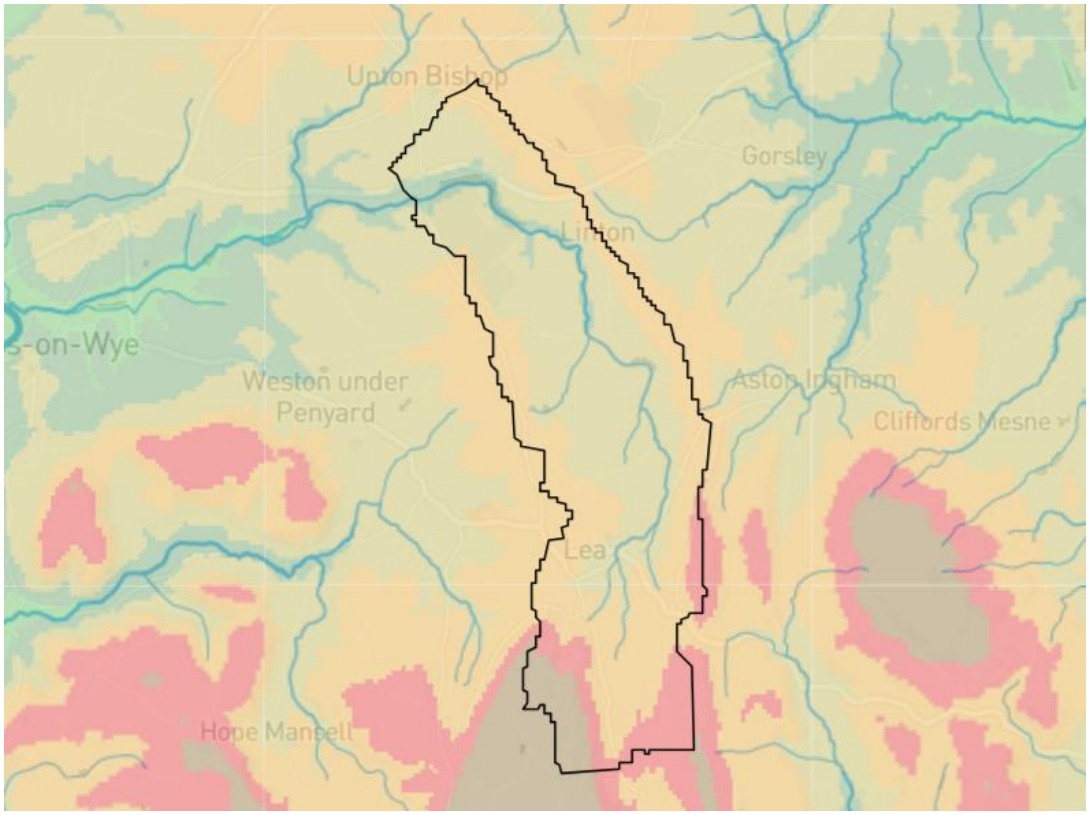


Figure: 20	Rudhall Brook at Sandford Bridge Catchment

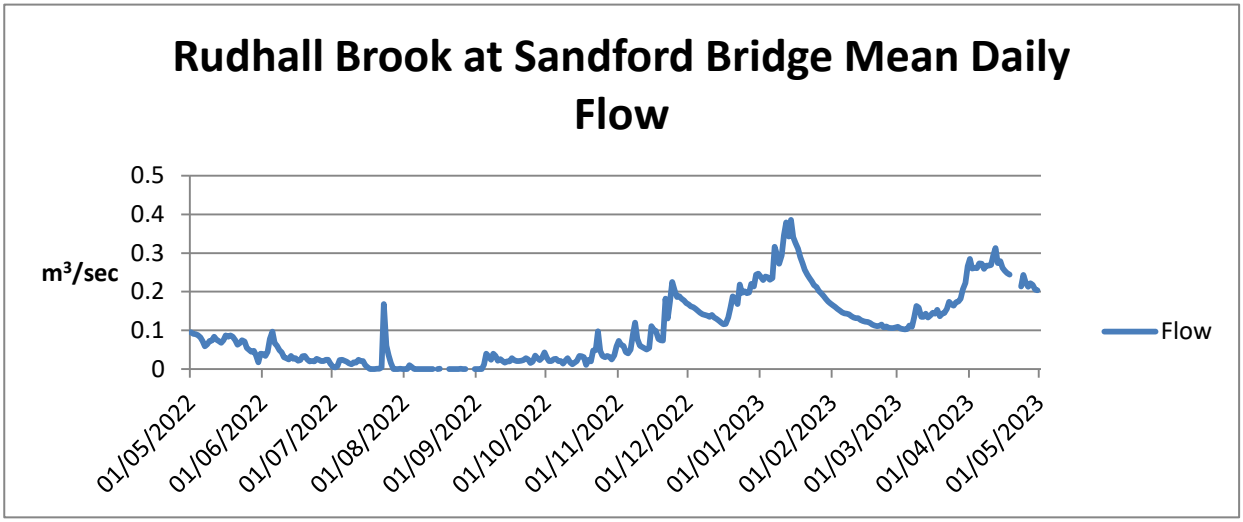
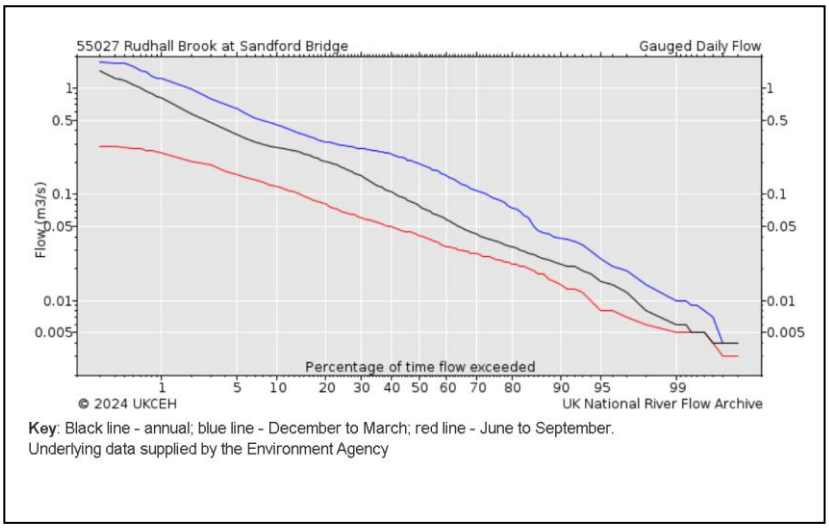


Figure: 21	Rudhall Brook at Sandford Bridge Daily Mean Flow



Mean Flow:	0.13 m^3/s
95% Exceedance (Q95):	0.015 m^3/s
70% Exceedance (Q70):	0.042 m^3/s
50% Exceedance (Q50):	0.078 m^3/s
10% Exceedance (Q10):	0.276 m^3/s
5% Exceedance (Q5):	0.369 m^3/s

Figure: 22	Flow Duration Curve Rudhall Brook at Sandford Bridge

7.1.11. Westbury Brook is classed as ASB3 High Sensitivity with High Base Flow, there will be no departure from the indicative abstraction limits associated with such a sensitivity. We anticipate abstraction levels of 100% for water at the discharge point in the lower pond, there is no requirement to provide a hands off flow equivalent to the flow duration Q95 value in order to maintain ecological benefit as the water shall be returned to the existing weir pool.

7.1.12. Hands Off Flow (HOF) as a condition is when the flow or level falls in the river below a set value when abstraction must stop to ensure there is always a minimum flow to continue down the length of river or stream between the offtake point and the discharge point in which the flow is reduced by the volume of water going through the penstock, turbine and tailrace (depleted reach). As there is no depleted reach at the point where the waterwheel will be installed there is no requirement to apply a HOF.

7.1.13. Daily mean flow as measured at the Sandford Bridge gauging station, Figure 21, was 0.076m3/sec on the 12 May 2022, from Figure 22 this equates to a flow duration value of around Q51%.

7.1.14. From the spot gauging that was undertaken on the 12/5/22 in the main channel upstream of the Mill pond the gauged flow detailed below indicates an

instantaneous measurement of 0.038m3/sec. equating to 49% of the gauged flow for the Rudhall at Sandford Bridge. When comparing the percentage difference in the areas between the catchments a similar percentage difference is recorded to the scaled difference in compared flows. There is a slight anomaly for flow duration values corresponding to the spot gauging scaled values taken in September and November when comparing flow as a percentage difference between the two points, however the estimated Qn% values for these two months do show a level of consistency with the expected flow duration values at Flaxley Mill.

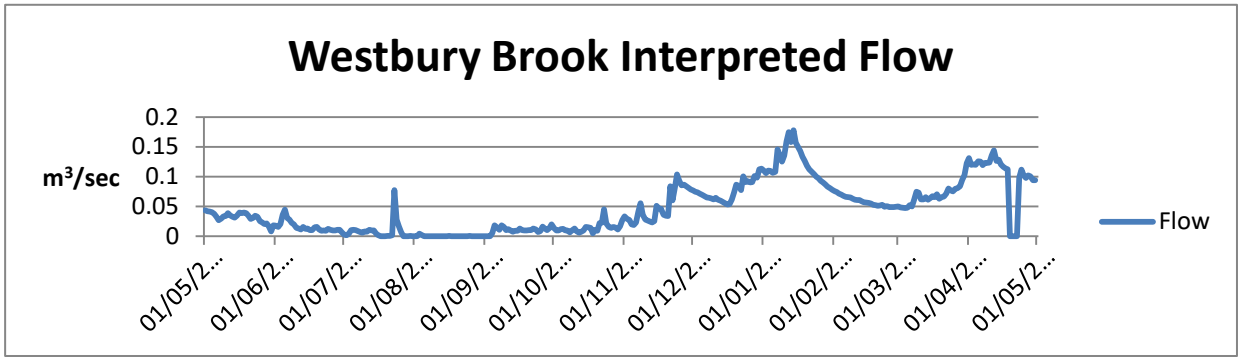
7.1.15. An additional comparison with daily mean flow was carried out with the Cannop Brook at Parkend and the Leadon at Wedderburn Bridge gauging stations. Flows at Parkend correlate between the area scaling and flow as a percentage below Q50% but there is a drift between the two scaling methodologies at higher flows. Considering flows at Wedderburn Bridge there is an increasing level of certainty that the gauged flow undertaken at Flaxley Mill was broadly consistent with flow duration Qn% values at Sandford Bridge.

7.1.16. Additional spot gauging was undertaken at Flaxley Mill and is summarised in Table 3, the full spot gauging records are provided at Annex 1.

Date	Flaxley Mil Gauged Flow	Parkend Flow	Gauged Flow as a % of Parkend	Qn%	Sandford Bridge	Gauged Flow as a % of Sandford Bridge	Qn%	Wedderburn Bridge	Gauged Flow as a % of Wedderburn Bridge	Qn%
12/05/2022	0.0373	0.092	40.5	71	0.076	49.1	51	0.712	5.2	65
08/09/2022	0.0282	0.054	52.2	98	0.04	70.5	69	0.333	8.5	98
10/11/2022	0.0677	0.23	29.4	48	0.061	111.0	58	2.95	2.3	18
25/03/2023	0.0707	0.472	15.0	25	0.164	43.1	33	4.12	1.7	13
26/03/2023	0.081	0.503	16.1	22	0.173	46.8	25	4.22	1.9	12

Table 3: Flow and Flow Duration Comparison at Gauged Sites

7.1.17. Using data from Rudhall Brook at Sandford Bridge gauging station and the spot gauged flow at Flaxley Mill we have interpreted annual flows for Westbury Brook at Flaxley Mill for the corresponding period between 1/5/22 - 30/4/23 detailed at Figure 23.

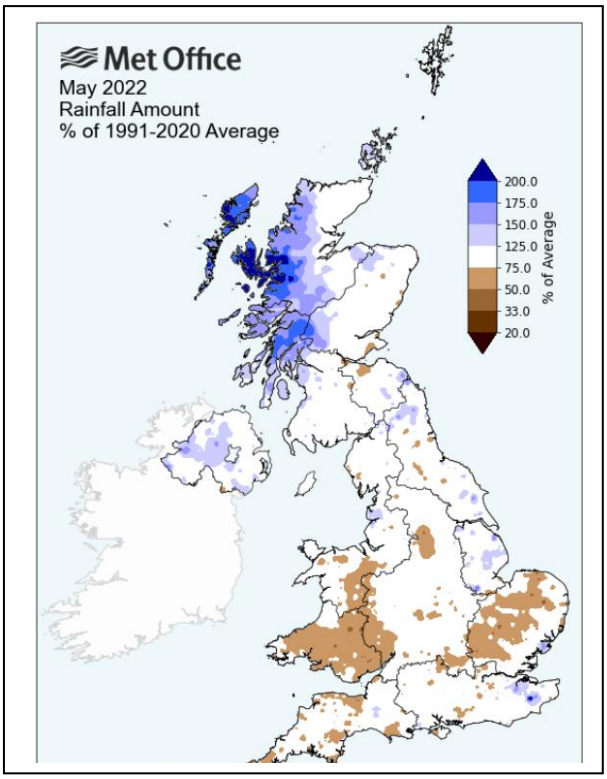


Mean Flow:	**0.060**
95% Exceedance (Q95):	0.007
70% Exceedance (Q70):	0.019
50% Exceedance (Q50):	0.036
10% Exceedance (Q10):	0.127
5% Exceedance (Q5):	0.170

Figure: 23	Interpreted Flow - Westbury Brook at Flaxley Mill	

7.1.18. It is expected that there will be some departures from the trends with higher flows, given that Westbury Brook is extremely flashy and responsive to high and intense precipitation. Therefore the interpreted flow graph at Figure 23 cannot completely correlate with the expected trend in scaled mean between catchments at higher flows. The effects of flashy flows and increased turbidity in Westbury Brook are visible in Figures 13 and 16.

7.1.19. Whilst many UK gauging stations registered mean monthly rainfall in the normal range for May thro to September 2022, the majority of catchments were below average by month-end including that of Westbury Brook. There was a notable increase in precipitation during the months between November2022 and March 2023 again indicating a correlation between rainfall and flow in the Severn and Wye Catchments. The flows noted and the corresponding flow predictions for Westbury Brook appear consistent with precipitation records for that period increasing confidence in the data and flow predictions produced.



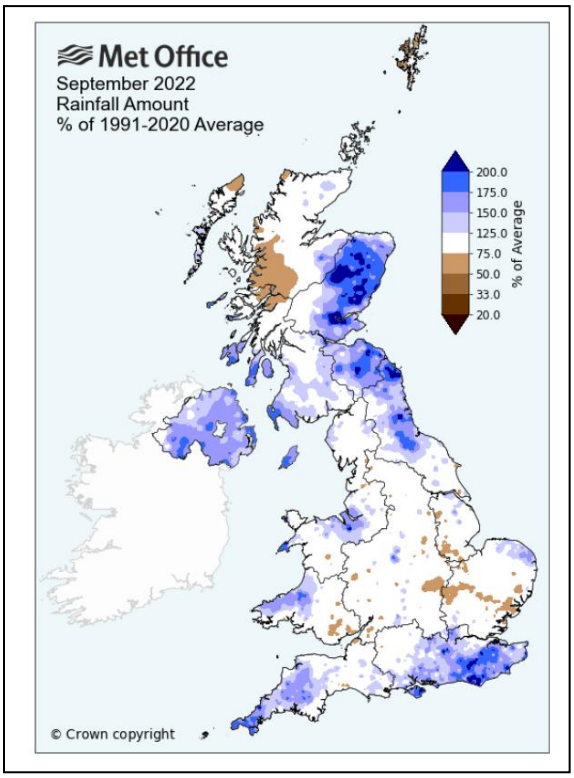
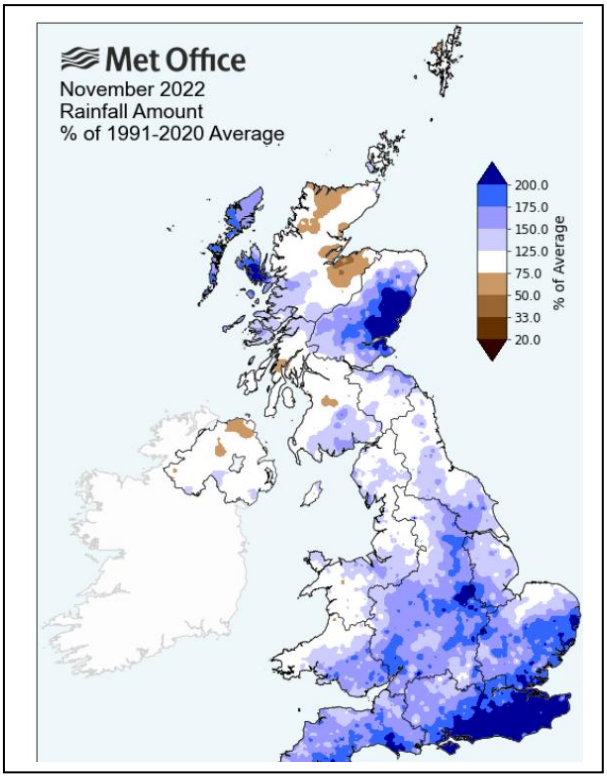


Figure: 24	UK Rainfall Distribution May & June 2022



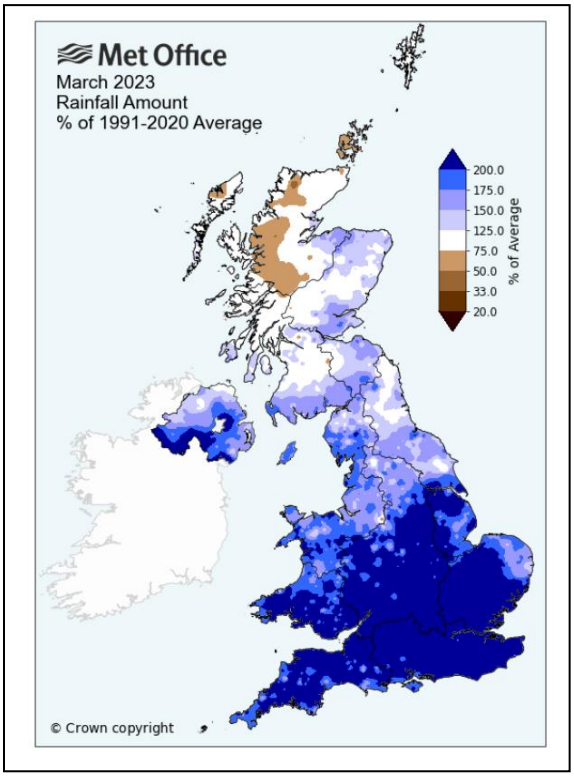


Figure: 25	UK Rainfall Distribution May & June 2022

7.2. **Operational Flow**

7.3. The proposal is to reinstate the former waterwheel at Flaxley Mill and utilise existing flows from the lower pond to the wheel pit. The proposed waterwheel at Flaxley Mill is of an overshot design having capability to use 100% of flow from the lower pond discharge up to a maximum take of 0.2m^3/sec. Water will discharge to the existing wheel pit where water is currently discharged to after passing over the waterwheel. Any flows above 0.2m^3/sec will pass over the waterwheel and discharge into the same wheel pit as currently exhibited in Figure 17.

7.4. The proposal does not require any changes to the existing watercourse or any of the existing upstream infrastructure and flow controls. The waterwheel is reactive to the in line flows at the point of installation.

7.5. Abstraction limits are in line with Statutory guidance Appendix 1: Hydroelectric power water abstraction levels Table B: hydropower schemes at an existing weir, however as there is no depleted reach and the structure is an" in-line "design a hands off flow at the intake point will not be required and cannot be justified.

8. **System Design**

8.1.

Intake Location	: SO 67799 15928
Waterwheel Location	: SO 67801 15929
Discharge Point	: SO 67801 15929
Hydrostatic Head	: 4m
Max Abstraction	: 0.2 m^3/sec
Depleted Reach	: 0m

8.2. The proposed waterwheel design is outlined in Figure 26, it should be noted that construction of the waterwheel is limited to the existing wheel pit and is an in line structure utilising existing flows. Water will pass through a short open channel approximately 2m in length from the existing discharge point to the top of the waterwheel from here it will flow to the exiting wheel pit. There will be no effective interruption to flow. The system will utilise the static head between the point where water exits the pond and enters the wheel pit.

8.3. It is not proposed to introduce any additional impounding works or increase flows to the waterwheel or its intake point. The system proposes to take 100% of flow without installation of a weir or addition of any impounding structures.

8.4. The depth of water in the wheel pit beneath the rim of the waterwheel is 450mm providing an appropriate depth of water to protect any fish, eel or lamprey caught in the buckets of the waterwheel as well as ensuring sufficient clearance between the wheel and pit bed.

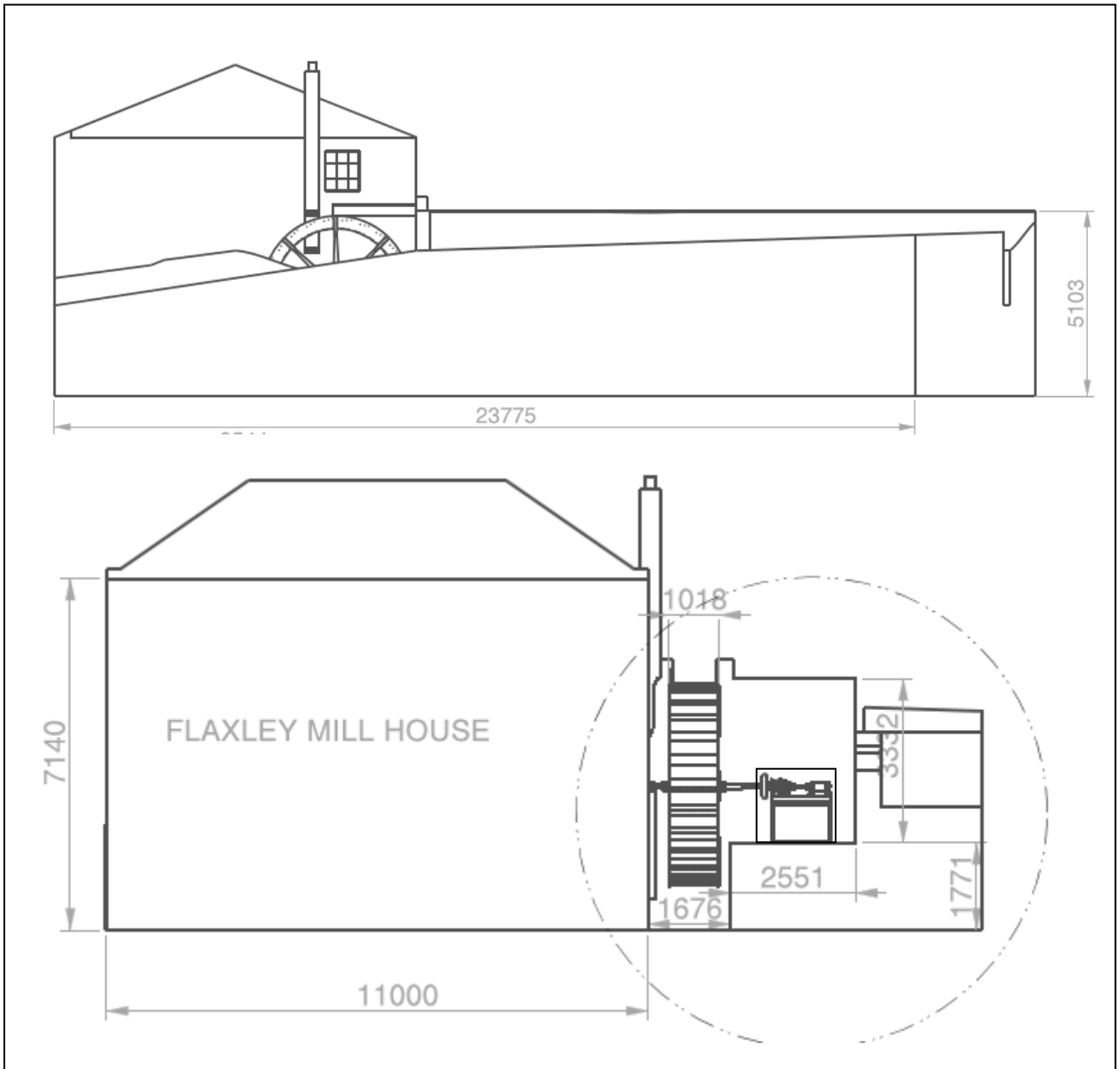


Figure: 24	Proposed Waterwheel

9. **Depleted Reach**

9.1. The proposal intends to take flow that is currently flowing from the lower mill pond discharge that is free falling 4m into the former wheel pit of the mill. The proposal does not intend to change any of the existing structures or flows to the mill pond or its discharge but simply takes 100% of flow cascading into the wheel pit up to a

maximum of 0.2m^3/sec. Flows above the design maximum will pass over the wheel into the existing water pool in the wheel pit.

9.2. The structure is in line with flow and does not create a depleted reach.

9.3. As there is no construction of a weir and there is no depleted reach there is no requirement for a hands off or compensation flow at the waterwheel intake as all flow will continue to the existing wheel pit and pool.

10. Turbidity

10.1. It is recognised that there is a potential for the outflow from hydro systems to induce turbulent flow and produce localised scouring giving rise to elevated levels of turbidity.

10.2. For this proposal, the kinetic energy of the free falling water is converted to mechanical and electrical energy as water is captured in a series of buckets and descends to the weir pool in a controlled way.

10.3. The use of a generator will create a reactive force equal to the weight of the water to control the speed of the waterwheel.

10.4. The wheel buckets will slowly empty as the wheel rotates resulting in a smooth and less turbid discharge compared to the existing 4m drop thereby reducing turbulence within the stream bed and avoiding the potential for increased levels of turbidity within the watercourse

.

10.5. The stream bed morphology within the wheel pit is composed of historical sandstone flagstones leading to a natural gravel and cobble morphology.

10.6. Overall the waterwheel will not increase existing levels of turbidity.

11. Access

11.1. The proposal is located on private land and there is no public access. The installation will therefore have no immediate impact on public access and shall have no impact on upstream and downstream access.

11.2. Installation and construction works will be conducted within the cartilages of the property and will have no impact on public access beyond the property boundary.

12. Conservation

12.1. Designations

12.1.1. Flaxley Mill sits outside the Wye Valley National Landscape Area of Outstanding Natural Beauty located approximately 5.8km due West from the Mill. The boundary of the Wye Valley AONB as shown in Figure 25 and can be seen to extend as far west as Monmouth and Llangovan, Prior's Frome near Hereford to the North and Chepstow to the South and covers 32,600 hectares.

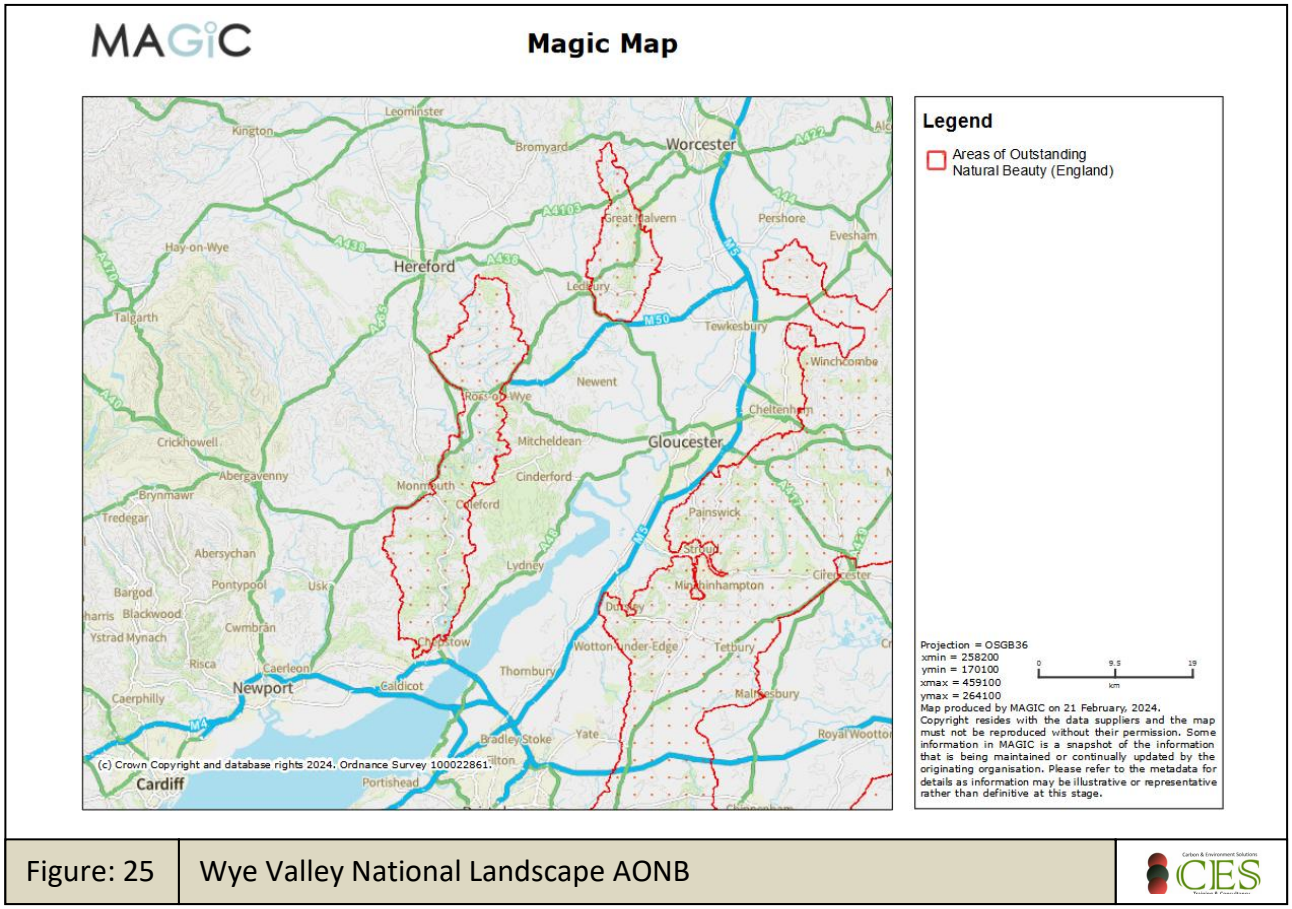


Figure: 25	Wye Valley National Landscape AONB

12.1.2. Flaxley Mill does not sit within any SSSI, SAC or RAMSAR land based designations. Westbury Brook Ironstone Mine SSSI and Edgehills Quarry SSSI are the closest designated sited approximately 1.5km to the North West of the Mill. Whilst located within the SSSI Impact Risk Zones for these designations, there are no restrictive categories that apply to the construction of the waterwheel at the Mill.

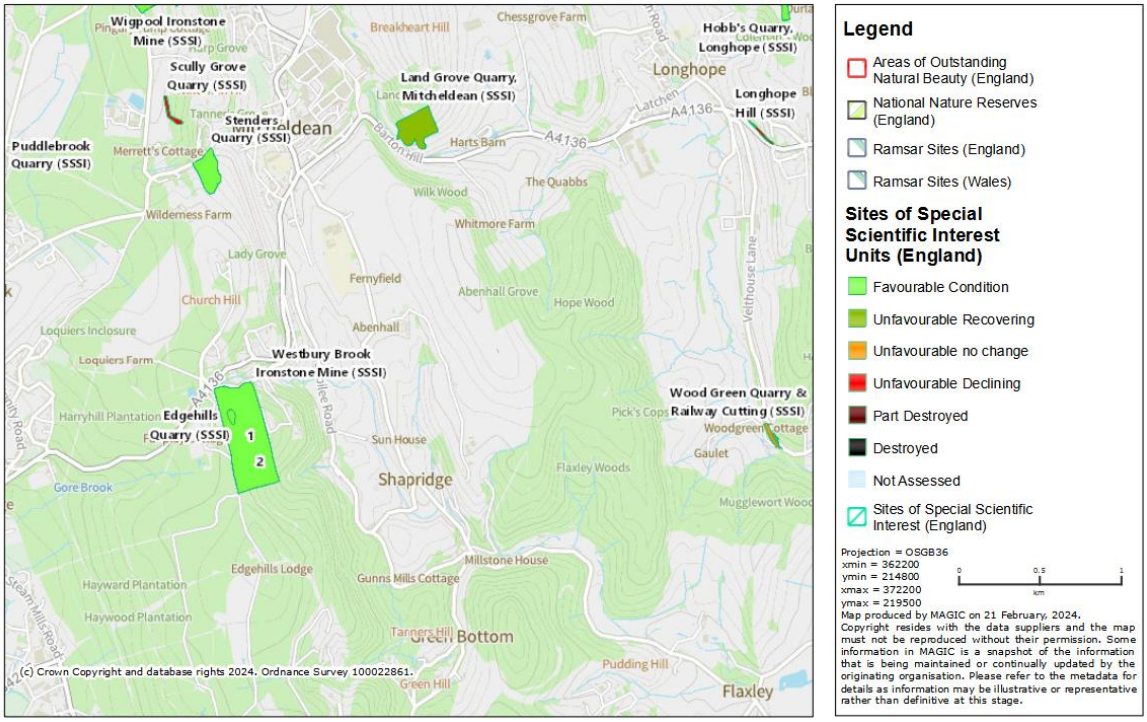


Figure: 25	Statutory Land Based Designations

12.1.3. The installation of a waterwheel is unlikely to impact directly or indirectly the surrounding designations.

12.1.4. At a site meeting with Environment Agency Ecologist - Talek Renals B.Sc (Hons) Environmental Monitoring Officer (Analysis and Reporting): West Midlands Area Environment Agency on the 20 September 2023 our proposal was discussed. He did not believe that our proposal would have a negative impact on the ecology of Westbury Brook. He did consider that the management of the ponds and channel upstream and downstream of the proposed waterwheel was commendable and that there was a wide range of vegetation species and ecology thriving at the site.

12.2. Ecological Assessment

12.2.1. Water Framework Directive

12.2.2. The EA licensing approach ensures that deterioration is avoided within the catchment in line with the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD). The WFD Regulations (2017) seek environmental objectives to protect and enhance the water environment. It ensures the sustainable use of water resources for economic and social development.

12.2.3. The River Leadon and River Frome are the dominant catchments in the Severn Vale, but the area also incorporates the smaller catchments of:

- Carey's Brook
- Bushley Brook
- River Chelt
- Hatherley Brook
- River Cam
- Westbury Brook (Figure 26)
- Cinderford Brook
- River Lyd

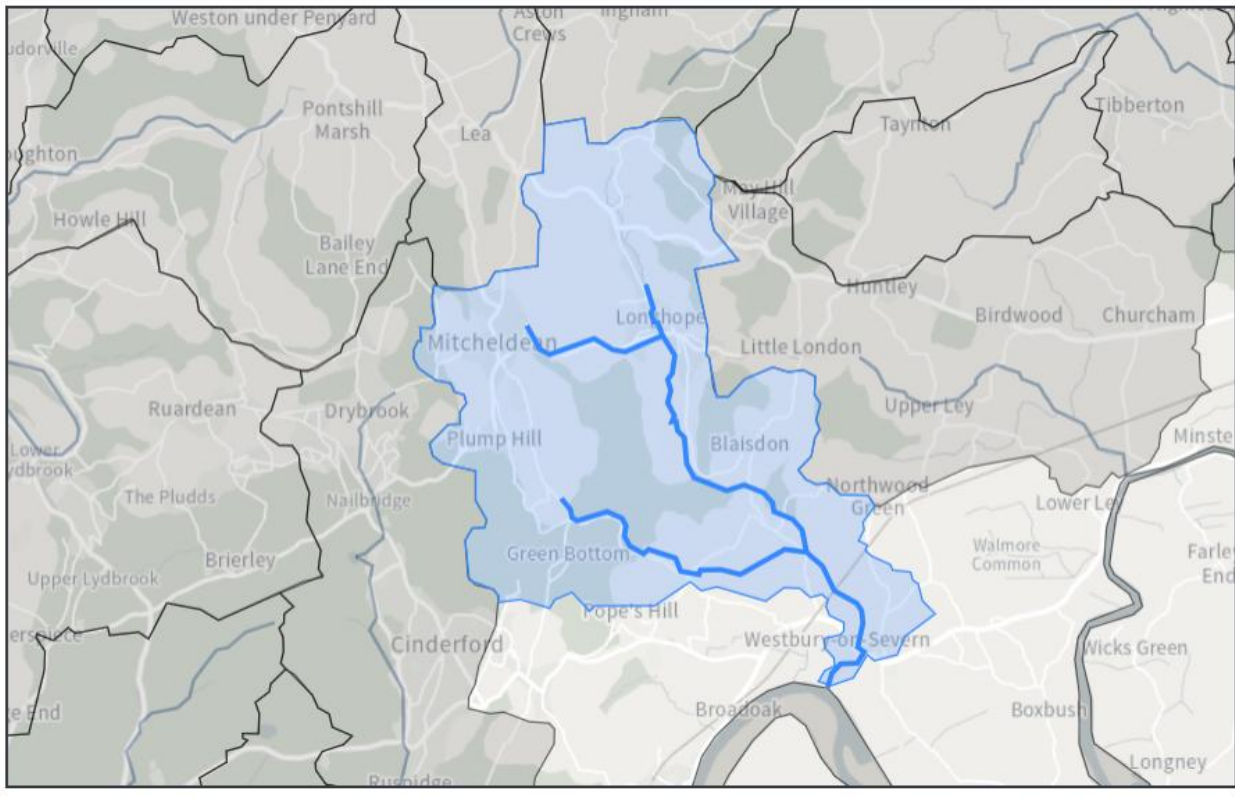


Figure: 26	Westbury Brook Catchment

12.2.4. The main demand for water within the Severn Vale catchment comes from agriculture and to a lesser extent public water supply. Significant quantities are also used for power generation, primarily within the south east of the region.

Water Body ID	Water Body Type	Hydromorphological designation	NGR
GB109054032770	River	not designated artificial or heavily modified	SO6877218992
Surveillance Water Body	**Length**	**Catchment area**	**Catchment area**
No	16.801 km	31.737 km2	3173.66 ha

Classification Item	2019
Ecological	Poor
Biological quality elements	Poor
Fish	High
Invertebrates	High
Macrophytes and Phytobenthos Combined	Poor
Macrophytes Sub Element	Poor
Physico-chemical quality elements	Moderate
Ammonia (Phys-Chem)	High
Dissolved oxygen	High
Phosphate	Moderate
Temperature	High
pH	High
Hydromorphological Supporting Elements	Supports good
Hydrological Regime	Supports good
Morphology	Supports good
Specific pollutants	High
Chromium (VI)	High
Copper	High
Iron	High
Zinc	High
Chemical	Fail
Priority hazardous substances	Fail
Benzo(a)pyrene	Good
Cadmium and Its Compounds	Good
Dioxins and dioxin-like compounds	Good
Heptachlor and cis-Heptachlor epoxide	Good
Hexabromocyclododecane (HBCDD)	Good
Hexachlorobenzene	Good
Hexachlorobutadiene	Good
Mercury and Its Compounds	Fail
Perfluorooctane sulphonate (PFOS)	Good
Polybrominated diphenyl ethers (PBDE)	Fail
Priority substances	Good
Cypermethrin (Priority)	Good
Fluoranthene	Good
Nickel and Its Compounds	Good
Other Pollutants	Does not require assessmen

Table 4 | Westbury Brook Catchment Water Body Classification

12.2.5. A summary of the EA water quality assessment for Westbury Brook is provided in Table 4. Overall water body classification is moderate with a likelihood that Comb Beck will be equal or better in its classification for water quality however due to the steep bed morphology ecological classification would be expected to be lower.

Significant water management issue	Physical modifications	Pollution from waste water	Pollution from towns, cities and transport	Changes to the natural flow and level of water	Invasive non-native species	Pollution from rural areas	Pollution from abandoned mines
Agriculture and rural land management	0	0	0	0	0	3	0
Industry	0	0	0	0	0	0	0
Mining and quarrying	0	0	0	0	0	0	0
Navigation	0	0	0	0	0	0	0
Urban and transport	0	0	0	0	0	0	0
Water Industry	0	2	0	0	0	0	0
Local & central government	0	0	0	0	0	0	0
Domestic general public	0	0	0	0	0	0	0
Recreation	0	0	0	0	0	0	0
Waste treatment and disposal	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
No sector responsible	0	0	0	0	0	0	0
Sector under investigation	0	0	0	0	0	0	0
Total	0	2	0	0	0	3	0

Table: 5 Westbury Brook Catchment Reasons for Not Achieving Good Status

12.2.6. The issues preventing Westbury Brook reaching good status and the sectors identified as contributing to them are detailed in Table 5. The numbers in the table are individual counts of the reasons for not achieving good status and it should be noted there may be more than one reason in a single water body.

12.2.7. Agricultural and Water Industry waste water are the primary sources impacting water quality and preventing Westbury Brook achieving good status.

12.2.8. The proposed waterwheel on Westbury Brook is not considered to conflict with the River Severn Catchment RBMP objectives. Nutrient enrichment of rivers results from waste water discharges and diffuse rural pollution and there is a legacy left by historic mine activities within the catchment that continues to cause environmental impact.

12.3. **Annex II Protected Species**

12.3.1. Whilst there is no record of Annex II species at Flaxley Mill the National Biodiversity Network Atlas does identify occurrences of Brook Lamprey and Bullhead downstream of the Mill. Whilst there may be no ecological record Westbury Brook does present the morphology suitable for other species and the occurrence of these cannot be discounted.

1096 Brook lamprey Lampetra planeri

Westbury Brook has features that provide the necessary conditions for both spawning and nursery areas – extensive gravel shoals, good water quality and areas of marginal silt suitable for **brook lamprey *Lampetra planeri***.

1099 River lamprey Lampetra fluviatilis

Westbury Brook has features that provide the necessary conditions for both spawning and nursery areas – extensive gravel shoals, good water quality and areas of marginal silt **river lamprey *Lampetra fluviatilis*** in an oligotrophic river.

1106 Atlantic salmon Salmo salar

Westbury Brook has features that provide the necessary conditions for both spawning and nursery areas – extensive gravel shoals, good water quality and areas of marginal silt suitable for **Atlantic salmon *Salmo salar.***

1355 Otter Lutra lutra

The waters of Westbury Brook represent good quality habitat with a wide range of suitable conditions for **otter *Lutra lutra***.

12.4. **Annex II Protected Species - Bats**

12.4.1. A dawn to dusk survey was undertaken to establish if the construction area would impact bats or their roosts. There were no roosts observed within the vicinity of the construction area but bats were observed feeding and watering at the upper pond and in the surrounding woodland. Trees provide shelter and attract a diverse range of insect species for bats to feed on and the surrounding woodland is likely to provide night and feeding roosts, maternity, satellite transitional and hibernation roosts.

12.4.2. Whilst bats were observed feeding at the upper pond and in the woodland there was no evidence to suggest bats were present in the area where the waterwheel is to be installed and that its construction would not adversely affect local bat communities, consequently further investigation is not required.

13. Water Quality

13.1. Abstracted Flow

13.1.1. All water used by the waterwheel will be returned to the watercourse. The development does not create a depleted reach. The installation of a waterwheel in the original wheel pit is unlikely to have a negative impact on Westbury Brook or Severn Vale catchment.

13.2. Potential for Pollution

13.2.1. There is a low risk of pollution potential from construction works associated with the installation and construction of the waterwheel and generator. Method statements and operating practices in accordance with GPP 5 will be applied to mitigate any potential for pollution.

13.2.2. There is deemed to be no risk of pollution from the operation of the waterwheel and generator.

13.2.3. The proposed installation is not considered to change the physical or chemical characteristics of Westbury Brook.

13.3. Depleted Reach

13.3.1. The installation of a waterwheel will not create a depleted reach and it is unlikely to have a negative impact on Westbury Brook.

13.4. Biodiversity and Fisheries

13.4.1. The morphology of Westbury Brook upstream of Flaxley Mill is considered to be an unfavourable habitat for BAP species however the presence of these species cannot be discounted. The preservation of flows and will preserve any migratory pathways or localised habitats.

13.4.2. Sand, gravel and finer deposits forming the stream bed at the valley floor are likely to provide an attractive habitat for migratory and non migratory salmonid, lamprey and eel populations, however these are unlikely to be impacted by the development. Historical structures upstream of Flaxley Mill that result in a heavily modified watercourse make it highly unlikely that there will be migratory fish, eel and lamprey in the Brook upstream of the Mill.

13.4.3. Fish were noted to be present in the ponds and areas of shallow gradient where there is a gravel and cobble bed. Bullhead are often suited to upper waters where cobble and gravel morphology exists, these are likely to be isolated populations and non migratory. Small numbers of Rainbow Trout have been noted in the ponds at

the Mill, however these are believed to relate to accidental upstream releases from fish farming cleaning activities.

13.4.4. The proposal is not considered to have a detrimental effect on fish and fauna within the watercourse.

13.5. **Aquatic Vegetation**

13.5.1. There is a wide variety of pond vegetation in the upper pond at Flaxley Mill and in the headrace, tail race and bypass channels, however the lower pond is constructed with a concrete lining and does not support vegetation. The proposed waterwheel is highly unlikely to impact aquatic vegetation within Westbury Brook as there will be no changes to the flow regime.

13.6. **Macro Invertebrates**

13.6.1. The preservation of flows within the Brook and absence of a depleted reach will mean that the installation of the waterwheel is unlikely to affect any local invertebrate populations within Westbury Brook or connected water.

13.7. **Angling**

13.7.1. The development is not considered to affect angling within the area.

14. **Managing Flood Risk**

14.1. **Potential to Increase Flooding**

14.1.1. The extent and magnitude of environmental and ecological impacts induced by the development and construction of a waterwheel on Westbury Brook at Flaxley Mill are considered to be low. The use of the discharged flow from the lower pond is unlikely to adversely affect the high flow flood characteristics of the Brook.

14.1.2. The waterwheel will not change the existing pathway for high volumes of water to be transported downstream and does not create a flood risk from the mobility of flood water. High flows associated with flood events within the Brook above the designed operating capacity of 0.2m3/sec will simply flow over the waterwheel to the wheel pit below. The proposed development is unlikely to increase the risk of flooding locally or remotely.

14.1.3. Within the derogated reach there is a very low risk that the installation will influence the flooding at, and both upstream and downstream of Flaxley Mill.

Figure: 34	Flood Risk Map Flaxley Mill

14.2. **Alterations to Channels and Flow**

14.2.1. There are no proposals to alter the upstream structures at Flaxley Mill or vary the existing flows as they discharge from the lower pond.

14.2.2. Consequently the installation of the waterwheel will not create a significant barrier to the movement of water and is therefore unlikely to increase flooding potential beyond that naturally occurring.

14.3. **Navigation**

14.3.1. **Risk to Navigable Waterways**

14.3.2. There are no navigable waterways affected by or within the confines of this development.

15. Electrical Connection

15.1. Small scale hydro electricity plants can be connected to the national electricity grid or can be stand-alone systems.

15.2. Due to the capacities of small scale hydro plants it means that they will generally be connected to medium or low voltage networks.

15.3. Historically, electricity networks were designed to transfer electrical power from the high voltage transmission grid to customers distributed on lower voltage systems. Their design is based on the assumption that power is transported in one direction and that load patterns are fairly predictable with well known daily and seasonal variations. These networks were operated passively to ensure that consumers were supplied with the quality of electricity within statutory limits.

15.4. The distributed generation such as hydro power systems is geographically disperse and delivers intermittent supplies of energy to the distribution network. The connection of distributed generation can result in power flows going in both directions.

15.5. Due to the capacity falling beneath the DNO notification threshold there is no requirement to make an application to the local Distributed Network Operator (DNO) and the connection can be made under self certification rules as it is considered that the impacts a small generation scheme can have on the distribution network are minor.

16. Carbon Reduction

16.1. The owners of Flaxley Mill would like to supplement their energy consumption by installing a small scale hydro-electric generation system powered by a waterwheel (maximum capacity 6kW). This will reduce dependency on grid connected electricity and reduce carbon emissions at the Mill.

16.2. Based on the annual flow of 1/5/22 - 30/4/23 the proposed waterwheel hydro power system is anticipated to generate approximately 11,118kWh of electricity annually which will provide a reduction in annual CO_2e emissions for the equivalent grid electricity in the order of 2.15 tonnes.

16.3. Hydro Power is a sustainable source of energy and this project aligns with initiatives promoted in the Government commitment to cost effective renewable energy. Renewable Energy is part of a diverse, low-carbon and secure energy mix that will

achieve the UK's net zero target for emissions. The Government produced, UK Renewable Energy Roadmap states "that renewable energy provides energy security, helps meet decarbonisation objectives and brings green growth to all parts of the UK".

16.4. Whilst recognising the opportunities that exist within the county, the Local Development Framework promotes the use of renewable energy technologies through its development policies. This project falls in line with local policy and will reduce reliance on conventional and less sustainable energy sources such as oil and coal and in turn will reduce the environmental impacts of non renewable resources through reductions in carbon emissions and their climate change potential.

17. Conclusions

17.1. It has been identified that the there is a good correlation between measured flows and estimated flow within Westbury Brook. Validation using spot gauged flow data cross referenced with Environment Agency gauging station data concludes that there is a high confidence in the predicted flows.

17.2. The preserved flows at the site and intent not to change the flow dynamics at the Mill will ensure that there is no impact on the character and quality of the watercourse.

17.3. The proposed development is not within or subject to any statutory designations however a number of environmental controls apply to surrounding land and water.

17.4. The design and mitigation applied to the waterwheel hydro power scheme is sympathetic to the sensitivities of the area and aims to preserve the environmental and ecological balances that currently prevail. The proposed design is non consumptive and uses only the flows being discharged from the lower pond and is considered to be sustainable in the context that it does not create a depleted reach.

17.5. It has been assessed that the proposed waterwheel will have no adverse effect on flows and habitat within the depleted reach or downstream within the Brook or connected waters.

17.6. Species listed within the adjacent SSSI and SAC designations will not be adversely affected by the installation.

Annex 1 - Spot Gauge Results : Flaxley Mill

Annex 1

System Report Page 1 of 3

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information	
File Name	FLAXLEY.002.WAD
Start Date and Time	2022/05/12 14:35:09

Site Details	
Site Name	MAIN ROAD
Operator(s)	EFW

System Information	
Sensor Type	FlowTracker
Serial #	P1632
CPU Firmware Version	3.4
Software Ver	2.30
Mounting Correction	0.0%

Units	(Metric Units)
Distance	m
Velocity	m/s
Area	m^2
Discharge	m^3/s

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.5%	1.4%
Velocity	1.4%	3.5%
Width	0.2%	0.2%
Method	2.3%	-
# Stations	3.1%	-
Overall	**4.3%**	**3.9%**

Summary

Averaging Int.	40	# Stations	16
Start Edge	LEW	Total Width	2.950
Mean SNR	22.1 dB	Total Area	0.437
Mean Temp	10.51 °C	Mean Depth	0.148
Disch. Equation	Mid-Section	Mean Velocity	0.0854
		Total Discharge	**0.0373**

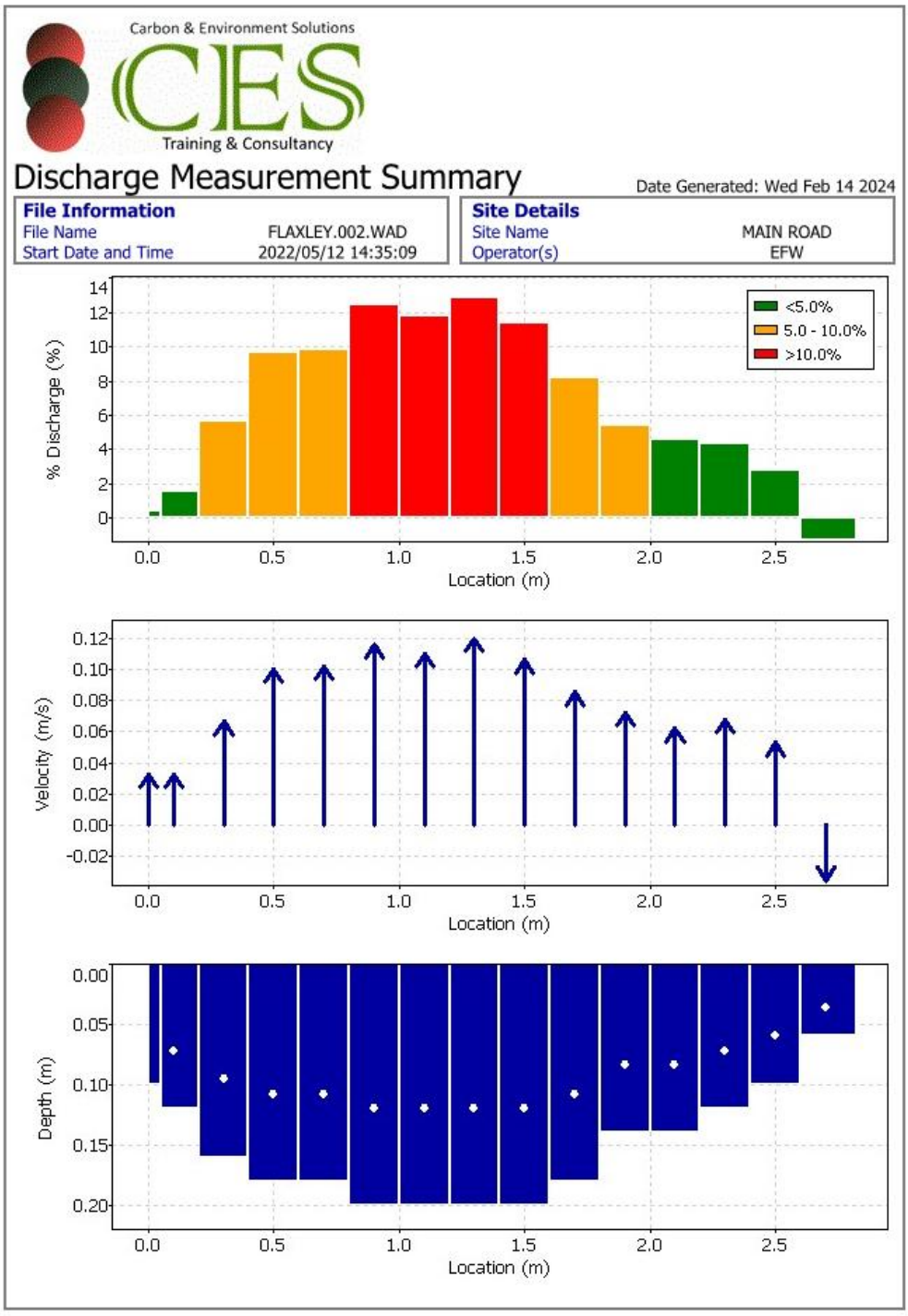
Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	14:35	0.00	None	0.100	0.0	0.0	0.0000	1.00	0.0329	0.005	0.0002	0.4
1	*14:35*	*0.10*	*0.6*	*0.120*	*0.6*	*0.048*	*0.0329*	*1.00*	*0.0329*	*0.018*	*0.0006*	*1.6*
2	14:37	0.30	0.6	0.160	0.6	0.064	0.0665	1.00	0.0665	0.032	0.0021	5.7
3	14:38	0.50	0.6	0.180	0.6	0.072	0.1002	1.00	0.1002	0.036	0.0036	9.7
4	14:39	0.70	0.6	0.180	0.6	0.072	0.1018	1.00	0.1018	0.036	0.0037	9.8
5	14:41	0.90	0.6	0.200	0.6	0.080	0.1159	1.00	0.1159	0.040	0.0046	12.4
6	14:42	1.10	0.6	0.200	0.6	0.080	0.1103	1.00	0.1103	0.040	0.0044	11.8
7	14:43	1.30	0.6	0.200	0.6	0.080	0.1199	1.00	0.1199	0.040	0.0048	12.9
8	14:44	1.50	0.6	0.200	0.6	0.080	0.1061	1.00	0.1061	0.040	0.0042	11.4
9	14:45	1.70	0.6	0.180	0.6	0.072	0.0852	1.00	0.0852	0.036	0.0031	8.2
10	14:46	1.90	0.6	0.140	0.6	0.056	0.0721	1.00	0.0721	0.028	0.0020	5.4
11	14:47	2.10	0.6	0.140	0.6	0.056	0.0619	1.00	0.0619	0.028	0.0017	4.7
12	*14:49*	*2.30*	*0.6*	*0.120*	*0.6*	*0.048*	*0.0677*	*1.00*	*0.0677*	*0.024*	*0.0016*	*4.4*
13	*14:50*	*2.50*	*0.6*	*0.100*	*0.6*	*0.040*	*-0.0530*	*-1.00*	*0.0530*	*0.020*	*0.0011*	*2.8*
14	*14:52*	*2.70*	*0.6*	*0.060*	*0.6*	*0.024*	*-0.0354*	*1.00*	*-0.0354*	*0.014*	*-0.0005*	*-1.3*
15	14:52	2.95	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

file:///C:/Program%20Files%20(x86)/SonTek/FlowTracker/Resources/Reports/Summ... 14/02/2024

System Report Page 2 of 3



file:///C:/Program%20Files%20(x86)/SonTek/FlowTracker/Resources/Reports/Summ... 14/02/2024

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.002.WAD	Site Name	MAIN ROAD
Start Date and Time	2022/05/12 14:35:09	Operator(s)	EFW

Quality Control

St	Loc	%Dep	Message
1	0.10	0.6	High angle: -36
12	2.30	0.6	High standard error: 0.019
		0.6	Boundary QC is Poor; possible boundary interference
13	2.50	0.6	High angle: -173
		0.6	High SNR variation during measurement: 7.7,7.7
14	2.70	0.6	High angle: -177
		0.6	High SNR variation during measurement: 6.9,6.9

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.004.WAD	Site Name	MAIN
Start Date and Time	2022/09/08 15:40:55	Operator(s)	

System Information	
Sensor Type	FlowTracker
Serial #	P1632
CPU Firmware Version	3.4
Software Ver	2.30
Mounting Correction	0.0%

Units	(Metric Units)
Distance	m
Velocity	m/s
Area	m^2
Discharge	m^3/s

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	3.8%
Velocity	1.5%	3.8%
Width	0.2%	0.2%
Method	2.9%	-
# Stations	5.8%	-
Overall	**6.7%**	**5.5%**

Summary

Averaging Int.	40	# Stations	9
Start Edge	LEW	Total Width	1.600
Mean SNR	26.3 dB	Total Area	0.646
Mean Temp	11.92 °C	Mean Depth	0.404
Disch. Equation	Mid-Section	Mean Velocity	0.0437
		Total Discharge	**0.0282**

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	15:40	0.30	None	0.480	0.0	0.0	0.0000	1.00	0.0490	0.048	0.0024	8.3
1	*15:40*	*0.50*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0490*	*-1.00*	*0.0490*	*0.100*	*0.0049*	*17.4*
2	*15:41*	*0.70*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0586*	*-1.00*	*0.0586*	*0.100*	*0.0059*	*20.8*
3	*15:43*	*0.90*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0603*	*-1.00*	*0.0603*	*0.100*	*0.0060*	*21.4*
4	*15:45*	*1.10*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0420*	*-1.00*	*0.0420*	*0.100*	*0.0042*	*14.9*
5	*15:46*	*1.30*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0271*	*-1.00*	*0.0271*	*0.100*	*0.0027*	*9.6*
6	15:47	1.50	0.6	0.400	0.6	0.160	0.0221	1.00	0.0221	0.080	0.0018	6.3
7	15:49	1.70	0.6	0.060	0.6	0.024	0.0228	1.00	0.0228	0.012	0.0003	1.0
8	15:49	1.90	None	0.060	0.0	0.0	0.0000	1.00	0.0228	0.006	0.0001	0.5

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

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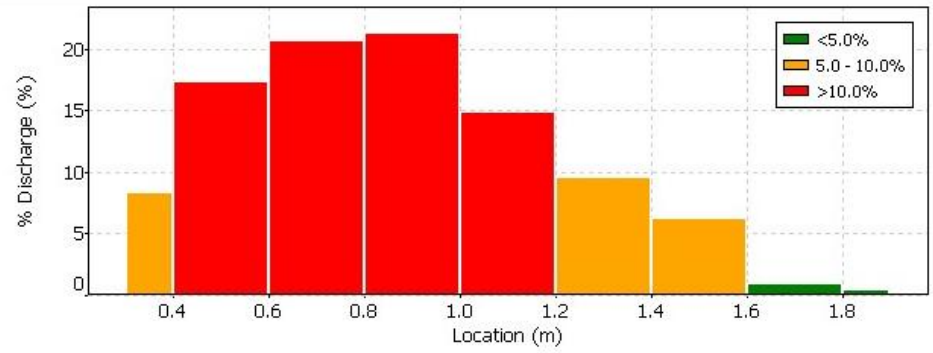
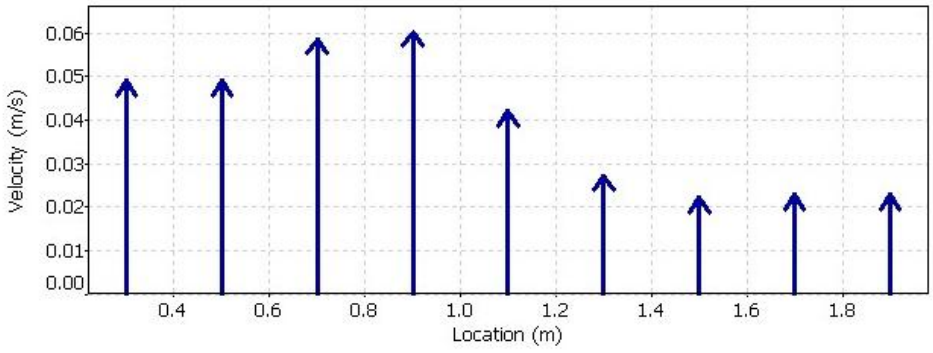
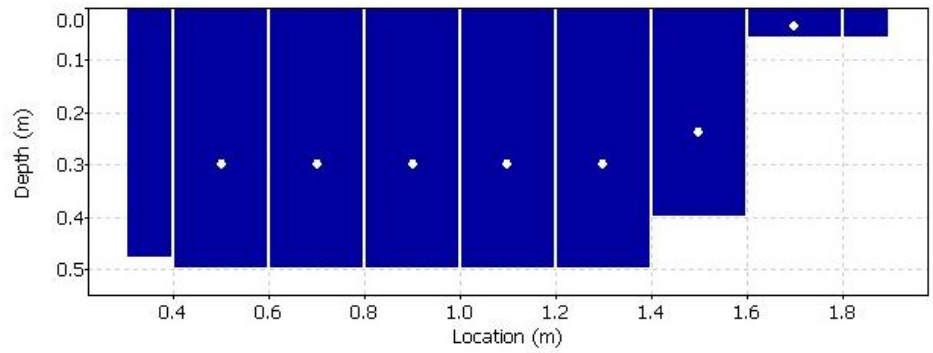
Discharge Measurement Summary

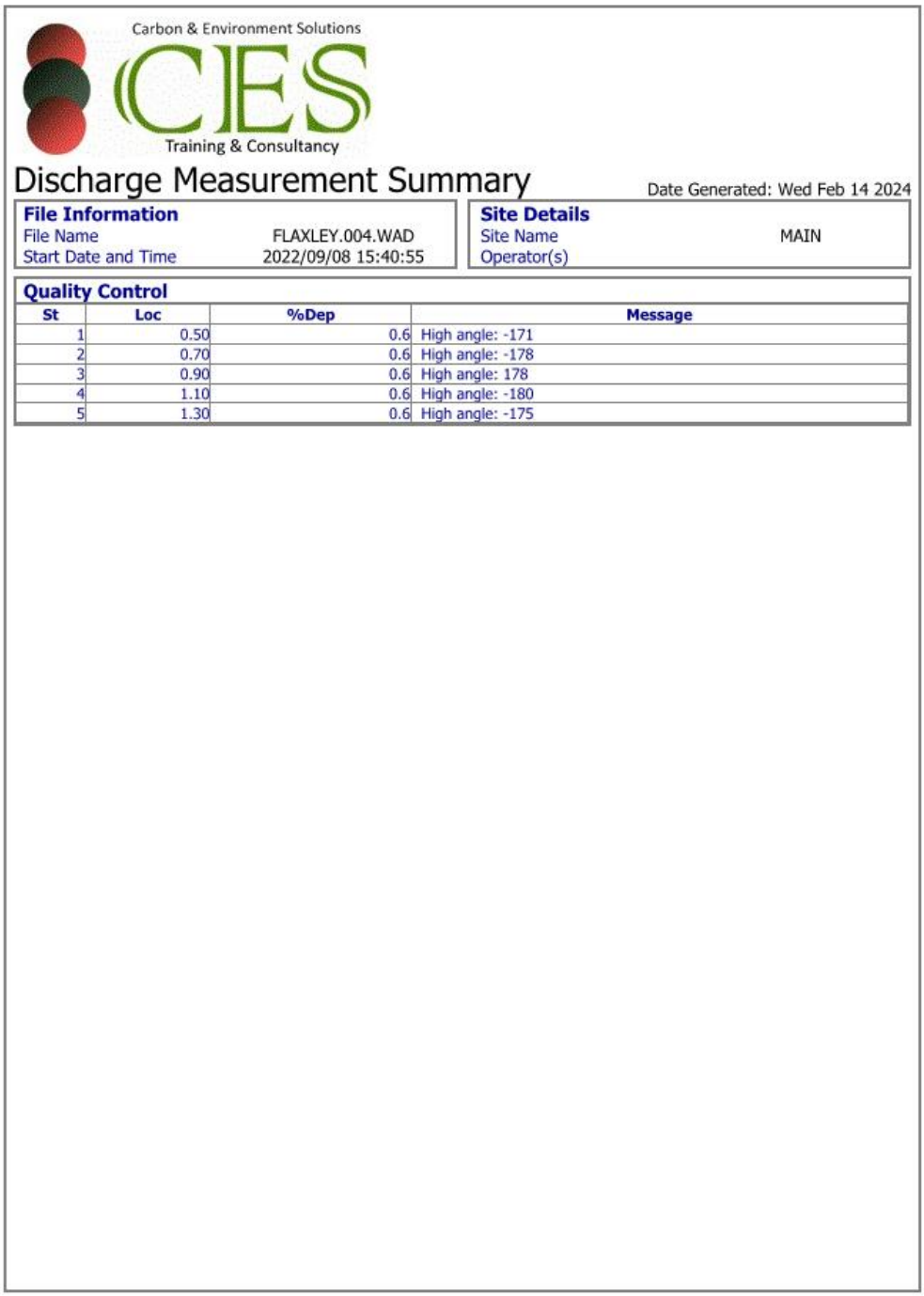
Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.004.WAD	Site Name	MAIN
Start Date and Time	2022/09/08 15:40:55	Operator(s)	









Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.004.WAD	Site Name	MAIN
Start Date and Time	2022/09/08 15:40:55	Operator(s)	

Quality Control

St	Loc	%Dep	Message
1	0.50	0.6	High angle: -171
2	0.70	0.6	High angle: -178
3	0.90	0.6	High angle: 178
4	1.10	0.6	High angle: -180
5	1.30	0.6	High angle: -175

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.005.WAD	Site Name	MAIN
Start Date and Time	2022/11/10 12:13:26	Operator(s)	

System Information	
Sensor Type	FlowTracker
Serial #	P1632
CPU Firmware Version	3.4
Software Ver	2.30
Mounting Correction	0.0%

Units	(Metric Units)
Distance	m
Velocity	m/s
Area	m^2
Discharge	m^3/s

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.5%	2.8%
Velocity	1.2%	9.0%
Width	0.2%	0.2%
Method	2.7%	-
# Stations	3.3%	-
Overall	**4.6%**	**9.5%**

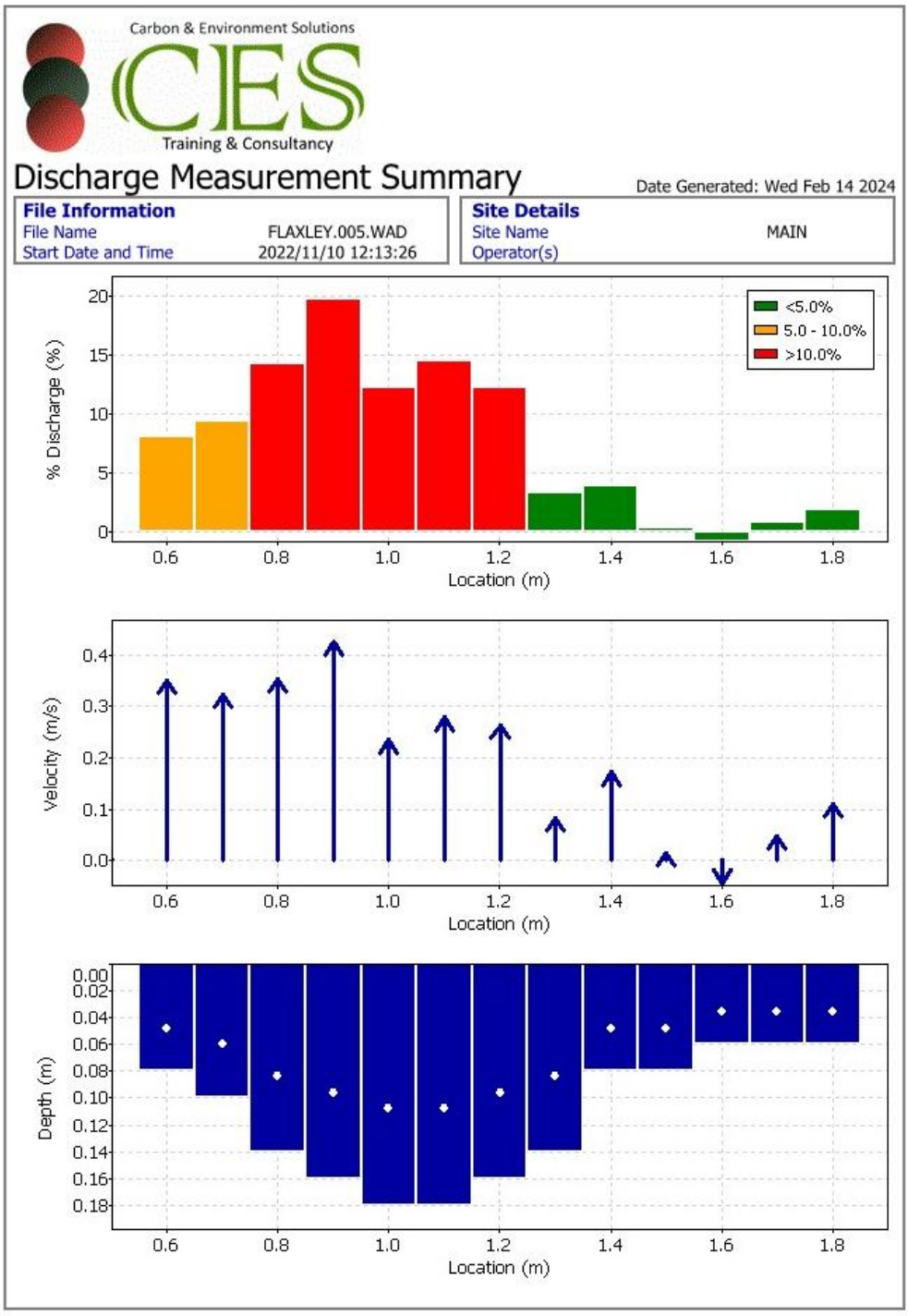
Summary

Averaging Int.	40	# Stations	15
Start Edge	LEW	Total Width	1.400
Mean SNR	27.3 dB	Total Area	0.148
Mean Temp	10.62 °C	Mean Depth	0.106
Disch. Equation	Mid-Section	Mean Velocity	0.2336
		Total Discharge	**0.0346**

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	12:13	0.50	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*12:13*	*0.60*	*0.6*	*0.080*	*0.6*	*0.032*	*0.3505*	*1.00*	*0.3505*	*0.008*	*0.0028*	*8.1*
2	12:14	0.70	0.6	0.100	0.6	0.040	0.3232	1.00	0.3232	0.010	0.0032	9.3
3	12:15	0.80	0.6	0.140	0.6	0.056	0.3528	1.00	0.3528	0.014	0.0049	14.3
4	12:16	0.90	0.6	0.160	0.6	0.064	0.4261	1.00	0.4261	0.016	0.0068	19.7
5	12:19	1.00	0.6	0.180	0.6	0.072	0.2343	1.00	0.2343	0.018	0.0042	12.2
6	12:24	1.10	0.6	0.180	0.6	0.072	0.2785	1.00	0.2785	0.018	0.0050	14.5
7	12:25	1.20	0.6	0.160	0.6	0.064	0.2637	1.00	0.2637	0.016	0.0042	12.2
8	12:26	1.30	0.6	0.140	0.6	0.056	0.0828	1.00	0.0828	0.014	0.0012	3.4
9	*12:29*	*1.40*	*0.6*	*0.080*	*0.6*	*0.032*	*-0.1717*	*-1.00*	*0.1717*	*0.008*	*0.0014*	*4.0*
10	12:31	1.50	0.6	0.080	0.6	0.032	-0.0147	-1.00	0.0147	0.008	0.0001	0.3
11	12:32	1.60	0.6	0.060	0.6	0.024	0.0452	-1.00	-0.0452	0.006	-0.0003	-0.8
12	*12:33*	*1.70*	*0.6*	*0.060*	*0.6*	*0.024*	*-0.0478*	*-1.00*	*0.0478*	*0.006*	*0.0003*	*0.8*
13	*12:34*	*1.80*	*0.6*	*0.060*	*0.6*	*0.024*	*-0.1109*	*-1.00*	*0.1109*	*0.006*	*0.0007*	*1.9*
14	12:34	1.90	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.


Carbon & Environment Solutions
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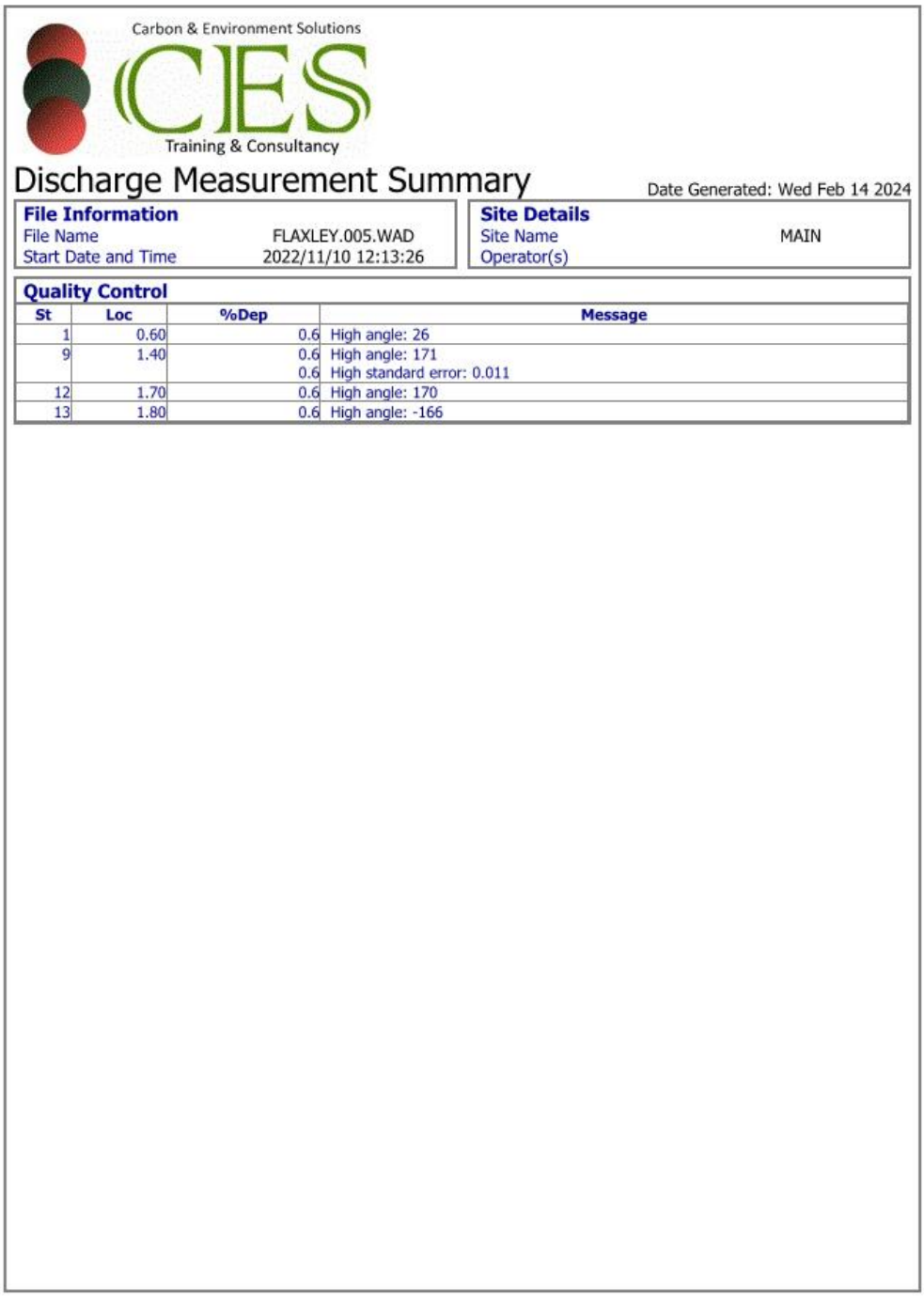
Discharge Measurement Summary
Date Generated: Wed Feb 14 2024
File Information
File Name FLAXLEY.005.WAD
Start Date and Time 2022/11/10 12:13:26
Site Details
Site Name MAIN
Operator(s)
% Discharge (%)
<5.0%
5.0 - 10.0%
>10.0%
Location (m)
Velocity (m/s)
Location (m)
Depth (m)
Location (m)



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Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.005.WAD	Site Name	MAIN
Start Date and Time	2022/11/10 12:13:26	Operator(s)	

Quality Control

St	Loc	%Dep	Message
1	0.60	0.6	High angle: 26
9	1.40	0.6	High angle: 171
		0.6	High standard error: 0.011
12	1.70	0.6	High angle: 170
13	1.80	0.6	High angle: -166

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information	
File Name	FLAXLEY.007.WAD
Start Date and Time	2023/03/25 16:13:00

Site Details	
Site Name	MAIN
Operator(s)	

System Information	
Sensor Type	FlowTracker
Serial #	P1632
CPU Firmware Version	3.4
Software Ver	2.30
Mounting Correction	0.0%

Units	(Metric Units)
Distance	m
Velocity	m/s
Area	m^2
Discharge	m^3/s

Discharge Uncertainty		
Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.3%	0.7%
Velocity	0.3%	2.7%
Width	0.1%	0.1%
Method	1.4%	-
# Stations	1.7%	-
Overall	**2.4%**	**3.0%**

Summary			
Averaging Int.	40	# Stations	31
Start Edge	LEW	Total Width	3.000
Mean SNR	27.5 dB	Total Area	0.398
Mean Temp	10.16 °C	Mean Depth	0.133
Disch. Equation	Mid-Section	Mean Velocity	0.1778
		Total Discharge	**0.0707**

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	16:12	0.25	None	0.130	0.0	0.0	0.0000	1.00	0.1352	0.007	0.0009	1.2
1	16:12	0.35	0.6	0.130	0.6	0.052	0.1352	1.00	0.1352	0.013	0.0018	2.5
2	16:14	0.45	0.6	0.120	0.6	0.048	0.1307	1.00	0.1307	0.012	0.0016	2.2
3	16:15	0.55	0.6	0.120	0.6	0.048	0.1459	1.00	0.1459	0.012	0.0018	2.5
4	16:16	0.65	0.6	0.140	0.6	0.056	0.1863	1.00	0.1863	0.014	0.0026	3.7
5	16:17	0.75	0.6	0.140	0.6	0.056	0.1900	1.00	0.1900	0.014	0.0027	3.8
6	16:18	0.85	0.6	0.140	0.6	0.056	0.2074	1.00	0.2074	0.014	0.0029	4.1
7	16:19	0.95	0.6	0.140	0.6	0.056	0.2001	1.00	0.2001	0.014	0.0028	4.0
8	16:20	1.05	0.6	0.150	0.6	0.060	0.2037	1.00	0.2037	0.015	0.0031	4.3
9	16:21	1.15	0.6	0.150	0.6	0.060	0.2016	1.00	0.2016	0.015	0.0030	4.3
10	16:22	1.25	0.6	0.150	0.6	0.060	0.2222	1.00	0.2222	0.015	0.0033	4.7
11	16:23	1.35	0.6	0.160	0.6	0.064	0.2144	1.00	0.2144	0.016	0.0034	4.9
12	16:25	1.45	0.6	0.150	0.6	0.060	0.2104	1.00	0.2104	0.015	0.0032	4.5
13	16:26	1.55	0.6	0.150	0.6	0.060	0.2254	1.00	0.2254	0.015	0.0034	4.8
14	16:27	1.65	0.6	0.140	0.6	0.056	0.2229	1.00	0.2229	0.014	0.0031	4.4
15	16:28	1.75	0.6	0.140	0.6	0.056	0.2062	1.00	0.2062	0.014	0.0029	4.1
16	16:29	1.85	0.6	0.140	0.6	0.056	0.2060	1.00	0.2060	0.014	0.0029	4.1
17	16:30	1.95	0.6	0.130	0.6	0.052	0.1936	1.00	0.1936	0.013	0.0025	3.6
18	16:31	2.05	0.6	0.140	0.6	0.056	0.1882	1.00	0.1882	0.014	0.0026	3.7
19	16:32	2.15	0.6	0.140	0.6	0.056	0.1727	1.00	0.1727	0.014	0.0024	3.4
20	16:33	2.25	0.6	0.140	0.6	0.056	0.1783	1.00	0.1783	0.014	0.0025	3.5
21	16:34	2.35	0.6	0.140	0.6	0.056	0.1851	1.00	0.1851	0.014	0.0026	3.7
22	16:35	2.45	0.6	0.140	0.6	0.056	0.1888	1.00	0.1888	0.014	0.0026	3.7
23	16:36	2.55	0.6	0.120	0.6	0.048	0.1637	1.00	0.1637	0.012	0.0020	2.8
24	16:37	2.65	0.6	0.120	0.6	0.048	0.1695	1.00	0.1695	0.012	0.0020	2.9
25	*16:38*	*2.75*	*0.6*	*0.140*	*0.6*	*0.056*	*0.0373*	*1.00*	*0.0373*	*0.014*	*0.0005*	*0.7*
26	*16:40*	*2.85*	*0.6*	*0.140*	*0.6*	*0.056*	*-0.1475*	*-1.00*	*0.1475*	*0.014*	*0.0021*	*2.9*
27	*16:42*	*2.95*	*0.6*	*0.120*	*0.6*	*0.048*	*-0.1175*	*-1.00*	*0.1175*	*0.012*	*0.0014*	*2.0*
28	*16:43*	*3.05*	*0.6*	*0.100*	*0.6*	*0.040*	*-0.1311*	*-1.00*	*0.1311*	*0.010*	*0.0013*	*1.9*
29	*16:44*	*3.15*	*0.6*	*0.080*	*0.6*	*0.032*	*-0.1092*	*-1.00*	*0.1092*	*0.008*	*0.0009*	*1.2*
30	16:44	3.25	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.007.WAD	Site Name	MAIN
Start Date and Time	2023/03/25 16:13:00	Operator(s)	

System Information	
Sensor Type	FlowTracker
Serial #	P1632
CPU Firmware Version	3.4
Software Ver	2.30
Mounting Correction	0.0%

Units	(Metric Units)
Distance	m
Velocity	m/s
Area	m^2
Discharge	m^3/s

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.3%	0.7%
Velocity	0.3%	2.7%
Width	0.1%	0.1%
Method	1.4%	-
# Stations	1.7%	-
Overall	**2.4%**	**3.0%**

Summary

Averaging Int.	40	# Stations	31
Start Edge	LEW	Total Width	3.000
Mean SNR	27.5 dB	Total Area	0.398
Mean Temp	10.16 °C	Mean Depth	0.133
Disch. Equation	Mid-Section	Mean Velocity	0.1778
		Total Discharge	**0.0707**

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	16:12	0.25	None	0.130	0.0	0.0	0.0000	1.00	0.1352	0.007	0.0009	1.2
1	16:12	0.35	0.6	0.130	0.6	0.052	0.1352	1.00	0.1352	0.013	0.0018	2.5
2	16:14	0.45	0.6	0.120	0.6	0.048	0.1307	1.00	0.1307	0.012	0.0016	2.2
3	16:15	0.55	0.6	0.120	0.6	0.048	0.1459	1.00	0.1459	0.012	0.0018	2.5
4	16:16	0.65	0.6	0.140	0.6	0.056	0.1863	1.00	0.1863	0.014	0.0026	3.7
5	16:17	0.75	0.6	0.140	0.6	0.056	0.1900	1.00	0.1900	0.014	0.0027	3.8
6	16:18	0.85	0.6	0.140	0.6	0.056	0.2074	1.00	0.2074	0.014	0.0029	4.1
7	16:19	0.95	0.6	0.140	0.6	0.056	0.2001	1.00	0.2001	0.014	0.0028	4.0
8	16:20	1.05	0.6	0.150	0.6	0.060	0.2037	1.00	0.2037	0.015	0.0031	4.3
9	16:21	1.15	0.6	0.150	0.6	0.060	0.2016	1.00	0.2016	0.015	0.0030	4.3
10	16:22	1.25	0.6	0.150	0.6	0.060	0.2222	1.00	0.2222	0.015	0.0033	4.7
11	16:23	1.35	0.6	0.160	0.6	0.064	0.2144	1.00	0.2144	0.016	0.0034	4.9
12	16:25	1.45	0.6	0.150	0.6	0.060	0.2104	1.00	0.2104	0.015	0.0032	4.5
13	16:26	1.55	0.6	0.150	0.6	0.060	0.2254	1.00	0.2254	0.015	0.0034	4.8
14	16:27	1.65	0.6	0.140	0.6	0.056	0.2229	1.00	0.2229	0.014	0.0031	4.4
15	16:28	1.75	0.6	0.140	0.6	0.056	0.2062	1.00	0.2062	0.014	0.0029	4.1
16	16:29	1.85	0.6	0.140	0.6	0.056	0.2060	1.00	0.2060	0.014	0.0029	4.1
17	16:30	1.95	0.6	0.130	0.6	0.052	0.1936	1.00	0.1936	0.013	0.0025	3.6
18	16:31	2.05	0.6	0.140	0.6	0.056	0.1882	1.00	0.1882	0.014	0.0026	3.7
19	16:32	2.15	0.6	0.140	0.6	0.056	0.1727	1.00	0.1727	0.014	0.0024	3.4
20	16:33	2.25	0.6	0.140	0.6	0.056	0.1783	1.00	0.1783	0.014	0.0025	3.5
21	16:34	2.35	0.6	0.140	0.6	0.056	0.1851	1.00	0.1851	0.014	0.0026	3.7
22	16:35	2.45	0.6	0.140	0.6	0.056	0.1888	1.00	0.1888	0.014	0.0026	3.7
23	16:36	2.55	0.6	0.120	0.6	0.048	0.1637	1.00	0.1637	0.012	0.0020	2.8
24	16:37	2.65	0.6	0.120	0.6	0.048	0.1695	1.00	0.1695	0.012	0.0020	2.9
25	*16:38*	*2.75*	*0.6*	*0.140*	*0.6*	*0.056*	*0.0373*	*1.00*	*0.0373*	*0.014*	*0.0005*	*0.7*
26	*16:40*	*2.85*	*0.6*	*0.140*	*0.6*	*0.056*	*-0.1475*	*-1.00*	*0.1475*	*0.014*	*0.0021*	*2.9*
27	*16:42*	*2.95*	*0.6*	*0.120*	*0.6*	*0.048*	*-0.1175*	*-1.00*	*0.1175*	*0.012*	*0.0014*	*2.0*
28	*16:43*	*3.05*	*0.6*	*0.100*	*0.6*	*0.040*	*-0.1311*	*-1.00*	*0.1311*	*0.010*	*0.0013*	*1.9*
29	*16:44*	*3.15*	*0.6*	*0.080*	*0.6*	*0.032*	*-0.1092*	*-1.00*	*0.1092*	*0.008*	*0.0009*	*1.2*
30	16:44	3.25	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

Carbon & Environment Solutions
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Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.007.WAD	Site Name	MAIN
Start Date and Time	2023/03/25 16:13:00	Operator(s)	

Quality Control

St	Loc	%Dep	Message
25	2.75	0.6	Boundary QC is Good; possible boundary interference
26	2.85	0.6	High angle: -169
		0.6	Boundary QC is Fair; possible boundary interference
27	2.95	0.6	High angle: -171
28	3.05	0.6	High angle: -172
29	3.15	0.6	High angle: -171

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information	
File Name	FLAXLEY.009.WAD
Start Date and Time	2023/03/26 11:13:30

Site Details	
Site Name	MAIN
Operator(s)	

System Information	
Sensor Type	FlowTracker
Serial #	P1632
CPU Firmware Version	3.4
Software Ver	2.30
Mounting Correction	0.0%

Units	(Metric Units)
Distance	m
Velocity	m/s
Area	m^2
Discharge	m^3/s

Discharge Uncertainty		
Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.3%	0.7%
Velocity	0.4%	2.4%
Width	0.1%	0.1%
Method	1.5%	-
# Stations	1.7%	-
Overall	**2.5%**	**2.6%**

Summary			
Averaging Int.	40	# Stations	31
Start Edge	LEW	Total Width	3.000
Mean SNR	30.9 dB	Total Area	0.410
Mean Temp	9.44 °C	Mean Depth	0.137
Disch. Equation	Mid-Section	Mean Velocity	0.1975
		Total Discharge	**0.0810**

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:13	0.30	None	0.120	0.0	0.0	0.0000	1.00	0.1360	0.006	0.0008	1.0
1	11:13	0.40	0.6	0.120	0.6	0.048	0.1360	1.00	0.1360	0.012	0.0016	2.0
2	*11:14*	*0.50*	*0.6*	*0.130*	*0.6*	*0.052*	*0.1403*	*1.00*	*0.1403*	*0.013*	*0.0018*	*2.3*
3	11:15	0.60	0.6	0.130	0.6	0.052	0.1587	1.00	0.1587	0.013	0.0021	2.5
4	11:16	0.70	0.6	0.140	0.6	0.056	0.1684	1.00	0.1684	0.014	0.0024	2.9
5	11:18	0.80	0.6	0.160	0.6	0.064	0.1824	1.00	0.1824	0.016	0.0029	3.6
6	11:19	0.90	0.6	0.160	0.6	0.064	0.2149	1.00	0.2149	0.016	0.0034	4.2
7	11:20	1.00	0.6	0.160	0.6	0.064	0.2291	1.00	0.2291	0.016	0.0037	4.5
8	11:21	1.10	0.6	0.160	0.6	0.064	0.2337	1.00	0.2337	0.016	0.0037	4.6
9	11:22	1.20	0.6	0.160	0.6	0.064	0.2491	1.00	0.2491	0.016	0.0040	4.9
10	11:22	1.30	0.6	0.160	0.6	0.064	0.2664	1.00	0.2664	0.016	0.0043	5.3
11	11:23	1.40	0.6	0.160	0.6	0.064	0.2642	1.00	0.2642	0.016	0.0042	5.2
12	11:24	1.50	0.6	0.160	0.6	0.064	0.2574	1.00	0.2574	0.016	0.0041	5.1
13	11:25	1.60	0.6	0.160	0.6	0.064	0.2722	1.00	0.2722	0.016	0.0044	5.4
14	11:26	1.70	0.6	0.150	0.6	0.060	0.2635	1.00	0.2635	0.015	0.0040	4.9
15	11:28	1.80	0.6	0.140	0.6	0.056	0.2528	1.00	0.2528	0.014	0.0035	4.4
16	11:29	1.90	0.6	0.140	0.6	0.056	0.2408	1.00	0.2408	0.014	0.0034	4.2
17	11:30	2.00	0.6	0.140	0.6	0.056	0.2112	1.00	0.2112	0.014	0.0030	3.7
18	11:32	2.10	0.6	0.140	0.6	0.056	0.2193	1.00	0.2193	0.014	0.0031	3.8
19	11:33	2.20	0.6	0.140	0.6	0.056	0.1837	1.00	0.1837	0.014	0.0026	3.2
20	11:35	2.30	0.6	0.120	0.6	0.048	0.1650	1.00	0.1650	0.012	0.0020	2.4
21	11:36	2.40	0.6	0.120	0.6	0.048	0.1988	1.00	0.1988	0.012	0.0024	2.9
22	11:37	2.50	0.6	0.120	0.6	0.048	0.1979	1.00	0.1979	0.012	0.0024	2.9
23	11:38	2.60	0.6	0.130	0.6	0.052	0.1972	1.00	0.1972	0.013	0.0026	3.2
24	11:39	2.70	0.6	0.130	0.6	0.052	0.1520	1.00	0.1520	0.013	0.0020	2.4
25	*11:40*	*2.80*	*0.6*	*0.140*	*0.6*	*0.056*	*0.1553*	*1.00*	*0.1553*	*0.014*	*0.0022*	*2.7*
26	*11:41*	*2.90*	*0.6*	*0.140*	*0.6*	*0.056*	*0.0559*	*1.00*	*0.0559*	*0.014*	*0.0008*	*1.0*
27	*11:43*	*3.00*	*0.6*	*0.110*	*0.6*	*0.044*	*-0.1411*	*-1.00*	*0.1411*	*0.011*	*0.0016*	*1.9*
28	*11:45*	*3.10*	*0.6*	*0.110*	*0.6*	*0.044*	*-0.0699*	*-1.00*	*0.0699*	*0.011*	*0.0008*	*0.9*
29	*11:47*	*3.20*	*0.6*	*0.110*	*0.6*	*0.044*	*-0.1394*	*-1.00*	*0.1394*	*0.011*	*0.0015*	*1.9*
30	11:47	3.30	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

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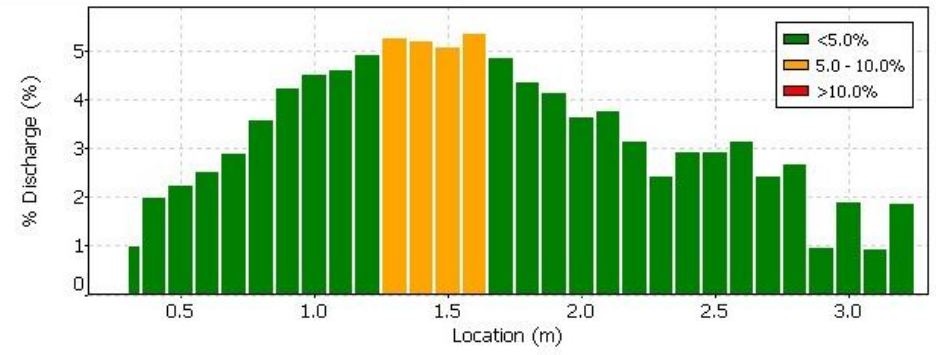
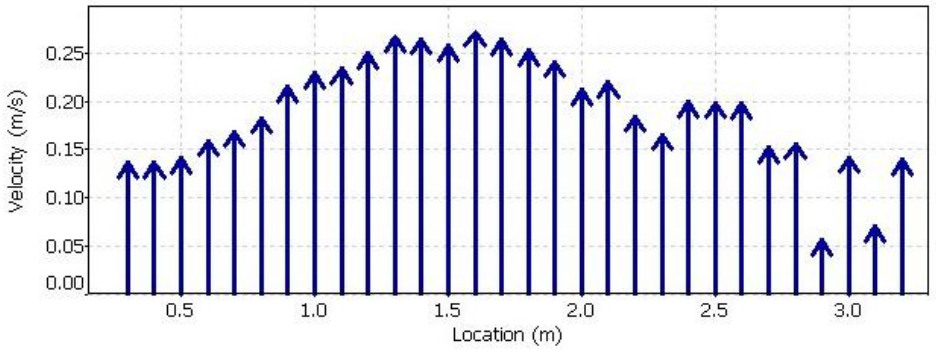
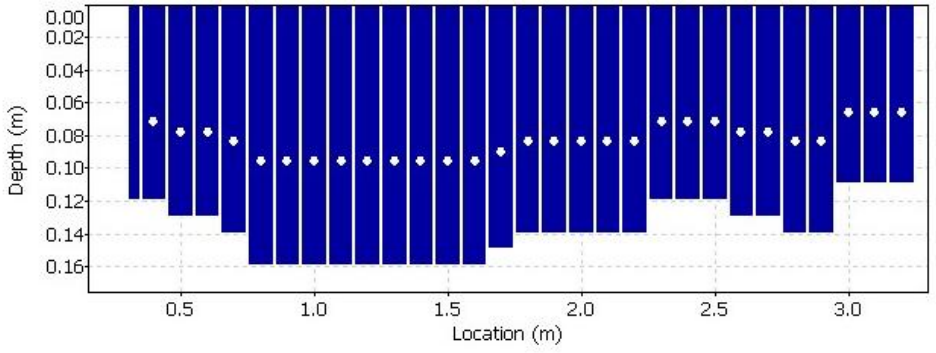
Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.009.WAD	Site Name	MAIN
Start Date and Time	2023/03/26 11:13:30	Operator(s)	







file:///C:/Program%20Files%20(x86)/SonTek/FlowTracker/Resources/Reports/Summ... 14/02/2024

Carbon & Environment Solutions CES Training & Consultancy

Discharge Measurement Summary

Date Generated: Wed Feb 14 2024

File Information		Site Details	
File Name	FLAXLEY.009.WAD	Site Name	MAIN
Start Date and Time	2023/03/26 11:13:30	Operator(s)	

Quality Control

St	Loc	%Dep	Message
2	0.50	0.6	High angle: -23
25	2.80	0.6	Boundary QC is Fair; possible boundary interference
26	2.90	0.6	Boundary QC is Good; possible boundary interference
27	3.00	0.6	High angle: -168
28	3.10	0.6	High angle: -172
29	3.20	0.6	High angle: -169

Report Prepared By:

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Consulting Environmental Engineer

Director
Carbon & Environment Solutions Ltd

Carbon & Environment Solutions Ltd

The observations and opinions contained in this report are based on available information held by statutory and non-government organisations and agencies and is not exhaustive. Whilst every effort is made to meet the client brief, no investigation can ensure complete assessment or prediction of the natural environment.

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