



Abbeydale

Building Environment Consultants

**CONDITIONS & SSSI MONITORING MEASURES
FOR QUARRY 3 OUTFALL
MONEYSTONE QUARRY, OAKAMoor
STAFFORDSHIRE**

Report: 4180057 C4MS

February 2024

Client:

Laver Leisure
C/oBolsterstone plc
36 Bridge Business Centre
Beresford Way
Chesterfield
S41 9FG

SSSI MONITORING MEASURES FOR QUARRY 3 OUTFALL MONEYSTONE QUARRY, OAKAMoor STAFFORDSHIRE

Report: 418057 C4MS

February 2024

DOCUMENT VERIFICATION SHEET

	Prepared By:	Checked By:
Name:	Peter J Lloyd	Richard Saville
Qualifications:	BSc MSc CGeol FGS	BSc CGeol FGS
Position:	Managing Director	Director
Signature:		

TABLE OF CONTENTS

1. INTRODUCTION	1
2. SMD/2022/0014 CONDITIONS	1
3. SSSI MONITORING MEASURES METHOD STATEMENT	2
3.1. Stream A, B & C Monitoring.....	3
3.2. Monitoring of Q3 Lake Levels	3
3.3. Monitoring of Stream A Water Quality	3
3.4. Water Quality Sample Locations.....	4
3.5. Construction Monitoring of Water Quality	4
3.6. Post Construction Monitoring.....	4
3.7. Annual Reporting	4
3.8. Mitigation Measures.....	4

APPENDICES

APPENDIX A - TABLES.....	1
--------------------------	---

SSSI MONITORING MEASURES FOR QUARRY 3 OUTFALL MONEYSTONE QUARRY, OAKAMoor STAFFORDSHIRE

1. INTRODUCTION

Planning permission (SMD/2022/0014) has been granted by SMDC for the construction of a surface water outfall. The proposed outfall is located on the south eastern corner of the lake within Quarry 3 at Moneystone Quarry (Nat Grid Ref: 404128E 346243N). The background, description and sequence of works is provided within Bowland Ecology report. BOW111 SMD/2022/0014 Condition 3 Protection of Whiston Eaves SSSI: Method Statement.

This document was produced on behalf of our client, Laver Leisure and their advisors and financiers, and should not be relied upon or transferred to any other parties without the express written authorisation of Abbeydale BEC Ltd and our client. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

The purpose of this document is to provide sufficient information on the SSSI Monitoring Measures proposed to meet Condition 4, 9, 12 and 13 of the planning permission.

2. SMD/2022/0014 CONDITIONS

Condition 4. No development including site stripping or clearance shall commence until such time that a Monitoring Scheme (with implementation timetable) to cover the construction and operational stage of the development hereby permitted has been submitted to and approved in writing by the Local Planning Authority.

- a) that flow monitoring apparatus is fit for purpose to accurately monitor the full range critical range of flows. This shall be completed prior to the development.
- b) the water level at the overspill for 5 years from the operation of the development. This shall be completed post development. The agreed water level is 156 AOD.
- c) Monitoring of water quality before and during construction to check that no fines, fuel or chemicals are entering the SSSI. See Annex A.
- d) Monitoring of future stream flows and sediments for 5 years from the operation of the development.
- e) Annual reporting of the data and necessary interpretation. The reports shall compare monitoring data against the results of predictive modelling carried out during the planning phase. Any discrepancies shall be clearly identified and explained, and actions proposed as necessary.
- f) A mechanism for mitigation if monitoring reveals issues. This is required in case the monitored results start to significantly deviate from predictions, in which case Natural England would require mitigation.

Condition 9. Scheme of works for infilling/removal of existing outfall and adjacent spillway channel

- a) The original quarry outfall will be buried in accordance with NE requirements.
- b) The initial spoil from the outfall excavation will be used to raise the ground in front of the existing outfall in the corner of the Q3 quarry (Zone 1);
- c) whilst the material won from SSSI area will be used to cover the original outfall and infill the channel cut to meet the EA reservoir requirements

Condition 12. Details for temporary spread and permanent removal of spoil arising from the excavation.

- a) The temporary spread of spoil is covered by the outfall method statement prepared prior to planning. (Copy Attached)
- b) Material is to be placed and compacted in place in accordance with SHW along the line of the access track;
- c) and at the end of each working shift the surface is to be weatherproofed such that surface water runs into the lake and so preventing surface flow reaching the the SSSI.
- d) The permanent removal of the spoil is covered by the main application Earthworks schedule;
- e) along with the lowering of the ground to the east of the outfall, the spoil will be taken to L4 in Q1E to form capping.

Condition 13. Details of future maintenance and operation of the outfall

- a) There are no moving parts or structures requiring maintenance
- b) The future maintenance will be primarily to keep the outfall channel clear of debris;
- c) this is covered within Condition 4 and Section 3 below as part of the monthly monitoring and in particular references 10 to 14 in Table 3.

3. SSSI MONITORING MEASURES METHOD STATEMENT

Since the start of syphoning of water from Q3 in July 2019 they have been monitored on a biweekly basis, recording the rate of flow from both syphons, pH and the flow volumes at the installed V notches in streams A, B and C. See Figure 1. The V notches were installed near to the confluences of Stream A, B and C when Q3 was being developed and had previously been recorded quarterly as part of monitoring for the restoration of the quarry. To meet the SSSI monitoring requirements the following adjustments to the current monitoring regime will be undertaken:-

3.1. Stream A, B & C Monitoring

The quarries existing Stream A, B & C monitoring apparatus will be used so comparison with historic flows can be made. (Some clearing of sediment and repair of the existing flow gates will be undertaken prior to the outfall construction).

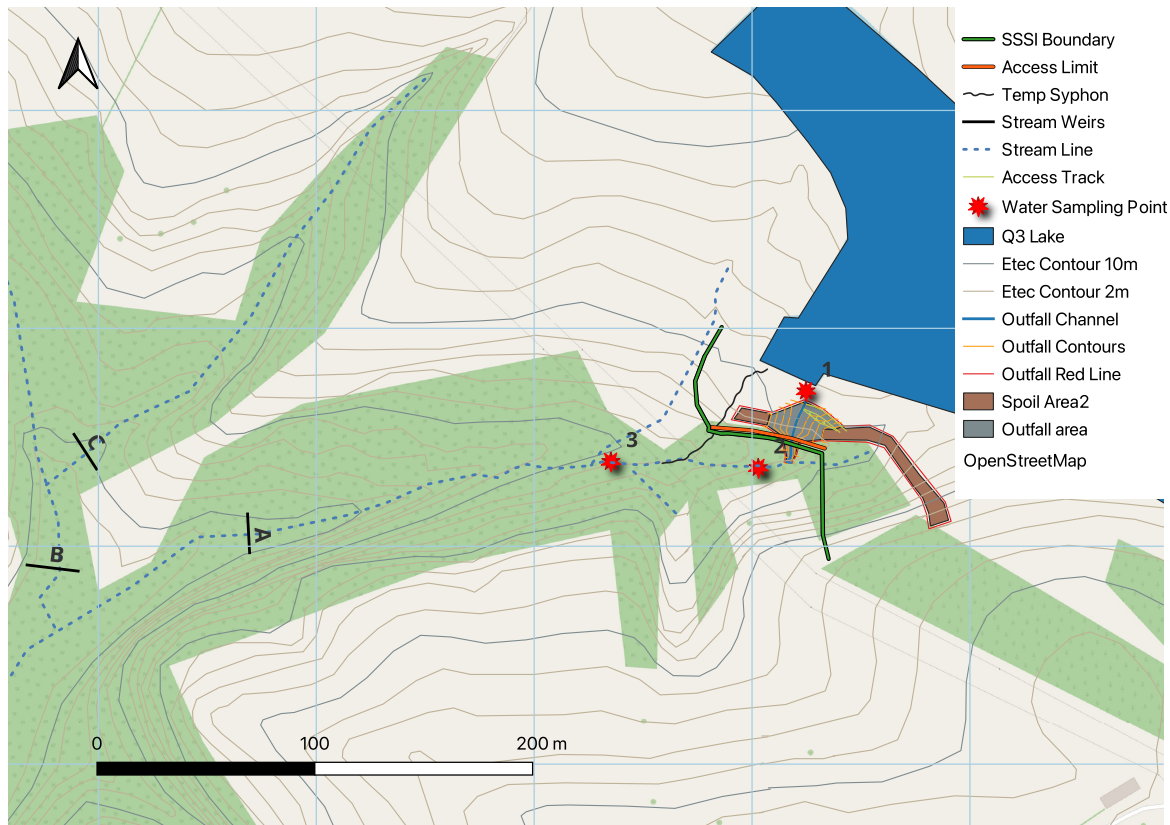


FIGURE 1 - SITE PLAN

3.2. Monitoring of Q3 Lake Levels

A new monitoring post will be installed in the southwest corner of Q3 beyond the area of proposed earthworks. (A second level pin will be maintained should the monitoring post become vandalised). The post will be installed prior to the outfall being constructed. The agreed water level is 156 AOD.

3.3. Monitoring of Stream A Water Quality

Monitoring of water quality will be completed on at least two occasions before construction to check that no fines, fuel or chemicals are entering the SSSI. Measurements of fines, oxygen levels and pH will be measured insitu. Water samples will also be collected and sent to a MCerts laboratory to determine the remaining water quality trigger levels listed in Table 1.

3.4. Water Quality Sample Locations

Sampling will be collected at the outfall entry point; at a point 1m downstream from the outfall exist and from a point 5m downstream of the current syphon outfall. See Figure 1.

3.5. Construction Monitoring of Water Quality

During construction of the outfall water quality sampling and stream flow will be undertaken weekly and containers will also be available during construction to sample ponding water, or any sampling additionally required by Bowland ECOW or Abbeydale BEC Site Engineer. Additionally, on completion of the outfall construction a final set of measurements will be taken.

3.6. Post Construction Monitoring

After completion of the outfall construction monitoring of the stream flows and sediment migration will be undertaken at monthly intervals for the following 5 years. The proposed timetabling of monitoring is presented in Table 2.

3.7. Annual Reporting

Following the anniversary of the completion of the outfall an annual report will be produced compiling the data collected over the previous 12 months and comparing it with past results and the JBA Consulting July 2021 report. The annual reports will compare monitoring data against the results of predictive modelling carried out during the planning phase. Any discrepancies will be clearly identified and explained, and actions proposed as necessary.

3.8. Mitigation Measures

A mechanism for mitigation if monitoring reveals issues. This is required in case the monitored results start to significantly deviate from predictions, in which case Natural England would require mitigation. A risk assessment of potential mitigating circumstances is given in Table 3, together mechanisms to mitigate.

Report 418057 C4MS | January 2024

APPENDIX A - TABLES

WATER QUALITY TRIGGER LEVELS - TABLE 1

Determinand	Trigger level/outside specified range
Dissolved Oxygen (percent saturation, 10 percentile):	< 85%
Biochemical oxygen demand (BOD) (mg/l, 90 percentile):	>1.5mg/l
pH:	>=6 to <=9
Acid neutralising capacity (ANC)(annual mean values):	< 80
Soluble reactive phosphorus (applied as a growing season (March-September) mean and as a whole year mean):	> 15ug/l
Total Ammonia as nitrogen (mg/l, 90 percentile):	> 0.2mg/l
95%ile un-ionised ammonia (NH ₃ -N, mg L ⁻¹):	> 0.025mg/l
Suspended solids (annual median value based on earlier recommendation pre-quarrying):	>20mg/l
Calcium	27 - 38mg/l
Magnesium	2.7 - 5.4mg/l
Iron	>0.01 - 0.03mg/l
Manganese	>0.01 - 0.24mg/l
Cadmium	>0.005mg/l
Chromium	>0.01mg/l
Copper	>0.01mg/l
Nickel	>0.01mg/l
Lead	>0.01mg/l
Zinc	>0.01mg/l
Chloride	19 - 24mg/l
Sulphate	28 - 38mg/l

OUTFALL SCHEDULE OF MONITORING - TABLE 2						
Reference	Monitoring	Reporting Engineer	Timeline			Location
			Pre Construction	Construction	In Service	
1	Q3 lake level Monitoring	Abbeydale BEC Site Engineer	Monthly Monitoring	Daily Monitoring	Monthly Monitoring	Monitor lake level using existing and/or proposed monitoring post east of outfall.
2	Examination of vegetation for wildlife.	Bowland ECOW	Prior to tree removal and prior to earthworks	Daily Monitoring		Within and adjacent to outfall area
3	Repair Quarries Stream A, B & C flow monitoring gates	Abbeydale BEC Site Engineer	Repair existing flow monitoring gates to allow at least 2 readings before earthworks			Located downstream close to confluence of Streams A, B & C
4	Monitor Stream flow at Quarries Monitoring Gates	Abbeydale BEC Site Engineer	At least 2 readings before earthworks	Weekly	Monthly Monitoring	Located downstream close to confluence of Streams A, B & C
5	Monitor Stream no-fines, pH and oxygen levels insitu.	Abbeydale BEC Site Engineer	At least 2 readings before earthworks	Weekly & on ECOW request		Monitor lake at outfall, at syphon outfall and monitoring gate. Additionally in Stream below outfall if water present.
6	Monitor Table 1 determinants	Abbeydale BEC Site Engineer to collect and dispatched to testing laboratory.	At least 2 readings before earthworks	Weekly & on ECOW request		Monitor lake at outfall and at syphon outfall. Additionally in Stream below outfall if water present.
7	Monitor Stream no-fines, pH and oxygen levels insitu	Abbeydale BEC Site Engineer			Monthly Monitoring	Monitor at lake inlet, 1m downstream of outfall outlet and at monitoring gate.
8	Debris in Outfall	Abbeydale BEC Site Engineer			Monthly inspections	Remove any debris from outfall channel
9	Vegetation growth	Bowland ECOW			Annual Inspection	Remove any vegetation that could jeopardise long-term flow through channel.
9	Annual Report of the data and interpretation against JBA predicted modelling	Abbeydale BEC Site Engineer			Annual Report	Report of data and overview of results

OUTFALL SCHEDULE OF MITIGATION - TABLE 3			
Reference	Potential Risk	Potential Mitigation	Effect of Mitigation
CONSTRUCTION			
1	Q3 lake level above 155.4m AOD prior to construction	Work is suspended until lake levels are lowered to below 155.4m AOD. The syphons are maintained to drawdown surplus water.	Reduce risk to low of overtopping through partly completed outfall.
2	Q3 lake level increases above 155.4m AOD during construction	Work is suspended until lake levels are lowered to below 155.4m AOD. The syphons are maintained to drawdown surplus water.	Reduce risk to low of overtopping through partly completed outfall.
3	Period of heavy rain forecast prior to earthworks starting	Earthworks to start in Spring/ Summer period within SSSI watershed areas when generally dry weather is forecast.	Reduce uncertainty of weather conditions at initial stages of works.
4	Waterlogging of ground and surface water run-off	No work shall be permitted in heavy and/or continuous rain or when surface water continues to pond in working areas. The Abbeydale Site Engineer, advised by the Bowland ECOW shall determine suitable dry conditions to commence/continue work.	Reduce risk to low that exposed ground becomes untrackable, and surface water flow is controlled.
5	Surface water run-off entering SSSI	At the end of each working period the Site Engineer will check all working areas and will instruct where necessary the surface to be reprofiled to drain towards the quarry lake. Newly placed stockpiles shall be compacted and weatherproofed to allow all run-off to drain towards the quarry lake.	Reduce risk to low
6	Access track becoming waterlogged	Scrape of wet areas of access track and install geotextile/ geogrid and working surface using site won sandstone gravel.	Reduce risk to low that access track becomes untrackable
7	Contamination is brought to site via plant and machinery	All plant and machinery shall be checked by ECOW prior at maintenance area prior to start of work in accordance with Table 9.4 Ecology Mitigation Measures.	Reduce risk to low
8	Fuel and hydraulic leaks from plant and machinery working within Outfall working area.	When not in use all plant and machinery shall be stored in compound outside SSSI watershed. All plant and machinery shall be regularly checked with spill kits, plant nappies and pollution prevention measures in accordance with Table 9.4 Ecology Mitigation Measures shall be in place throughout the period of works.	Reduce risk to negligible
9	Q3 lake level unexpectedly rises above 156m AOD during excavation works.	Site Engineer to suspend excavation and all plant and machinery shall be returned to compound area. Prior to full withdrawal of plant, with ECOW guidance the Site Engineer will instruct any modification to cut profile, geotextile deployment required to limit risk of uncontrolled overtopping into SSSI.	Reduce overtopping risk to low, contamination risk to negligible.
IN SERVICE			
10	Q3 lake remaining below 156m AOD	Lake water level shall be monitored monthly as per NE requirements, including sediment, pH and flow monitoring at syphon outfall and Quarry monitoring station.	Remove any loose debris & unstable blocks
11	Q3 lake level at 156m AOD	Lake water level shall be monitored monthly as per NE requirements, including sediment, pH and flow monitoring at 1m downstream of outfall, syphon outfall and Quarry monitoring station.	Reduce risk to low
12	Q3 lake levels exceed 156m AOD and flow exceeds JBA modelling flow.	Placing quarry won gravel in outfall channel can be used to limit peak flow initially. Longer term, additional restrictions at L4 lake outfall can be used to reduce peak flow into L5 & Q3.	Maintain flow below JBA predicted peak flow levels
13	Debris in Outfall	Regular inspections and removal of debris from channel	Remove any debris promptly
14	Vegetation growth	Annual inspections	Remove any vegetation that could jeopardise long-term flow through channel.