

Technical Note:

Vaynor Quarry: Tracer Test and Water Quality Sampling

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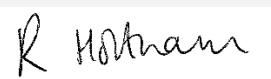
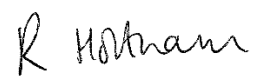
Prepared for Hanson Quarry Products Europe Limited

Document reference: 64789TN4, July 2022

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1 Introduction

1.1 Background

Vaynor Quarry (as shown on Figure 1.1 and hereinafter referred to as the 'Site') is an inactive limestone quarry owned by Hanson Quarry Products Europe Limited (Hanson). It is located approximately 1 km north-west of the outskirts of Merthyr Tydfil. The Site has been quarried for limestone since at least the 1940s but has been mothballed since 2007. Hanson is proposing to recommence quarrying and the Site is currently the subject of a Review of Old Mineral Permissions (ROMP) designed to update the planning conditions which apply at the Site.

Tracer testing and water quality sampling were undertaken at the Site during Autumn and early Winter 2020 to determine the source of the spring in the plant area in the south-west of the Site. Two tracer tests were originally proposed to determine whether the spring is sourced from a pond in the south-east of the quarry void (the south-east pond) or from a series of ponds north of the plant site in the west of the void. The second tracer test from the south-east pond was later cancelled with a round of water quality testing being undertaken instead (see details below).

This Technical Note has been prepared by Stantec UK Limited (Stantec) to describe the testing undertaken and the results obtained. This testing is used to support the Stantec's Hydrogeological Impact Assessment (HIA) (reported within Chapter 9 of SLR Consulting, 2022) which has been prepared in support of the ROMP applications. This technical note should be read in conjunction with the HIA.

1.2 Report Outline

This report includes the following:

- a summary of the tracer testing undertaken and results;
- a summary of the water quality testing and results; and
- conclusions drawn from the combined testing.

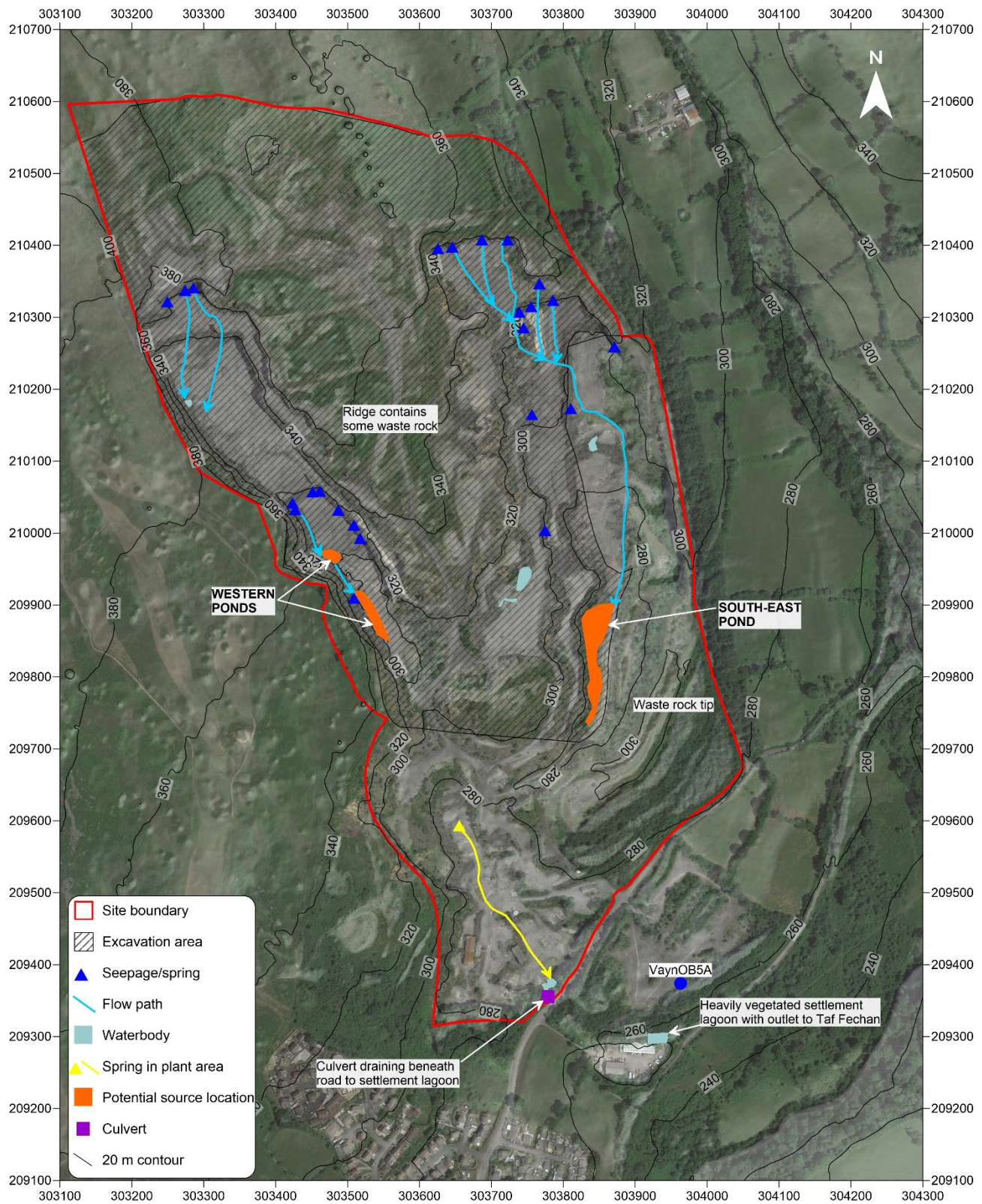


Figure 1.1 Vaynor Quarry site location

2 Tracer Test

2.1 Release Locations

Tracer testing was undertaken by using the Optical Brightening Agent (OBA) Durowhite Liquid A. Two locations were initially identified to release the OBA at the Site as shown on Figure 1.1: the western ponds and the south-east pond. These ponds had previously been identified as being potential sources of the spring in the plant site (see below). These ponds have no surface water outlet and all discharge (other than evaporation) is to the underlying limestone. The source of water to these ponds is a combination of groundwater seepage (from the quarry faces or underlying limestone), runoff and incident rainfall.

To undertake the tracer test in the ponds in the western ponds, the OBA was introduced by pouring in from four points around each of the two ponds. It was then mixed using a rod to ensure that it was evenly distributed throughout the waterbody.

Due to concerns over the potential for excessive dilution, and logistical issues in introducing the tracer, the larger south-east pond, was not tested. An alternative method for detecting whether the south-east pond could be the source of the spring water was used instead based on water chemistry testing, as detailed in Section 3.

2.2 Receptor Locations

The receptor is the spring in the plant area. This rises from the floor of the plant area (i.e. from the limestone) and forms a small stream. Further along its reach, flow appears to increase, likely due to the addition of further discharge from the limestone and runoff. The small stream discharges to a pond in the south of the Site from which flow discharges off-site via a culvert beneath Vaynor Road.

Six approximately equidistant monitoring locations were identified along the length of the spring-sourced stream. Fluocapture monitoring devices were installed at each of these six monitoring locations to detect any OBA flowing through the stream water. These locations are plotted on Figure 2.1.

The fluocaptors comprised cotton wool placed in plastic bags with holes through to enable water to flow through. If present, the OBA would be absorbed onto the cotton wool and once dried would fluoresce under UV light.

2.3 Method

Background fluocaptors were placed in the stream on 24 August 2020, almost four weeks before the release of the OBA to ensure no OBA was already present. These were changed to new fluocaptors, on 18 September 2020, shortly before the release of the OBA, to be in place to capture the agent should it follow this pathway. After the new fluocaptors were installed, the OBA was released into the two western ponds on 18 September.

Fluocaptors can only confirm that they have been in contact with OBA-containing water at some point during their installation but not when, for how long, or on how many occasions. The second set of fluocaptors were retrieved on 8 October, having been in-situ for almost three weeks and were replaced with a third set of fluocaptors. Three weeks is a sufficient length of time to capture any

rapid breakthrough of the OBA. The third set of fluocaptors was retrieved a further five weeks later on 13 November 2020, these would capture any slow breakthrough of the OBA.

The OBA was released into the western ponds without prior dilution, as the size of the waterbodies was sufficient to offer substantial dilution prior to infiltration to the underlying limestone. In total, 360 ml of OBA was released into the two western ponds. The approximate combined areas of the two ponds at the time of adding the OBA was around 350 m² and, due to the preceding dry weather, the approximate depths of each were 5 cm. Mixing of the OBA within this total volume approximates to a dilution ratio of no more than 0.002%. The release of this volume of OBA is a “de minimis” discharge (i.e. it is less than 10 l discharge of a non-hazardous pollutant for scientific purposes) and is therefore excluded from the Environmental Permitting Regulations (2018).

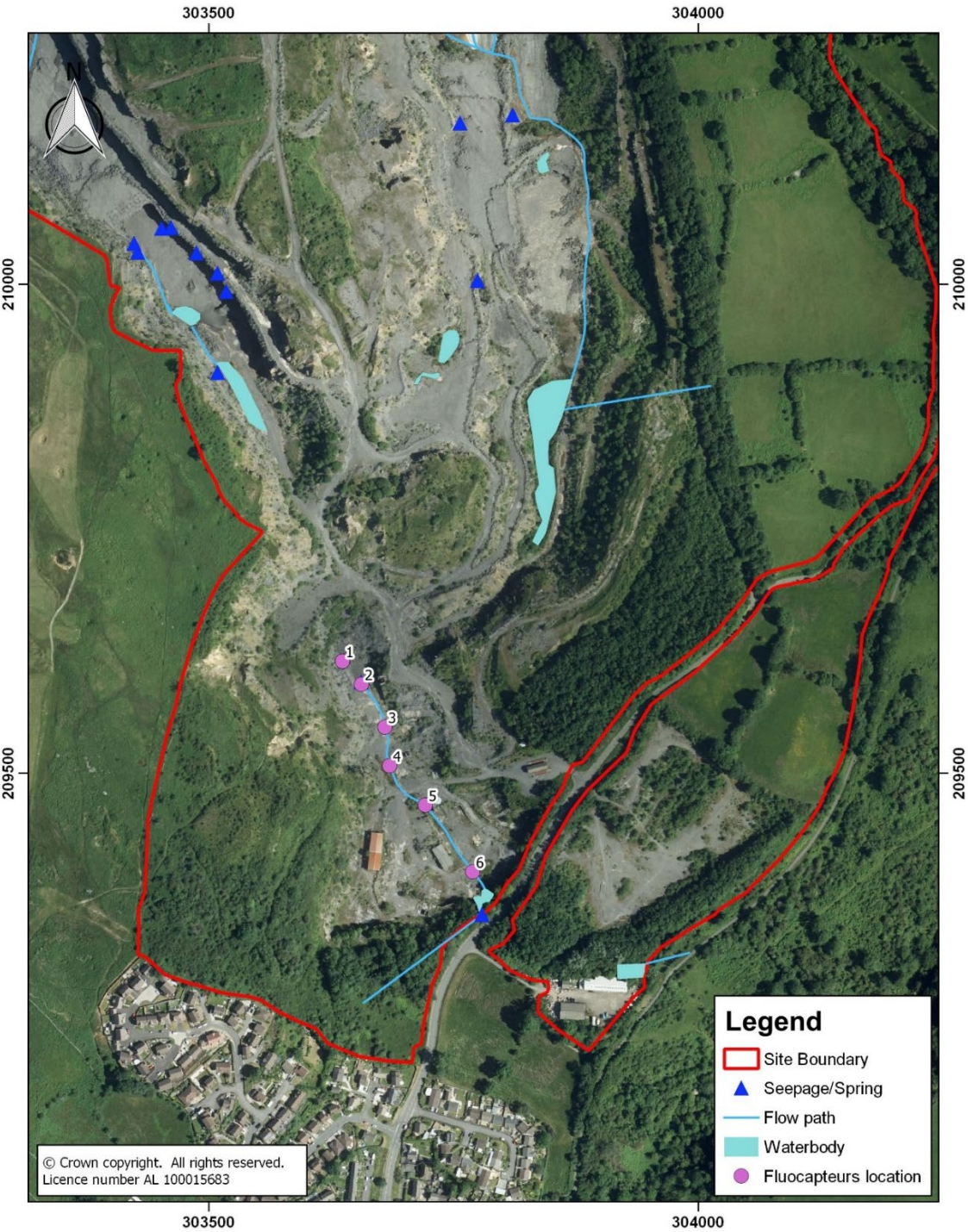


Figure 2.1 Fluocapture monitoring locations

2.4 Tracer Test Results

The test results for the release into the western ponds are presented in Table 2.1. The results show whether OBA was detected (Y) or not detected (N) at each location following each visit. Total rainfall volumes recorded at Penderyn Quarry during the periods the fluocapturs were installed are noted in Table 2.1.

Table 2.1 Western pond test - results for presence of OBA

Monitoring location	Background visit – placed 24/08/2020, retrieved 18/09/2020	Visit 2 –Placed 18/09/2020, retrieved 08/10/2020	Visit 3 - Placed 08/10/2020, retrieved 13/11/2020
Rainfall between insertion and removal (mm)	88.4	126.6	252
Time in-situ (days)	25	20	36
1	N	N	N
2	N	N	Y
3	N	N	N
4	N	N	N
5	N	N	N
6	N	N	Y

No OBA was detected on the background fluocaptors. A negative result was also recorded on all of the fluocaptors placed on visit 2 to capture the OBA should it breakthrough quickly. On the third set of fluocaptors, OBA was detected at location 2 in the north of the plant area and location 6 in the south, suggesting a breakthrough at some point during their installation. Again, no detects were identified at the other monitoring locations.

Due to the nature of the stream, it is expected that all locations downstream of location 2 would detect a positive result however, this is not the case. The positive detections are thought to be true results and are seen on the cotton wool as small circles glowing under UV light around where the openings in the plastic containers are present. This indicates that the detections are related to water flow indicating a connection with discharge from the western ponds. These circles are approximately 0.5 cm diameter and are shown in Figure 2.2.

It is uncertain why there are no detects at locations 1, 3, 4 and 5, but there are a number of possible reasons, as follows:

- Absence of OBA, i.e. a negative detection, is possible at location 1 because it appears to be an isolated pond upstream of the spring adjacent to stockpiles of rock. This water could be sourced more locally, possibly from stockpile drainage rather than the limestone aquifer.
- A spring discharge was observed at location 4 and it is possible that the source could be from elsewhere and not the western ponds.
- The groundwater component to the stream could be diluted to differing extents along its reach, with non-detects occurring where the groundwater component is diluted to a greater extent (either due to a lesser flux from groundwater or a greater inflow from surface water). Rainfall

from Penderyn Quarry indicates that runoff rates were relatively high over the course of the test.

- The fluocapteurs may have been interfered with by a third party and may have been removed from the stream. During the first retrieval the fluocapteur at location 6 had been removed from the stream. Interference by third party could cause a false negative result but is highly unlikely to cause a false positive result.

The results of this tracer test indicate that the source of the spring in the plant area is, at least partly, the western ponds. The positive results suggest a breakthrough time of somewhere between 20 – 56 days which, with the ponds 320 - 410 m away, which would equate to flow velocities of between 6 m/day to 20 m/day. This is not unreasonable in limestone environments due to the nature of flow paths in karstic terranes.

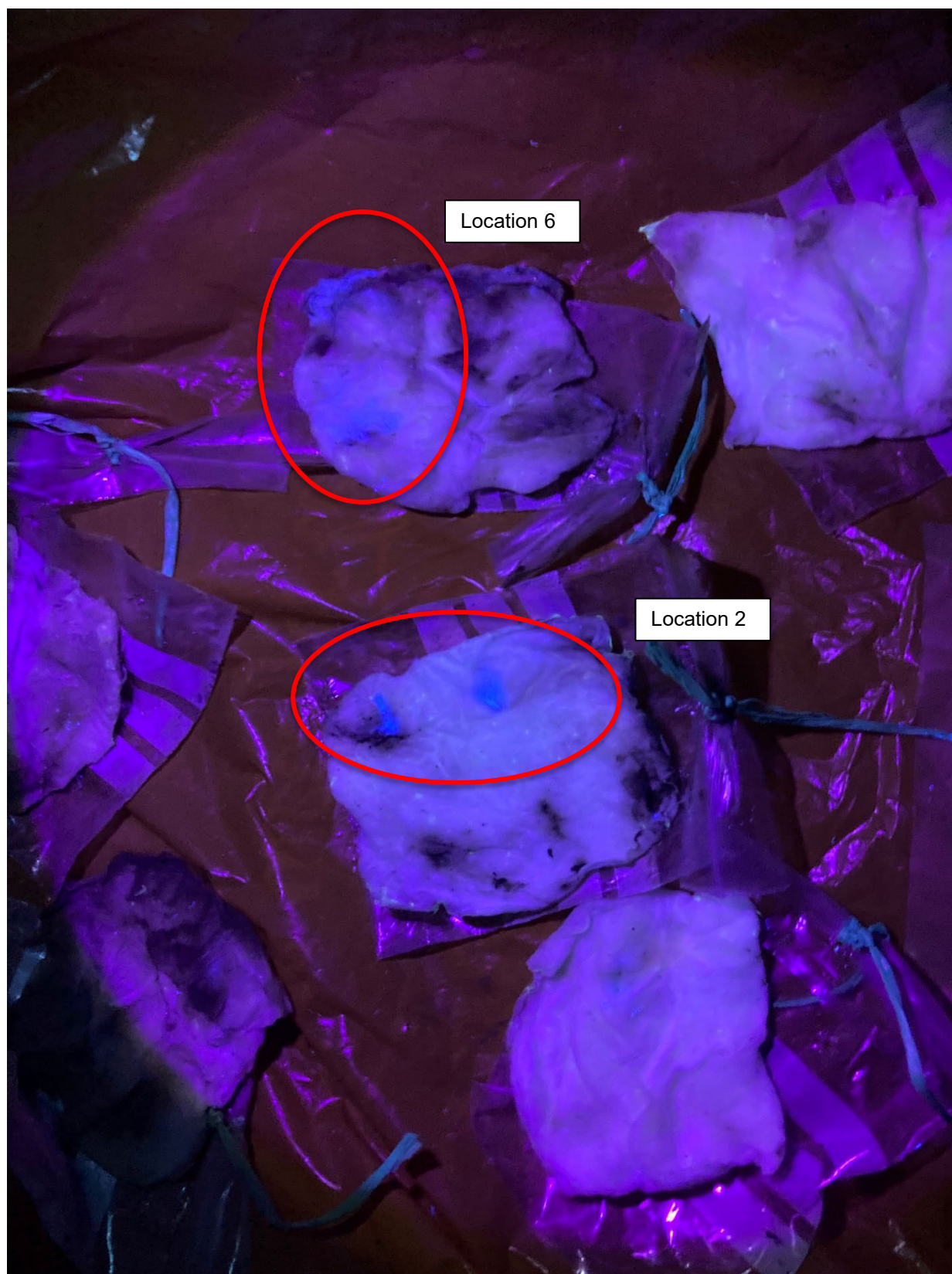


Figure 2.2 Fluocapteurs under UV light from locations 2 and 6

3 Water Quality Sampling

3.1 Method

Due to the difficulty of testing whether a connection between the south-east pond and spring is present and because of the initial negative test result from the western pond tracer test (i.e. on 8 October 2020), a water quality sampling round was undertaken on 13 November 2020 (i.e. this decision was made prior to the positive test result later identified).

Based on chemical sampling undertaken previously at the Site, limestone groundwater (from the on-site monitoring boreholes) has a different chemistry to that of local surface water and so the source (or sources) contributing to the spring could potentially be determined based on comparison of chemical signatures between the different locations. The chemical signature of the spring in the plant area was reviewed and compared to the south-east pond, western pond, and limestone borehole (VaynOB5A shown on Figure 1.1) and previous monitoring results from the Nant y Glais, VaynOB5A and springs. The water quality data results are included in Appendix A and are discussed below.

3.2 Sampling Locations

Water quality samples were taken from the following locations, shown on Figure 1.1:

- South-east pond;
- western pond;
- VaynOB5A (limestone borehole); and
- spring in the plant area.

3.3 Water Quality Sampling Results

Durov and Piper plots have been used to analyse the water chemistry and these are displayed in Figure 3.1 and Figure 3.2, respectively. For comparison, mean concentrations from quarterly water quality monitoring at two spring locations, the Nant y Glais and VaynOB5A have been added (see Stantec (2020) for further details). The Durov and Piper plots show that the Nant y Glais (i.e. surface water) and VaynOB5A (i.e. limestone groundwater) have different chemistries with results for the springs plotting in-between.

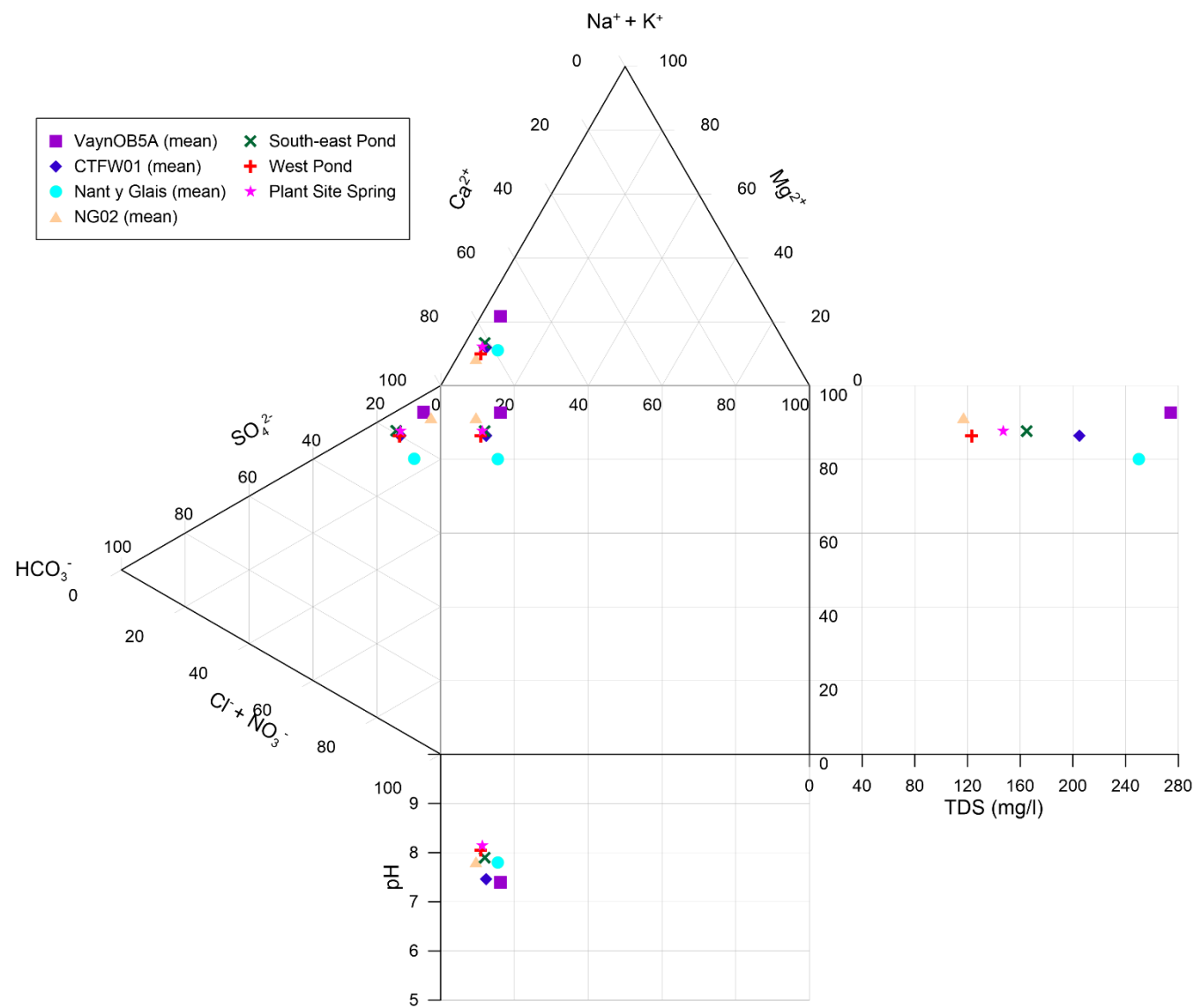
The sampling undertaken as part of this study shows that both ponds and the spring plot very closely together on both the Durov and Piper plots, indicating that the chemical signatures are not distinct. The position of both the ponds and the plant spring suggests that the spring is mostly likely sourced from a combination of surface water and limestone groundwater and therefore could be sourced from the south-east pond, the western ponds, a combination of the two or some other source. Other sources could be the sinkholes located further west which collect runoff and would therefore have a signature between surface water and limestone groundwater (Stantec, 2020). Based on the Durov and Piper plots alone therefore, it is not possible to draw a firm conclusion.

Limestone groundwater at the Site has higher concentrations of calcium and hardness. The spring has hardness concentrations that lie between those of the south-east pond and western ponds but lower than those in limestone groundwater (i.e. at VaynOB5A). Table 3.1 summarises the water quality results of these determinands. To arrive at the plant spring, water from either pond would need to travel through the limestone aquifer. As it flows through the limestone, the chemical

signature would be expected to evolve to become closer to limestone groundwater with respect to calcium and hardness (as measured at VaynOB5A). Accepting this as true makes it more likely that the plant spring is sourced from the western ponds rather than the south-east pond. Concentrations at the spring are lower than at the south-east pond and it is unlikely that concentrations of calcium and hardness would fall as water travels through the aquifer. Meanwhile, concentrations of calcium and hardness are higher at the spring than at the western ponds meaning the water could have evolved within the aquifer before reaching the spring.

Table 3.1 Calcium and hardness concentrations

Monitoring location	Hardness as CaCO ₃ (mg/l)	Calcium (mg/l)
VaynOB5A	275	80.4
South-east pond	143	48.5
Western ponds	113	38
Plant spring	134	44.5



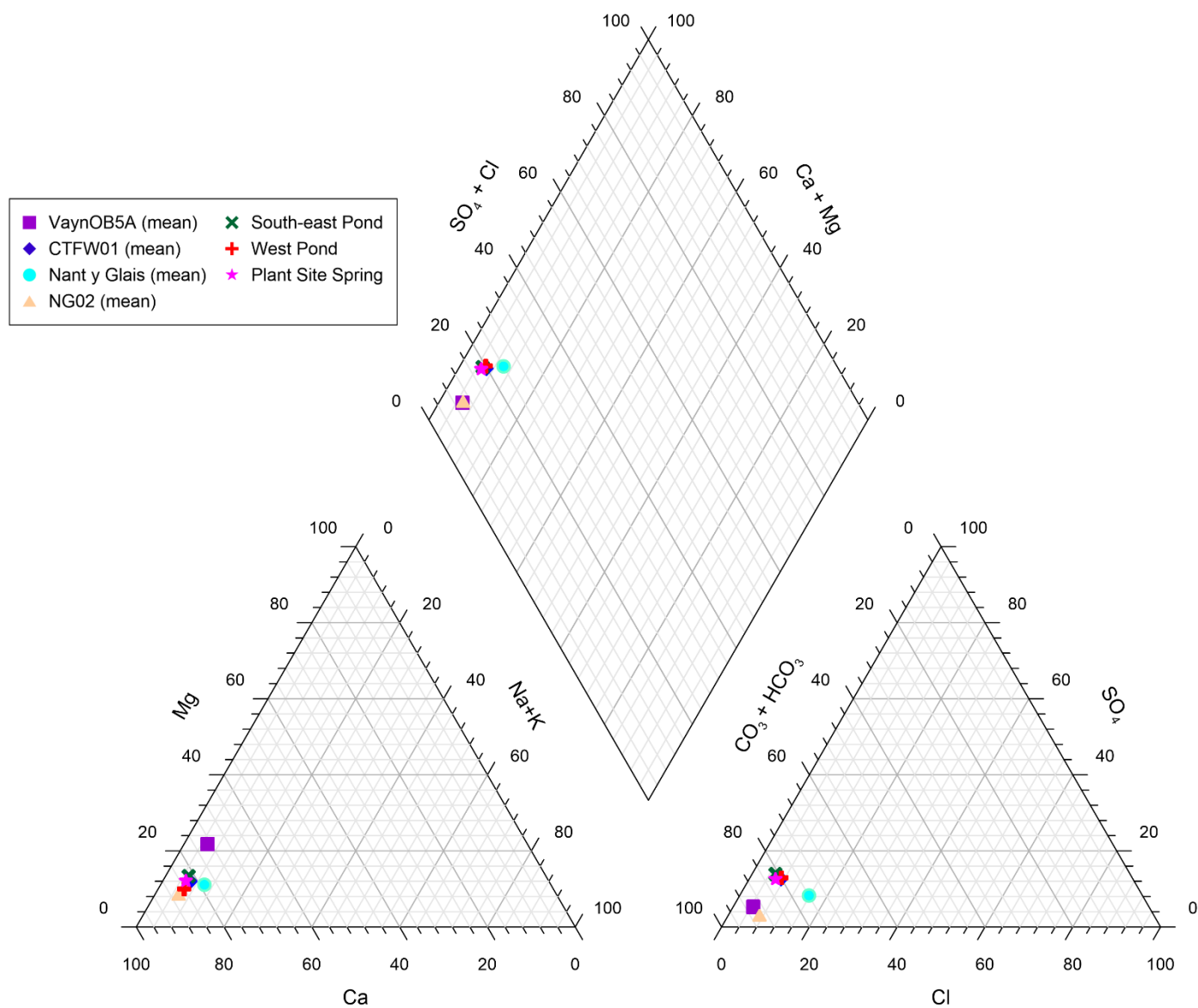


Figure 3.2 Piper plot

4 Conclusions

In conclusion both the tracer test and water quality sampling suggest that the spring is mostly likely to be at least partially sourced from the western ponds. However, uncertainty remains and at least part of the spring flow could be sourced from another source, such as sinkholes to the north-west of the Site. Hardness and calcium concentrations suggest it is more likely that the spring is sourced in part from the western ponds rather than the south-east pond.

References

SLR Consulting, 2022. Vaynor Quarry Environmental Statement Volume 1 Environment Act ROMP Review, SLR Consulting, July 2022

Appendices

Appendix A

Water Quality Results



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SY2 6FD

Attention: Elizabeth Wilson

CERTIFICATE OF ANALYSIS

Date of report Generation:	30 November 2020
Customer:	Stantec UK Limited
Sample Delivery Group (SDG):	201117-27
Your Reference:	64789
Location:	Vaynor
Report No:	577800

We received 4 samples on Tuesday November 17, 2020 and 4 of these samples were scheduled for analysis which was completed on Thursday November 26, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	201117-27	Client Reference:	64789	Report Number:	577800
Location:	Vaynor	Order Number:	EPL000299	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23256342	SW1			13/11/2020
23256345	SW2			13/11/2020
23256346	SW3			13/11/2020
23256348	VAYNOR BSA			13/11/2020

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 201117-27
Location: Vaynor

Client Reference: 64789
Order Number: EPL000299

Report Number: 577800
Superseded Report:

Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	23256342	23256345	23256346	23256348
						SW1	SW2	SW3	VAYNOR BSA
Sample Type						DO KIT + DO 250 ml glass (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)
						SW	SW	SW	GW
Alkalinity as CaCO3	All	NDPs: 0 Tests: 4				X	X	X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 4				X	X	X	X
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 4				X	X	X	X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4					X	X	X
Dissolved Oxygen by Titration	All	NDPs: 0 Tests: 4				X	X	X	X
pH Value	All	NDPs: 0 Tests: 4				X	X	X	X
Phosphate by Kone (w)	All	NDPs: 0 Tests: 4				X	X	X	X
Total Dissolved Solids (Grav)	All	NDPs: 0 Tests: 4				X	X	X	X
Total Metals by ICP-MS	All	NDPs: 0 Tests: 4				X	X	X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 201117-27
Location: Vaynor

Client Reference: 64789
Order Number: EPL000299

Report Number: 577800
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM021	Method 2540C, AWWA/APHA, 20th Ed., 1999	Determination of total dissolved solids in waters by gravimetry.
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM187	Winkler, L.W, Ber Deutsch. Chem. Ges, 21,2843,1888."	Dissolved Oxygen in Natural and Waste Waters HMSO 1979 ISBN 011 751442
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



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SDG: 201117-27
Location: Vaynor

Client Reference: 64789
Order Number: EPL000299

Report Number: 577800
Superseded Report:

Test Completion Dates

Lab Sample No(s)	23256342	23256345	23256346	23256348
Customer Sample Ref.	SW1	SW2	SW3	VAYNOR BSA
AGS Ref.				
Depth				
Type	Surface Water	Surface Water	Surface Water	Ground Water

Alkalinity as CaCO ₃	24-Nov-2020	24-Nov-2020	24-Nov-2020	24-Nov-2020
Anions by Kone (w)	26-Nov-2020	26-Nov-2020	26-Nov-2020	26-Nov-2020
Conductivity (at 20 deg.C)	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020
Dissolved Metals by ICP-MS	26-Nov-2020	26-Nov-2020	26-Nov-2020	26-Nov-2020
Dissolved Oxygen by Titration	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020
Nitrite by Kone (w)	23-Nov-2020	23-Nov-2020	23-Nov-2020	23-Nov-2020
pH Value	19-Nov-2020	19-Nov-2020	19-Nov-2020	19-Nov-2020
Phosphate by Kone (w)	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020
Total Dissolved Solids (Grav)	19-Nov-2020	19-Nov-2020	19-Nov-2020	19-Nov-2020
Total Metals by ICP-MS	25-Nov-2020	25-Nov-2020	25-Nov-2020	25-Nov-2020



CERTIFICATE OF ANALYSIS

SDG:	201117-27	Client Reference:	64789	Report Number:	577800
Location:	Vaynor	Order Number:	EPL000299	Superseded Report:	

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung. Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.