

ANNEX 14

Cavanacaw Monitoring plan for
environmental waters

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1 INTRODUCTION

1.1 Background

Omagh Minerals currently operates an open-pit gold mine at Cavanacaw, near Omagh in County Tyrone. The existing mine consists of an open pit approximately 50 m deep, with the ground level at 160 mAOD and the current base of the pit at approximately 116 mAOD.

It is proposed to extend the mining operations both laterally and downward, through underground workings, with the current Kearney Pit being restored to ground level with material from the rock stockpile.

1.2 Scope of Work

ESI Ltd. was instructed to prepare a site monitoring plan for the proposed development to assist in the management of groundwater and surface water flow, level and quality. This includes the specification of control and compliance limits and an action plan in the event of these limits being exceeded.

The plan was drafted by ESI in consultation with Omagh Minerals and the Northern Ireland Environment Agency (NIEA).

1.3 Plan structure

This document sets out the site monitoring plan requirements in relation to the proposed development. Section 2 summarises water management at the site. Section 3 presents a description of surface water monitoring requirements. Section 4 provides a similar description for groundwater monitoring. Section 5 presents an action plan to be followed in the event of any potential threat of environmental impacts emanating from the activities at the site, including an action plan in response to compliance limit breaches. Section 6 describes the frequency and reporting of monitoring.

1.4 Mine life stages

Reference is made in the plan to four life stages of the mine, corresponding to different periods of development and restoration. These are:

- Stage 1: Current operational stage (open pit mining)
- Stage 2: Further operational stage (underground mining)
- Stage 3: Post-operational, groundwater recovery stage
- Stage 4: Post-operational, long term impact monitoring

2 SITE WATER MANAGEMENT

This document does not present the management plan for water used on site. In summary the principles of site water use include the following.

- Water runoff from undisturbed catchment areas is diverted away from the mining area, wherever possible; this "clean" water is kept separate from other site water including process water and is routed to natural discharge points.
- Sediment-laden runoff from disturbed areas is treated prior to re-use in the water management system or release into the natural environment.
- Storm water runoff and groundwater collected within pit areas or from the mine are controlled and managed appropriately, through an established system of settlement lagoons that can be used as needed for treatment.
- Discharge of surplus mine water off-site is minimised by recycling captured water to the processing plant.

The site operates three discharge consents, which are listed in Table 2.1. Treated process water and mine discharge are discharged to Kerr Burn under consent 20501/90. Site surface drainage from the northern part of the site is discharged to Botera Burn under consent 11/12. Waste water from the site offices is also discharged to Botera Burn under consent 136/11. The locations of the discharge points are shown in Figure 1.

According to the discharge consents, surface water quality discharges are subject to the following compliance limits.

Table 2.1 Surface water discharge consent thresholds

Parameter	11/12		20501/90		136/11	
	Com	Ctrl	Com	Ctrl	Com	Ctrl
Ammoniacal Nitrogen as NH ₄ (mg/l)	-	-	≤1	0.75	-	-
Biochemical Oxygen Demand (mg/l)	-	-	≤10	7.5	≤10	7.5
pH value	-	-	6-9	6.5-8.5	-	-
Suspended Solids(mg/l)	≤50	40	≤50	40	≤15	10
Visible Oil Or Grease	None	-	None	-	None	-
Discharge volume (m ³ /day)	-	-	-	-	≤1	0.8

Com = Compliance limit from discharge consent; Ctrl = proposed control level for internal use

* Maximum discharge is limited such that the upstream flow in Kerr Burn plus the discharge is no greater than 20% of the flow in Creevan Burn (i.e. a dilution factor of 5 is maintained).

3 SURFACE WATER MANAGEMENT

Surface water features on and near the site are described in the Environmental Statement and its addenda.

3.1 Surface water monitoring infrastructure and locations

Four surface water receptors were identified in the vicinity of the site: Creevan Burn, Kerr Burn, Boyles Burn and Botera Burn.

Creevan Burn is located approximately 100 m to the south of the Site and flows in an easterly direction, before flowing to the south approximately 1.5 km to the east of the Site. The stream eventually flows into the Owenreagh River to the south. Kerr Burn runs along the southern edge of the site and discharge to Creevan Burn approximately 200m from the south east corner. Botera Burn is fed by two tributaries that run north from the northern side of the site; while Boyles Burn rises just to the east of the site and runs easterly before turning southwards to join Creevan Burn further downstream. The four burns are shown in Figure 1.

3.2 Surface water flow

Detailed flow monitoring has historically been undertaken at three points, focused on the process water discharge, as shown in Table 3.2. Limited data are available for Botera and Boyles Burns: Omagh Minerals periodically records whether these streams are flowing, when visiting for water quality samples. In future this monitoring will be augmented to gain more detailed background data for flows on these Burns, in case additional future discharges to them are required.

Table 3.1 Flow monitoring locations

Location		Approx. grid ref.		Description of monitoring	Stages
		Easting	Northing		
KB1	Kerr Burn upstream of discharge from polishing pond	240095	370420	Continued monitoring for base flow in Kerr Burn	1, 2, (3)
P Pond	Discharge from the polishing pond	240100	370425	Continued monitoring of discharge flows	1, 2
Creevan Burn	At the public road bridge over Creevan Burn, around 36 m downstream of the Kerr Burn confluence	240310	370140	Continued monitoring of Creevan Burn for base flow and potential impact	1, 2
SW11	Boyles Burn at site boundary	240430	370980	Enhanced flow monitoring to be undertaken for 12 months prior to any discharge to Boyles Burn	1, 2, (3)
SW12	Botera Burn at site boundary	240020	371480	Enhanced flow monitoring to be undertaken for 12 months prior to any new discharge to Botera Burn ¹	1, 2, (3)

¹ There are two existing discharge consents to Botera Burn, as shown in Table 2.1; base flow monitoring would be undertaken prior to any application to increase the total discharge to Botera Burn.

The stages included in the final table of the column refer to the life stages of the mine, described in Section 1.4. Monitoring is expected to be required at each monitoring point during the stages mentioned; stage numbers in brackets indicate doubt at this stage as to

whether monitoring will be needed. These questions should be reviewed at the appropriate time as mentioned in Section 6.3.

Flow monitoring at Kerr Burn, Creevan Burn and the discharge from the polishing pond will continue daily at the installed weirs. At Boyles and Botera Burns new V-notch weirs will be installed close to the site boundary (and downstream of any discharge points). These will be monitored monthly for flow, with additional visits on days when the flow measured at Kerr Burn is high. The purpose of this is to ascertain the typical flood flows in the streams; they will therefore be visited when the flow at Kerr Burn is above 24 l/s (weir head of at least 200 mm)¹.

The potential for impacts on surface water flows will be limited to the period during which the mine is dewatered. For this reason flow monitoring will not be required in stage 4; during stage 3 limited monitoring may be needed, depending on whether impacts have been identified during stage 2.

3.3 Stored water volume

The volume of water storage available in the site surface water management system (lagoons and polishing pond) should be monitored by means of simple water level measurements at surveyed position(s). A minimum of one day's water storage should be available at all times, to include the current volume of site process water discharged (including any pumped groundwater) and the volume anticipated from a rainfall event over the catchment of the system with a 20-year return period. This volume of storage should be always available as a contingency, and should be indicated by a control level on one or more lagoons, calculated as a function of the above volume and the current total storage available in the system. The calculation should therefore be revised each time a significant alteration is made to the surface water management system or to the site water production.

3.4 Monitoring point maintenance

Inspections are to be carried out on each routine monitoring visit. If any damage or defect to the monitoring infrastructure is found then this is to be recorded and remedial measures implemented as soon as practically possible.

3.5 Surface water quality

Surface water quality data are currently collected from the locations in Table 3.2.

Table 3.2 Surface water quality monitoring locations

Location ID	Approx. grid ref.		Description	Stages
	Easting	Northing		
KB1	240095	370420	Kerr Burn upstream of discharge from polishing pond	1, 2
KB2	240110	370410	Kerr burn downstream of discharge from polishing pond	1, 2
SW11	240430	370980	Boyles Burn at site boundary	1, 2
SW12	240020	371480	Botera Burn at site boundary	1, 2
Kerr Burn	240095	370420	Kerr Burn just before the discharge from the polishing pond	1, 2
P Pond	240100	370425	Discharge from the polishing pond	1, 2
Creevan Burn	240310	370140	At the public road bridge over Creevan Burn, around 36 m downstream of the Kerr Burn confluence	1, 2

Surface water quality at all listed locations is to be monitored for the determinands outlined in Table 3.3. Surface water samples are to be analysed by a UKAS-accredited laboratory.

¹ 24 l/s represents the 90th percentile flow for Kerr Burn from 2008 to 2011.

Table 3.3 Surface water quality monitoring requirements

Frequency	Parameters
Quarterly	Field parameters: pH, electrical conductivity, temperature
	Metals: Antimony, cadmium, chromium, cobalt, copper, gold, iron, lead, manganese, mercury, molybdenum, nickel, silver, titanium, zinc
Quarterly	Major ions: Calcium, chloride, magnesium, sulphate, alkalinity as CaCO ₃
	Others: Biological oxygen demand, chemical oxygen demand, suspended solids, sulphide, arsenic, ammoniacal nitrogen, nitrate, nitrite, phosphorous

The following information is to be collected in relation to all surface water quality samples:

- Monitoring point reference name or ID;
- Unique sample code;
- Date and time of sample collection;
- Any quality control duplicate information;
- Sample matrix code (i.e. SW = surface water);
- Date sent to laboratory;
- Sampling technique;
- Sample observations (e.g. colour, odour);
- Description of weather and flow;
- Any additional pertinent comments.

Surface water monitoring data is to be submitted to the Northern Ireland Environment Agency on a quarterly basis.

3.6 Assessment criteria

The discharge consents (Table 2.1) list the compliance limits that must be met for each location. Control levels are proposed as an early warning at approximately 75% of the compliance limit. Control levels are for the use of site management, and should prompt a review of conditions and water management process in case continued upward trends might give rise to a breach of consent compliance limits.

In reporting, surface water quality should be compared for reference purposes to the Environmental Quality Standards for freshwater, which are outlined in Table 3.4 below.

Table 3.4 Selected Environmental Quality Standards

Determinand	Unit	EQS FW
Ammonia (NH ₃)	mg/l	0.015
Arsenic	mg/l	0.05
Cadmium	µg/l	0.08
Chloride	mg/l	250
Chromium [†]	µg/l	5
Copper [†]	mg/l	0.01
Iron	mg/l	1
Lead	mg/l	0.072
Mercury	µg/l	1
Nickel	mg/l	0.02
Sulphate as SO ₄	mg/l	400
Zinc [†]	mg/l	0.075

[†] Hardness dependent: minimum concentration (corresponding to low hardness) shown in table

4 GROUNDWATER MONITORING

Groundwater occurrence is described in the Environmental Statement and its addenda.

The site operates below water table and currently abstracts water from a sump at the base of the open void; in future additional groundwater will be drained from the mine as it is built. Pumped water may be used in site processes, or discharged directly to the settlement lagoon system. From the settlement lagoons it passes to the polishing pond and then to the discharge point on Kerr Burn.

4.1 Monitoring infrastructure and locations for shallow groundwater

Four groundwater monitoring boreholes exist at the site, located to the west, south and north east. These are numbered GW1, GW2, GW3 and GW4 (see Figure 1 for locations). These boreholes were installed during 1995 as reported in Knight Piesold Ltd. (1998). The boreholes are used primarily for monitoring groundwater within the superficial deposits.

4.2 Monitoring of deep groundwater

Additional deep groundwater monitoring will be undertaken as development progresses. This will include monitoring of inflows and influent water quality at each significant water strike during the development of adits. Because the site is dewatered, groundwater will be influent to the site and water entering newly developed workings will provide a good indication of background water quality. To advance the mine, test probes are routinely drilled prior to blasting, to allow checks on the likely water inflow. These test probes will be used to collect water samples and to measure inflows whenever a significant inflow is recorded². Care must be taken not to contaminate these samples with debris or materials used in the mining process. The locations of the sample points must be clearly logged at the time of sampling, including the elevation relative to Ordnance datum and a brief description of the geology at the point of issue. Successive sample points will be given clearly identifiable IDs. For illustrative purposes they are labelled MW1 to MWn in Table 4.1 below (for "mine water 1", etc.)

Deep boreholes will also be used to monitor groundwater levels and quality at depth. For illustrative purposes these are labelled GW5 and GW6 in Table 4.1 below, and example locations are shown on Figure 1. The details of design and depth cannot yet be determined, but must be agreed prior to any installation with the NIEA.

Deep boreholes will be sited away from the mineralised area. Precise locations for deep groundwater monitoring boreholes will be agreed prior to installation, but criteria will include the following

- The boreholes should be in locations expected to be down-gradient of mine workings after groundwater recovery: i.e. particularly to the north and south.
- Boreholes may be targeted to intercept the mineralised structures (fracture sets).
- The boreholes should be between the site boundary and the worked area.

Table 4.1 Groundwater monitoring locations

Location ID	Approx. grid ref.		Description	Stages
	Easting	Northing		
GW1	239601	370858	Shallow groundwater to west of site	1, 2, 3, 4
GW2	239950	370353	Shallow groundwater to south of site	1, 2, 3, 4
GW3	240242	370411	Shallow groundwater to south east of site	1, 2, 3, 4
GW4	240347	371034	Shallow groundwater to north east of site	1, 2, 3, 4
GW5 and 6	--	--	Deep groundwater; locations to be agreed with NIEA prior to installation, probably north and south of worked area	2, 3, 4

² Significant inflow is here taken to be a flow rate of at least 1 litre per minute.

MW1 to n	--	--	Mine water entries as they are found	2
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The stages included in the final column of the table refer to the life stages of the mine, described in Section 1.4. Monitoring is expected to be required at each monitoring point during the stages mentioned; stage numbers in brackets indicate doubt at this stage as to whether monitoring will be needed. These questions should be reviewed at the appropriate time as mentioned in Section 6.3.

4.3 Water levels

Groundwater levels should be measured on a monthly basis. The following information is to be collected in relation to groundwater level data:

- Monitoring point reference name or ID;
- Date and time of monitoring event;
- Value for dip to water;
- Value for dip to base of well;
- Reference datum (i.e. top of borehole pipe / top of borehole headworks).

4.4 Water quality

Groundwater quality monitoring should be undertaken for the determinands listed in Table 4.2.

Table 4.2 Requisite groundwater quality monitoring

Determinand	Unit	Determinand	Unit
Alkalinity as CaCO ₃	mg/l	Lead	µg/l
Ammoniacal nitrogen as N	mg/l	Magnesium	mg/l
Arsenic	µg/l	Manganese	mg/l
Aluminium	µg/l	Mercury	µg/l
Cadmium	µg/l	Nickel	µg/l
Calcium	mg/l	Nitrate as N	mg/l
Chloride	mg/l	Nitrite as N	mg/l
Chromium	µg/l	Potassium	mg/l
COD	mg/l	Silver	µg/l
Copper	µg/l	Sodium	mg/l
Cyanide	mg/l	Sulphate as SO ₄	mg/l
Electrical conductivity	µS/cm	Sulphide	mg/l
Iron	µg/l	Suspended solids	mg/l
		Temperature	°C

The following information is to be collected in relation to all groundwater quality samples:

- Monitoring point reference name or ID;
- Unique sample code;
- Date and time of sample collection;
- Any quality control duplicate information;
- Sample matrix code (i.e. GW = groundwater);
- Date sent to laboratory;
- Sampling technique;
- Sample observations (e.g. colour, odour);
- Any additional pertinent comments.

4.5 Borehole maintenance

Inspections are to be carried out on each routine monitoring visit. If any damage or defect to the borehole is found then this is to be recorded and remedial measures implemented as soon as practically possible.

4.6 Assessment criteria

By way of example, control and compliance limits for groundwater quality for boreholes GW1 to GW4 have been calculated for selected determinands using data from January 2010 to October 2013. The summary water quality data are presented in Appendix A, and the selected determinands (considered representative of potential pollutants from mine processes) are presented in Table 4.3.

These compliance limits should be considered to come into force when the mine operation allows the movement of groundwater away from the site, with the potential to contaminate surrounding waters. This is expected to occur at stage 3 of the mine's life. At the close of stage 2, these example limits should therefore be reviewed in the light of additional data collected between now and then.

Calculations are statistically based, as recommended by regulatory authorities. Control levels are set at the mean value plus two standard deviations. Exceedance of a control level is intended to be a warning that the data require review to verify whether there is an upward trend of an indicator substance. Compliance limits are set at the mean value plus three standard deviations. Exceedance of a compliance limit represents a breach of standards and warrants report to the regulator along with consideration of mitigation. Details of response actions are provided in Section 5.

Table 4.3 Derivation of control and compliance limits

Determinand / borehole	Count	Mean (mg/l)	Control level (Mean + 2 SD, mg/l)	Compliance limit (Mean + 3 SD, mg/l)
Arsenic	37	0.75	2.72	3.71
GW1	10	0.34	0.53	0.63
GW2	11	1.20	4.62	6.32
GW3	11	0.72	1.43	1.78
GW4	5	0.66	1.32	1.66
Cadmium	37	0.22	0.55	0.72
GW1	10	0.10	0.12	0.13
GW2	11	0.10	0.10	0.10
GW3	11	0.43	0.71	0.85
GW4	5	0.23	0.37	0.43
Chromium	37	5.97	43.42	62.15
GW1	10	2.31	5.63	7.28
GW2	11	2.02	5.16	6.73
GW3	11	3.14	7.68	9.95
GW4	5	28.18	126.49	175.64
Copper	37	4.36	30.86	44.11
GW1	10	1.20	2.21	2.72
GW2	11	0.90	1.27	1.45
GW3	11	4.90	7.87	9.36
GW4	5	17.08	89.55	125.79
Chloride	37	11.64	15.48	17.40
GW1	10	10.01	12.61	13.91
GW2	11	11.02	13.33	14.48
GW3	11	13.05	16.57	18.33
GW4	5	13.14	16.18	17.70
Sulphate	37	5.46	13.96	18.21
GW1	10	4.06	13.26	17.86

Determinand / borehole	Count	Mean (mg/l)	Control level (Mean + 2 SD, mg/l)	Compliance limit (Mean + 3 SD, mg/l)
GW2	11	2.48	3.88	4.57
GW3	11	6.44	11.37	13.83
GW4	5	12.64	15.63	17.12

Collection of regular water level data should begin immediately for existing boreholes and on the installation of any deep groundwater boreholes. Baseline water level data should be collected over a period of one year, at which time similar control and compliance limits can be set for groundwater levels.

5 ACTION PLAN

In the event that conditions on site are judged to present a threat to environmental waters, mitigating action will be taken. The appropriate actions will be determined on a case by case basis, but some principles and examples are set out here.

5.1 Mitigation of compliance breaches identified through monitoring

In the event that potential or actual impacts on environmental waters are attributed to the site (as measured primarily by the breach of compliance limits) the procedure to be followed is set out in Table 5.1.

Table 5.1 Exceedance action plan procedure

Stage	Action
1	Confirm the basic data about the event (nature, timing, location and relevant climate or other conditions)
2	Take any urgent corrective action if there is an immediate threat to habitats or surface waters
3	Report the incident to regulatory authorities
4	Increase monitoring frequency and identify any potential contributing factors
5	Assess the monitoring data for any anomalies or indications of cause
6	Review risks to environmental waters, in consultation with NIEA
7	If risks are deemed acceptable re-assess relevant control and compliance limits
8	If risks are deemed unacceptable develop appropriate mitigation and management strategies
9	Implement the mitigation and management strategies
10	Monitor and review the results

5.2 Potential actions for consideration in specific cases

Possible mitigation measures in the event of specific impacts are described in Table 5.2.

Table 5.2 Possible mitigation measures

Event	Mitigation measures
Excessive discharge of process water or sewage discharge to surface water courses	Immediately prevent further discharge at affected location(s); apply any viable corrective measures (e.g. water treatment such as flocculation to reduce suspended solids, stopping processes that produce dirty water); assess reasons for breach and adjust processes and plans to prevent a recurrence
Stored surface water volume exceeds established control level	Stop or reduce processes that discharge water; use emergency storage if necessary
Flow in surface water courses reduced below baseline	Distribute compensatory flows of clean pumped groundwater or clean surface runoff to the affected watercourses; if a long-term scheme is required, develop an augmentation scheme that may include an abstraction well and lining appropriate sections of stream beds to prevent water loss to the ground
Groundwater levels drop below established compliance limits	Assess stream flow data and water level trends, along with dewatering volumes, to determine whether the groundwater level change can be attributed to mine dewatering and whether any reduction in flow in the streams is apparent; if a causal link is apparent or suspected, agree a programme of augmentation of stream flows with the regulator

Event	Mitigation measures
Groundwater quality deteriorates beyond compliance limits	Assess trends to establish whether this may have been caused by site activity; if a causal link is apparent or suspected, appropriate actions may include a wider risk assessment of relevant receptors, suspension of specific activities or abstraction of water to contain the movement of contaminants

6 REPORTING AND REVIEW

6.1 Regular reporting of monitoring information

The purpose of reporting data is to provide a formal channel for the communication of monitoring results to site management operatives and the Northern Ireland Environment Agency (NIEA). Reporting should be provided electronically and periodically to the NIEA. Reports should be submitted to the NIEA adhering to the following key principles:

- Timely submission, meeting any requisite deadlines;
- Collated and presented in a consistent format;
- Quarterly presentation of monitoring data; annual compilation accompanied by interpretation.

6.2 Reporting a breach

When assessment criteria (compliance limits) are breached the action plan in Section 5 should be implemented. The NIEA should also be notified of any compliance limit breach as soon as Omagh Minerals becomes aware of it and stating the following information:

- Date and time of the exceedance;
- The assessment criteria breached and nature of the incident;
- Observations and data relating to the exceedance and its effects;
- Action taken / to be taken by the operator.

In the event of an obvious contamination incident, pre-planned and preventative steps should be undertaken in order to mitigate or remediate the impact.

The source of the contamination should be identified as soon as possible and the relative risk assessed in relation to human health and the environment through groundwater and surface water receptors. If the risk is deemed to be unacceptable, steps should be put in place to minimise the impact and remove the source of contamination.

If the risk is deemed to be acceptable, the monitoring programmes, assessment criteria and frequency should be re-assessed in order to reflect the level of risk.

Emergency contingency measures may be required in relation to:

- Excessive discharge into surface water courses of site effluent;
- Spillage from fuel or storage tanks on site directly into nearby surface water courses.

In the event of either of these occurring then corrective measures must be immediately implemented and the NIEA informed.

6.3 Monitoring plan review

The monitoring plan for the site is to be assessed internally on an annual basis with regard to the monitoring data collected throughout the year, to check that it still meets the needs of the site operations.

At the completion of each stage of mine development and otherwise at minimum five-yearly intervals the monitoring plan is to be reviewed to assess the environmental impacts, if any, that have occurred and the likely impacts of the subsequent stage of mine development. Changes to regulation and to understanding of the local geology and hydrology, as well as more general developments in knowledge of environmental impact, will be taken into account in these reviews. Reviews will be undertaken in consultation with relevant external parties, including the Northern Ireland Environment Agency. Decisions regarding future bedrock groundwater monitoring borehole installations will be undertaken as part of this process.

APPENDIX A

Groundwater quality summary statistics (all boreholes) Jan 2010 – Oct 2013

	Count	Min	Max	Mean	5%ile	95%ile	SD	Mean +2SD	Mean +3SD
Aluminium (diss. fil)	37	2.9	383	49.7	2.9	180	76.8	203	280
Arsenic (diss. fil)	37	0.0574	6.1	0.751	0.12	1.49	0.971	2.69	3.67
CaCO ₃	37	1.91	103	32.7	4.58	92.6	28.1	88.9	117
Cadmium (diss. fil)	37	0.1	0.704	0.218	0.1	0.541	0.165	0.548	0.714
Calcium (diss. fil)	37	0.576	29.2	9.82	0.713	27	8.53	26.9	35.4
Chloride	37	8.2	15.9	11.6	8.94	15.4	1.89	15.4	17.3
Chromium (diss. fil)	37	0.237	116	5.97	0.594	8.02	18.5	42.9	61.4
COD	37	7	62.5	19.1	7	43.2	12.6	44.3	56.9
Cond. (mS/cm)	52	0.02	0.73	0.119	0.038	0.255	0.109	0.336	0.445
Copper (diss. fil)	37	0.85	81.9	4.36	0.85	7.09	13.1	30.5	43.6
Cyanide	33	0.05	0.05	0.05	0.05	0.05	2.08E-17	0.05	0.05
Iron (diss. fil)	37	0.019	0.759	0.0984	0.019	0.636	0.192	0.483	0.675
Lead (diss. fil)	37	0.02	0.902	0.226	0.02	0.802	0.285	0.796	1.08
Magnesium (diss. fil)	37	0.055	7.39	2.12	0.272	6.43	1.79	5.7	7.49
Manganese (diss. fil)	37	67.7	2950	577	75.5	2750	861	2300	3160
Mercury (diss. fil)	37	0.01	0.0209	0.0113	0.01	0.0173	0.00267	0.0166	0.0193
Nickel (diss. fil)	37	1.26	159	8.36	1.67	7.19	25.2	58.7	83.9
Nitrate (N)	4	0.0677	0.771	0.358	0.0677	0.734	0.303	0.965	1.27
Nitrate (NO ₃)	33	0.0677	15.2	1.37	0.0677	2.99	2.6	6.57	9.17
Nitrite (N)	4	0.0152	0.0152	0.0152	0.0152	0.0152	n.d.	0.0152	0.0152
Nitrite (NO ₂)	33	0.0152	0.05	0.0468	0.0152	0.05	0.01	0.0668	0.0768
pH	57	4.25	8.27	6.42	5.14	7.99	0.922	8.26	9.19
Potassium (diss. fil)	37	1	4.32	2.34	1	3.84	0.747	3.83	4.58
Silver (diss. fil)	37	1.5	1.5	1.5	1.5	1.5	n.d.	1.5	1.5
Sodium (diss. fil)	37	5.52	10.3	7.73	6.19	9.39	1.09	9.92	11
SS	20	2.5	5830	359	5.83	513	1260	2870	4130
Sulphate	37	2	17	5.46	2	12.8	4.19	13.8	18
Sulphide	33	0.01	0.1	0.0353	0.01	0.1	0.0397	0.115	0.155
Temp	37	2	1210	135	6.46	664	263	662	925
Zinc (diss. fil)	37	0.41	86.7	22.1	1.68	63.1	24.1	70.2	94.3