



Karuah East Quarry
ABN: 80 141 505 035
Karuah East Quarry Pty Limited
Blue Rock Close, Karuah NSW 2324

W: www.hunterquarries.com.au
E: karuah@hunterquarries.com.au
T: 02 4050 0304
P: PO Box 23, Thornton NSW 2322

Karuah East Quarry

Environmental Monitoring Report

December 2023



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1.0 Introduction

This report has been completed to meet the requirements of Section 66(6) of the *Protection of the Environment Operations Act 1997* and the NSW Environmental Protection Authority's (EPA) Requirements for Publishing Pollution Monitoring Data (EPA, 2013). This report summarises the required monitoring data under Environmental Protection Licence 20611 (the EPL) and Project Approval MP09_0175 (the Consent) for the Karuah East Quarry (the Quarry) as summarised by **Table 1** and **Table 2** respectively.

Table 1 *Summary of Environment Protection Licence, EPL 20611*

EPL Number:	EPL 20611
Licensee's Name:	Karuah East Quarry Pty Limited
Licensee's Address:	Karuah East Quarry PO Box 3284, Thornton NSW 2322 Blue Rock Close, Karuah NSW 2324
Link to Full Licence on the EPA website:	EPL 20611

Table 2 *Summary of Project Approval, MP09_0175*

Project Approval:	MP09_0175
Applicant:	Karuah East Quarry Pty Limited
Consent Authority:	NSW Planning Assessment Commission
Link to Full Project Approval on the DPE website:	Project Approval MP09_0175

A summary of the environmental monitoring data for December 2023 is covered in this report. Tables throughout this report provide key monitoring information from the EPL and the Consent, including:

- location of monitoring;
- pollutant;
- unit of measurement; and
- monitoring frequency required.

Monitoring locations are illustrated by the site plan provided by **Appendix 1**.

2.0 Air Quality Monitoring

Dust emissions generated by the Quarry operation must not cause additional exceedances of ambient air quality criterion outlined in Schedule 3, Condition 13 of the Consent and summarised by **Table 3**, **Table 4** and **Table 5**.

Deposited dust and TSP/PM10 monitoring is undertaken at the locations listed in **Table 6**, in accordance with the Approved Methods of Sampling and Analysis of Air Pollutants in NSW (EPA, 2022).

Table 3 Long-term Assessment Criteria for Deposited Dust (MP09-0175).

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level ¹	Maximum Total Deposited Dust Level ¹
Deposited Dust	Annual	2 g/m ² /month	4 g/m ² /month

¹ Deposited dust is assessed as insoluble solids as defined by AS 3580.10.1-2003.

Table 4 Long-term Assessment Criteria for Particulate Matter (MP09-0175).

Pollutant	Averaging Period	Criterion
Total Suspended Particulates	Annual	90 µg/m ³
Particulate Matter < 10 µm (PM10)	Annual	30 µg/m ³

Table 5 Short-term Assessment Criteria for Particulate Matter (MP09-0175).

Pollutant	Averaging Period	Criterion
Particulate Matter < 10 µm (PM10)	24-hour	50 µg/m ³

Table 6 Air Quality Monitoring Locations (EPL 20611).

Site Monitoring Point ID	EPL Monitoring Point ID	Location	Address	Coordinates
DDG 1	4	South-West of Karuah East Quarry	54 Mill Hill Close, Karuah NSW 2324	32°38'04"S 151°59'58"E
DDG 2	5	South-West of Karuah East Quarry	64 Mill Hill Close, Karuah NSW 2324	32°38'02"S 152°00'09"E
DDG 3	6	South-West of Karuah East Quarry	Lot 251 DP1092111, Karuah NSW 2324	32°37'57"S 151°59'41"E
DDG 4	7	East of Karuah East Quarry	21 Halloran Road, North Arm Cove NSW 2324	32° 37' 30.87"S 152°01'10.18"E
DDG 5	8	South-West of Karuah East Quarry	Lot 21 DP1024341, Karuah NSW 2324	32° 37' 55.33"S 152°00'2.74"E
HVAS	9	South-West of Karuah East Quarry	64 Mill Hill Close, Karuah NSW 2324	32°38'03"S 152°00'09"E

2.1 Deposited Dust Monitoring

Deposited dust results for the 12-months prior-to and including December 2023 are summarised by **Table 7**.

Table 7 *Deposited dust monitoring results.*

Reporting Period	Start Date	End Date	Days	DDG 1 EPL ID 4	DDG 2 EPL ID 5	DDG 3 EPL ID 6	DDG 4 EPL ID 7	DDG 5 EPL ID 8
Jan-23	5/01/2023	3/02/2023	29	0.2	0.4	0.8	0.1	0.4
Feb-23	3/02/2023	5/03/2023	31	0.9	0.7	0.2	0.3	0.8
Mar-23	5/03/2023	5/04/2023	30	1.1	1.5	1.1	1.1	1.1
Apr-23	5/04/2023	4/05/2023	29	0.3	0.5	0.3	0.2	1.2
May-23	4/05/2023	5/06/2023	32	0.2	0.3	0.3	0.4	0.4
Jun-23	6/06/2023	4/07/2023	28	0.6	2.5	1.8	–	–
Jul-23	4/07/2023	3/08/2023	30	0.4	0.9	1.2	1.1	0.3
Aug-23	3/08/2023	4/09/2023	32	0.7	0.3	0.5	0.5	0.2
Sep-23	4/09/2023	4/10/2023	30	1.5	2.6	1.4	1.4	2.0
Oct-23	04/10/2023	2/11/2023	31	1.4	2.4	2.2	1.6	2.5
Nov-23	2/11/2023	30/11/2023	28	1.6	-	1.4	1.0	2.0
Dec-23	30/11/2023	28/12/2023	28	1.1	1.0	1.3	1.3	1.7
Progressive Annual Average				0.8	1.2	1.0	0.8	1.1

Monitoring results for the December 2023 reporting period at all five DDG monitoring sites are within the long-term annual deposited dust limit of 4 g/m²/month.

It should be noted that DDG 4 and DDG 5 samples in the June 2023 reporting period, and DDG 2 sample in the November 2023 reporting period become contaminated with vegetation matter and are therefore discounted from averaging. These failure to monitor events were reported to the NSW Department of Planning & Environment (DPE), the NSW EPA and surrounding landholders in accordance with the relevant conditions of the Consent and EPL.

2.2 High Volume Air Sampling

TSP and PM10 results for the December 2023 reporting period are summarised by **Table 8** and illustrated respectively by **Figure 1** and **Figure 2**.

Table 8 *HVAS TSP and PM10 monitoring results for the December 2023 reporting period.*

Run Date	Total Suspended Particulates, TSP (µg/m ³)	Particulate Matter < 10 µm, PM10 (µg/m ³)
1/12/2023	24	12
7/12/2023	38	20
13/12/2023	36	18
19/12/2023	58	27
25/12/2023	17	11
31/12/2023	19	11
Annual Average	32.0	16.5

Monitoring results for the six HVAS run days within the December 2023 reporting period were compliant with the long-term limits for TSP and PM10 and short-term limits for PM10.

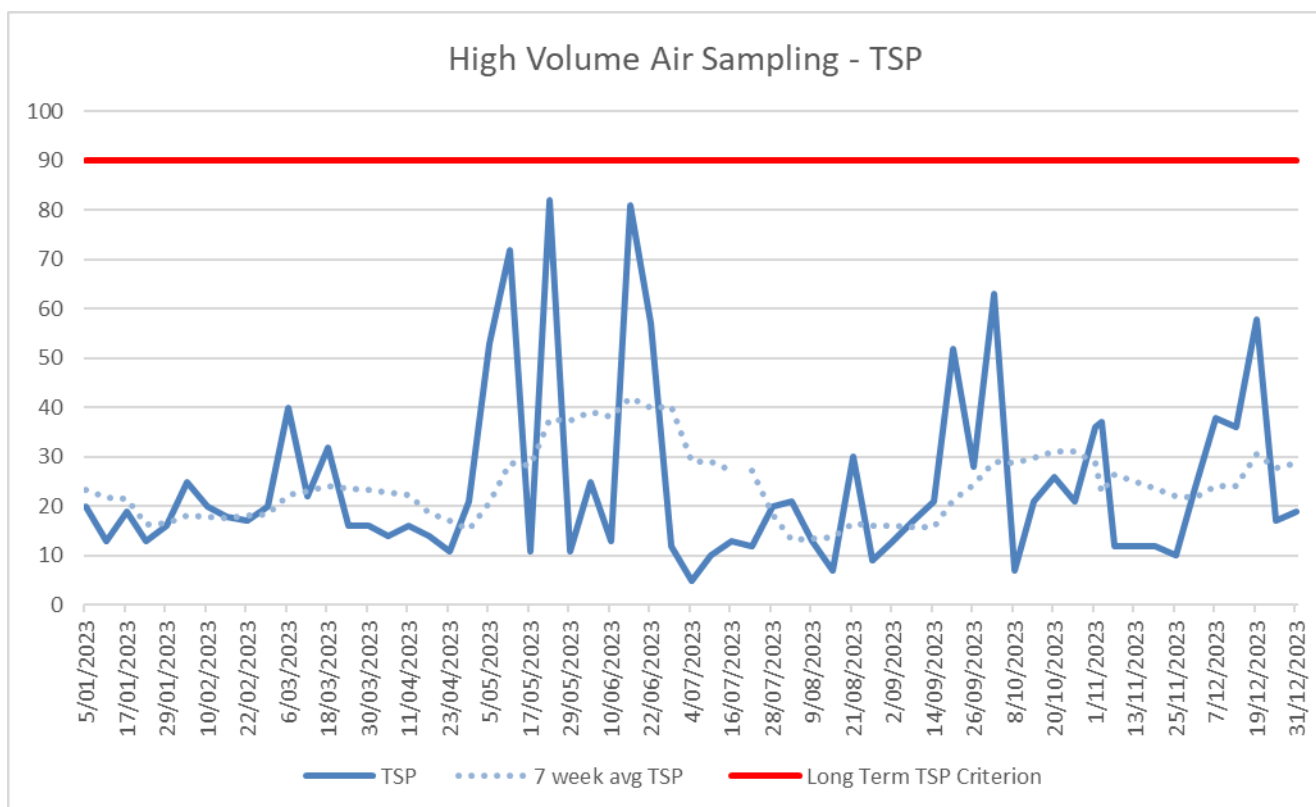


Figure 1 Long-term TSP monitoring trends.

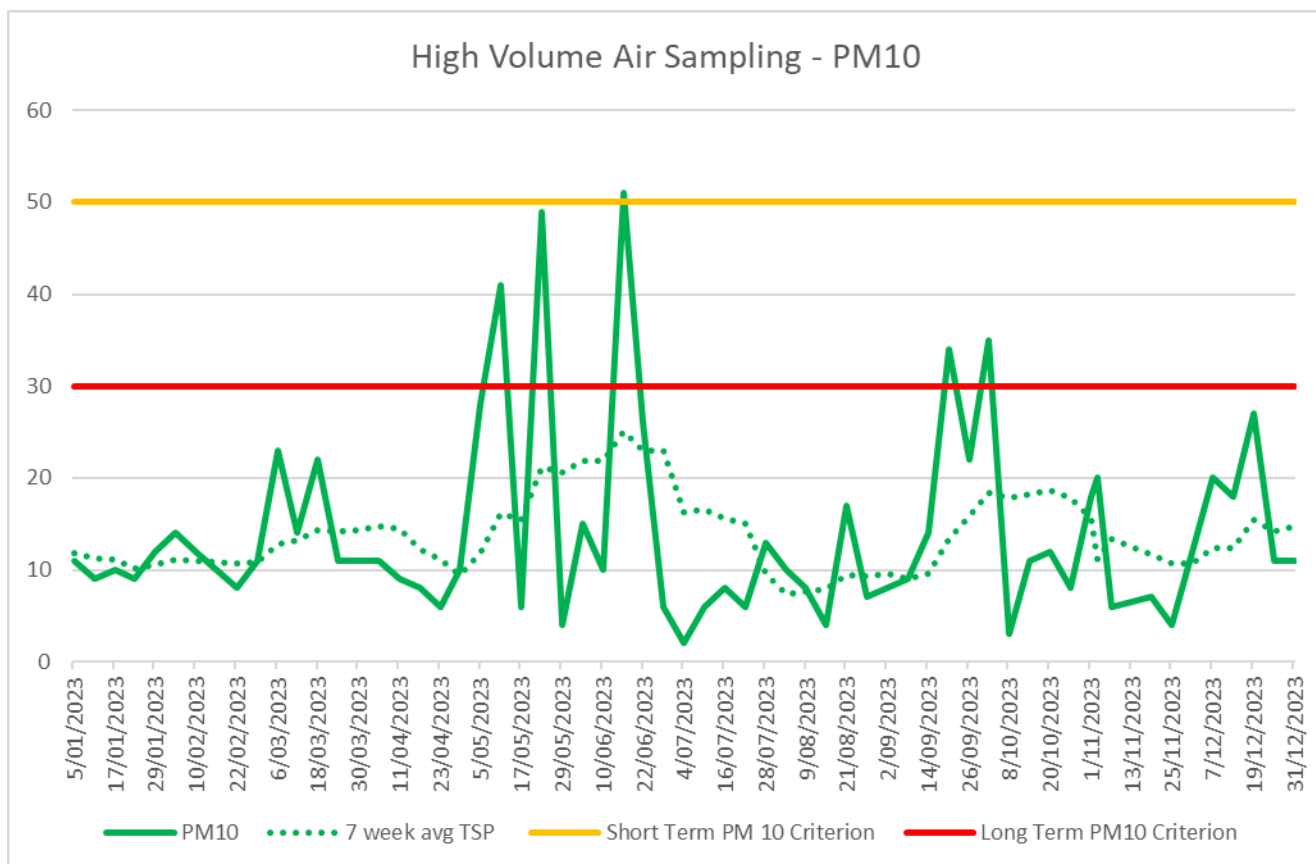


Figure 2 Long-term PM10 monitoring trends.

3.0 Blast Monitoring

Blast monitoring is undertaken for all blasts at the Quarry at the nearest residential location (EPL Monitoring Point 11) to ensure that air blast overpressure and ground vibration remain within the compliance limits, as summarised by **Table 9**.

There was one blast within the December 2023 reporting period, as summarised by **Table 10**, and was observed to be within compliance limits.

Table 9 *Blasting Airblast Overpressure and Ground Vibration Criteria (MP09-0175 & EPL 20611).*

Location	Airblast Overpressure (dB(L))	Ground Vibration (mm/s)	Allowable Exceedance
Private Residence B	120	10	0%
EPL Monitoring Point ID 11	115	5	5% over 12-month reporting period.

Table 10 *Blasting Monitoring Results.*

Date	Time	Location	Airblast Overpressure (dB(L))	Ground Vibration (mm/s)
Friday, 08/12/2023	13:37	RL 120	n/t	n/t

*Not triggered = n/t
Ground Vibration < 0.5 mm/s
Overpressure < 108 dB(L)

4.0 Noise Monitoring

Noise monitoring is undertaken in accordance with the EPL and DPE-approved Noise Management Plan, which requires attended noise monitoring to be conducted on a quarterly basis.

No noise monitoring was conducted during the December 2023 reporting period.

5.0 Surface Water Monitoring

Water monitoring is undertaken in accordance with the EPL and DPE approved Water Management Plan, which includes monthly surveillance sampling and daily sampling during discharge events.

Surface water surveillance monitoring was undertaken on 28 December 2023.

Table 11 *Surface Water Monitoring Results.*

Parameter	Units	EPL Discharge Limits	Dam 1	Dam 2	Dam 3	SW 2	SW 3
Oil and Grease	mg/L	5 and/or non-visible	<5	<5	<5	<5	<5
pH	pH	6.5 – 8.5	7.8	8.3	7.4	7.2	7.2
Total Suspended Solids	mg/L	40	1,180	<5	<5	23	12
Parameter	Units	ANZECC Guidelines ¹	Dam 1	Dam 2	Dam 3	SW 2	SW 3
Conductivity	µS/cm	125 – 2200	563	4,770	1,290	479	260
Total Dissolved Solids	mg/L	--	590	3,580	1,070	510	220
Total Phosphorus	mg/L	0.025	0.54	<0.05	<0.05	0.10	<0.05
Ammonia	mg/L	0.2	0.02	<0.02	<0.02	0.05	<0.02
<Nitrogen (Nitrate)	mg/L	0.350	<5.2	0.20	<0.005	<0.005	<0.005
Total Hardness (as CaCO ₃)	mg/L	--	35	1,800	310	40	55
Arsenic	mg/L	0.024	0.006	<0.001	<0.001	0.003	<0.001
Cadmium	mg/L	0.0002	0.0002	0.0003	<0.0001	<0.0001	<0.0001
Calcium	mg/L	--	5.1	660	110	5.3	12
Chromium	mg/L	0.001	0.033	<0.001	<0.001	0.001	0.005
Copper	mg/L	0.0014	0.034	0.002	<0.001	0.007	<0.001
Lead	mg/L	0.0034	0.021	<0.001	<0.001	0.003	<0.001
Magnesium	mg/L	--	5.4	30	12	6.6	6
Manganese	mg/L	1.9	1.2	0.24	0.047	0.57	0.13
Nickel	mg/L	0.011	0.025	0.001	<0.001	0.004	<0.001
Potassium	mg/L	--	2	9.1	3	3	2
Sodium	mg/L	--	95	130	100	74	27
Vanadium	mg/L	--	0.13	0.002	<0.001	0.02	0.001
Zinc	mg/L	0.0312	0.21	0.012	0.004	0.028	0.003

¹ Key default trigger values presented in ANZECC 2000 for slightly disturbed upland rivers in NSW. Heavy metals based on hard water (120-179 mg CaCO₃/L).

Daily discharge monitoring was conducted when discharging surface water from the Quarry via the licenced discharge points in accordance with Condition L2 and M2 of the EPL, as summarised by **Table 12**

Table 12 **Discharge Water Monitoring Results.**

Date	pH	Total Suspended Solids, TSS (mg/L)	Oil and Grease	Discharge Type
LDP 1 – Dam 1				
-	-	-	-	-
LDP 2 – Dam 2				
-	-	-	-	-
LDP 3 – Dam 3				
-	-	-	-	-

6.0 Weather Station Monitoring

The Quarry operates and maintains a permanent meteorological monitoring station to record weather parameters including temperature, wind speed and direction, solar radiation and rainfall. **Figure 3** below outlines the weather records for the December 2023 reporting period.

Monthly Weather Summary



Site: Karuah East Quarry

Month: December 2023

Date	Day	Temperature @ 2m			Temperature @ 10m			Winds			Solar Radiation		Rain ²
		Max ¹	Min ²	Ave ¹	Max ¹	Min ²	Ave ¹	Max Gust ¹	Ave Speed ¹	Dir Ave ¹	Max ¹	Ave ¹	
		°C	°C	°C	°C	°C	°C	km/h	km/h	deg	W/m ²	W/m ²	
1	Wed	31.5	15.9	24.1	30.3	16.9	24.3	42.6	5.9	231.7	1204.9	270.5	0.0
2	Thu	31.3	19.4	23.6	27.8	19.3	22.7	28.4	6.0	169.0	1156.7	252.1	2.2
3	Fri	26.3	16.9	20.5	23.7	17.6	20.4	18.9	3.3	170.0	1269.3	142.4	4.0
4	Sat	30.3	17.5	22.6	26.8	18.3	21.8	33.1	6.7	154.8	1025.8	303.2	0.0
5	Sun	27.3	13.1	19.9	23.8	13.9	19.3	26.0	4.8	161.2	1218.2	246.3	0.0
6	Mon	35.2	18.8	25.7	32.4	20.3	25.4	34.3	4.9	160.9	980.8	320.0	0.0
7	Tue	29.3	16.7	22.3	25.8	16.9	21.1	30.8	5.3	197.1	948.3	293.2	0.0
8	Wed	33.5	18.2	23.9	30.3	18.7	23.0	34.3	6.0	164.8	969.9	276.8	0.0
9	Thu	38.7	22.2	29.4	36.0	23.6	29.0	33.1	5.0	139.3	1062.4	311.1	0.0
10	Fri	42.6	21.5	30.1	38.7	21.2	29.2	36.7	7.8	181.4	964.2	259.4	0.2
11	Sat	33.0	17.1	24.5	29.7	17.9	23.8	30.8	5.5	153.3	1241.7	260.2	0.0
12	Sun	35.9	19.2	25.9	31.8	19.5	24.7	23.7	5.3	151.2	970.8	319.7	0.0
13	Mon	31.1	19.1	24.1	27.6	19.6	23.2	37.9	7.3	138.9	1215.7	289.5	0.0
14	Tue	34.7	20.5	27.1	31.5	21.0	26.1	33.1	5.6	162.0	951.7	311.8	0.0
15	Wed	40.1	21.8	29.0	38.7	21.4	28.6	39.0	6.9	235.3	1108.3	221.1	0.0
16	Thu	29.4	16.6	23.0	25.6	17.3	22.0	28.4	5.7	171.1	1176.7	258.8	0.0
17	Fri	39.4	20.5	27.2	37.5	20.8	26.5	45.0	8.3	188.1	1030.0	307.2	0.0
18	Sat	27.0	22.2	24.0	24.7	22.3	23.1	29.6	7.5	142.8	1161.7	180.4	0.0
19	Sun	33.1	21.8	26.7	29.8	22.0	25.8	30.8	5.5	142.5	1110.8	219.7	0.0
20	Mon	38.6	19.2	23.5	35.5	19.2	23.3	43.8	5.9	205.0	1022.4	154.8	22.4
21	Tue	22.0	16.7	18.8	21.6	16.7	18.8	31.9	6.0	229.2	284.2	49.0	17.0
22	Wed	24.2	17.2	19.7	22.4	17.4	19.5	40.2	7.0	201.0	964.2	125.6	2.6
23	Thu	25.9	15.1	19.9	22.8	15.3	19.1	29.6	5.8	193.6	1035.0	289.1	1.0
24	Fri	27.7	17.0	21.5	24.3	17.2	20.8	26.0	5.3	158.3	1124.9	290.3	0.0
25	Sat	28.5	15.9	21.2	26.1	16.4	20.8	22.5	3.9	198.6	1166.6	179.8	0.6
26	Sun	28.6	18.1	23.3	26.0	18.6	22.7	27.2	5.5	151.9	1340.8	253.2	0.2
27	Mon	32.7	16.6	23.6	29.5	17.7	23.4	24.9	3.9	164.8	1174.2	225.4	1.0
28	Tue	31.7	16.1	22.9	28.2	17.1	22.2	27.2	4.6	183.1	1049.2	291.4	0.2
29	Wed	35.3	17.0	25.3	32.9	17.3	24.8	27.2	5.2	217.3	1091.6	270.4	0.0
30	Thu	31.7	18.1	23.3	28.4	19.3	23.1	27.2	3.8	180.8	1101.6	191.2	0.6
31	Fri	29.6	18.2	22.9	26.2	18.4	21.9	35.5	7.9	156.6	958.3	275.7	4.8
Ave or Total		31.8	18.2	23.9	28.9	18.7	23.2	31.6	5.7	176.0	1067.1	246.4	56.8
High		42.6	22.2	30.1	38.7	23.6	29.2	45.0	8.3		1340.8	320.0	22.4
Low		22.0	13.1	18.8	21.6	13.9	18.8	18.9	3.3		284.2	49.0	

Notes: 1. Values are for the 24 hour period from 9am to 9am next day.

No. rain days >1mm:

5.00

2. Values are for the 24 hours to 9am.

Figure 3 Weather Records Summary – December 2023.

7.0 Production Data

Monthly monitoring of sales and truck movements are summarised by **Table 13**.

Table 13 *Quarry Production Data.*

Month	Truck Movements	Quarry Product Sales (t)
Jan-23	2,090	78,075
Feb-23	3,702	63,813
Mar-23	3,392	55,950
Apr-23	1,942	61,862
May-23	2,867	95,428
Jun-23	2,752	87,714
Jul-23	2,534	56,165
Aug-23	2,677	97,787
Sep-23	2,928	84,877
Oct-23	3,741	116,043
Nov-23	4,026	123,790
Dec-23	2,607	77,851

8.0 Reporting

8.1 Reportable Environmental Incidents

During the December 2023 reporting period, no reportable environmental incidents occurred at the Quarry.

8.2 Reportable non-compliances

During the December 2023 reporting period, no reportable non-compliances were identified at the Quarry.

8.3 Community Complaints

During the December 2023 reporting period, no community complaints were received by the Quarry.

Appendix 1 – EPL 20611 Monitoring Locations

Karuah East Quarry

Monitoring Locations

Legend

- Attended Noise
- Dust Deposition
- Groundwater
- High Volume Air Samplers
- Surface Water
- Unattended Noise



Google Earth

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