



# Awaba Waste Management Facility

Annual Review 2021-2022

Lake Macquarie City Council

9 August 2022



The Power of Commitment

**GHD Pty Ltd | ABN 39 008 488 373**

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|             |          |           | Name     | Signature                                                                           | Name               | Signature                                                                             | Date     |
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| Annual Review Title Block                                                                                                                                                                                                                                                         |                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Name of Operation                                                                                                                                                                                                                                                                 | Awaba Waste Management Facility |
| Name of Operator                                                                                                                                                                                                                                                                  | Lake Macquarie City Council     |
| Development Consent/Project Approval #                                                                                                                                                                                                                                            | 10_0139                         |
| Name of Holder of Project Approval                                                                                                                                                                                                                                                | Lake Macquarie City Council     |
| Annual Review Commencement Date                                                                                                                                                                                                                                                   | 11 August 2021                  |
| Annual Review Completion Date                                                                                                                                                                                                                                                     | 30 June 2022                    |
| I, Paul Collins, certify that this audit report is a true and accurate record of the compliance status of Awaba Waste Management Facility for the period 11 August 2021 to 30 June 2022 and that I am authorised to make this statement on behalf of Lake Macquarie City Council. |                                 |
| Name of authorised reporting officer                                                                                                                                                                                                                                              | Paul Collins                    |
| Title of authorised reporting officer                                                                                                                                                                                                                                             | Manager Waste Services          |
| Signature of authorised reporting officer                                                                                                                                                                                                                                         | <i>P. Collins</i>               |
| Date                                                                                                                                                                                                                                                                              | 9 August 2022                   |

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# 1. Statement of compliance

This section details compliance with the conditions of project approval 10\_0139 and any other licences and approvals as at the end of the reporting period (30 June 2022).

Table 1.1 identifies whether or not non-compliances occurred during the reporting period for each statutory approval. Where non-compliances are identified, further details are provided in Table 1.2. Non-compliances have been colour-coded in that table, in accordance with the risk level descriptions provided in Table 1.3.

**Table 1.1**      *Statement of compliance*

| Approval                                        | Were all conditions of the relevant approval(s) complied with during the reporting period? |
|-------------------------------------------------|--------------------------------------------------------------------------------------------|
| Project Approval 10_0139                        | No                                                                                         |
| EPL 5873                                        | No                                                                                         |
| Trade Waste Agreement (Consent no: 2014-1036/9) | Yes                                                                                        |

An Independent Environmental Audit (IEA) was conducted during the report period (Umwelt 2022), with the report submitted in March 2022. A number of non-compliances and opportunities for improvement were identified in the IEA. Lake Macquarie City Council (LMCC) provided a response to each audit outcome with the Response to Audit Report (RAR) submitted to DPE following the audit in May 2022. IEA non-compliances relevant to the report period are provided in Table 1.1, along with a reference to the section where progression against these non-compliances can be found. The response to the audit recommendations and progression against the identified actions is provided in Section 9.

In addition to the non-compliances identified within the IEA, an additional non-compliance with the EPL was identified during the report period relating to two water monitoring exceedances at Monitoring Point 7 (MP7).

**Table 1.2**      *Non-Compliances identified during the IEA or self reported*

| Relevant approval        | REF       | Condition description                                                                                                                                                                                                                                                                                                                                                                              | Compliance status | IEA Comment                                                                                                                                                                                                                               | Where addressed in Annual Review |
|--------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Project Approval 10_0139 | Sch3. C6  | Upon commencement of the development, or as otherwise agreed by the Director-General, the Proponent shall surrender the development consents identified in Table 1 in accordance with Sections 75YA and 104A of the EP&A Act.                                                                                                                                                                      | Non-compliant-    | No evidence has been provided to verify if all existing development consents have been surrendered as required.                                                                                                                           | Section 9.1                      |
|                          | Sch 4 C6  | Prior to commencement of operation, the Proponent shall ensure that a Trade Waste Agreement is in place with Hunter Water Corporation for the life of the Project.                                                                                                                                                                                                                                 | Non-compliant     | A Trade Waste Agreement was in place prior to the commencement of operations but only covered a 12-month period and expired on the 30 June 2021. The Agreement does not cover the life of the Project as was stipulated in the condition. | Section 9.1                      |
|                          | Sch 4 C9  | The Proponent shall:<br>(a) implement suitable measures to prevent the unnecessary proliferation of litter both on and off Site resulting from the landfilling operations; and<br>(b) inspect daily and clear the Site (and if necessary, surrounding area) of litter resulting from the landfilling operations, on a daily basis.                                                                 | Non-compliant     | Daily litter inspections are not being undertaken as required. During the site inspection proliferation of litter was observed and was seen spreading offsite and into surrounding bushland.                                              | Section 6.5 and Section 9.1      |
|                          | Sch 4 C10 | The Proponent shall:<br>(a) implement suitable measures to manage pests, vermin and declared noxious weeds on Site; and<br>(b) inspect the Site on a regular basis to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on Site in sufficient numbers to pose an environmental hazard, or cause the loss of amenity in surrounding area. | Non-compliant     | No evidence could be provided to show regular inspections and/or measures for managing pests, vermin and declared noxious weeds were undertaken during the audit period.                                                                  | Section 6.6 and Section 9.1      |
|                          | Sch 4 C11 | The Proponent shall ensure that all licensed surface water discharges from the Site comply with discharge limits (volume and quality) set for the Project in any EPL or relevant provisions of the POEO Act.                                                                                                                                                                                       | Non-compliant     | No evidence showing cell designs were submitted to the EPA (letter or email correspondence) was able to be provided during this audit to verify designs were submitted prior to commencement of any construction.                         | Section 9.1                      |



| Relevant approval | REF       | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance status | IEA Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Where addressed in Annual Review |
|-------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                   | Sch 4 C18 | <p>The Proponent shall:</p> <p>(a) design and install the leachate management and collection system generally in accordance with the conceptual design in the EA (as shown in Appendix 5), applicable Australian Standards and industry standard best practice guidelines, or otherwise approved by the EPA;</p> <p>(b) ensure that leachate generated by the Project is minimised and appropriately contained, collected and disposed of;</p> <p>(c) as required, leachate generated by the Project shall be transferred for disposal to the Rathmines No. 6 WWPS in accordance with HWC's requirements;</p> <p>(d) install a leachate barrier system to be used for the direct impoundment of leachate (see conditions 11 and 12 of this Schedule);</p> <p>(e) design and operate the leachate management system to prevent leachate from escaping to surface water, groundwater or the surrounding subsoils;</p> <p>(f) direct all surface water from areas not subject to waste disposal or leachate disposal away from the leachate management system; and</p> <p>(g) treat all water that has entered areas filled with waste, or been contaminated by leachate, as leachate to the satisfaction of the Director-General.</p> | Non-compliant     | Leachate generated by the Project has not been appropriately contained, collected, or disposed of throughout the audit period. Leachate is not solely disposed of at the Hunter Water Corporation's Rathmines facility by pipeline but is also regularly disposed at the Edgeworth WWTW via truck at up to 80KL per day. It was not able to be verified if the ongoing trucking of leachate to the Edgeworth Facility is approved under PA 10_0139. The supporting EIS only references trucking during emergency situations to prevent overflow events. | Section 9.1                      |
|                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Non-compliant     | Leachate generated by the Project has not been appropriately contained, collected, or disposed of throughout the audit period. Leachate is not solely disposed of at the Hunter Water Corporation's Rathmines facility by pipeline but is also regularly disposed at the Edgeworth WWTW via truck at up to 80KL per day. It was not able to be verified if the ongoing trucking of leachate to the Edgeworth Facility is approved under PA 10_0139. The supporting EIS only references trucking during emergency situations to prevent overflow events. | Section 6.1.1<br>Section 9.1     |
|                   | Sch 4 C19 | <p>The Proponent shall prepare and implement a Soil, Water and Leachate Management Plan for the Project. The Plan shall be prepared by a suitably qualified and experienced expert in consultation with LMCC, the NOW and the EPA and be submitted to the Director-General for approval prior to the commencement of Operations. The Plan shall include:</p> <p>(a) a Site water balance for the Project, that details:</p> <ul style="list-style-type: none"> <li>• sources and security of water supply;</li> <li>• water use on Site;</li> <li>• water management on Site;</li> </ul> <p>(b) an erosion and sediment control plan that:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Non-compliant     | Plans within the Soil, Water and Leachate Management Plan are outdated and need revision to reflect current operations and the Surface Water, Groundwater and Leachate Monitoring Program needs to be revised to include relevant EPL criteria.                                                                                                                                                                                                                                                                                                         | Section 6<br>Table 6.1.          |

| Relevant approval | REF | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Compliance status | IEA Comment | Where addressed in Annual Review |
|-------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|----------------------------------|
|                   |     | <ul style="list-style-type: none"> <li>• is consistent with the requirements of the latest version of the Blue Book Volume 1 and Volume 2B;</li> <li>• identifies activities on Site that could cause soil erosion and generate sediment; and</li> <li>• describes the measures that will be implemented to: <ul style="list-style-type: none"> <li>i. minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures and maintain these structures over time;</li> <li>ii. ensure that any topsoil stockpiles on Site are suitably managed to ensure that the topsoil in these stockpiles can be beneficially used in the proposed revegetation and rehabilitation of the Site.</li> </ul> </li> </ul> <p>(c) a leachate management plan that:</p> <ul style="list-style-type: none"> <li>• includes final detailed design specifications of the leachate management and collection system on Site; and</li> <li>• demonstrates how the requirements of Condition 18 of Schedule 4 have been addressed;</li> </ul> <p>(d) a stormwater management plan that:</p> <ul style="list-style-type: none"> <li>• is consistent with the guidance in the latest version of the Blue Book Volume 1 and Volume 2B;</li> <li>• includes final detailed design specifications for the stormwater management and collection system; and</li> <li>• demonstrates how the requirements of Condition 17 of Schedule 4 have been addressed;</li> </ul> <p>(e) a surface water, groundwater and leachate monitoring program that includes:</p> <ul style="list-style-type: none"> <li>• baseline data (including water flow and quality);</li> <li>• details of the proposed monitoring network; And</li> <li>• the parameters for testing and respective impact assessment criteria and trigger levels or action under the surface water, groundwater and leachate response plan.</li> </ul> <p>(f) a surface water, groundwater and leachate response plan that:</p> <ul style="list-style-type: none"> <li>• includes a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels; and</li> <li>• describes the measures that could be implemented to respond to any surface or groundwater contamination that may be caused by any development. The Plan shall be documented in the Landfill Environmental Management Plan (see Condition 3 in Schedule 5).</li> </ul> |                   |             |                                  |

| Relevant approval | REF       | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Compliance status | IEA Comment                                                                                                                                                 | Where addressed in Annual Review |
|-------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                   | Sch 4 C22 | The Proponent shall ensure that dust generated by the Project does not exceed the criteria listed in Tables 2 to 4 at any private residential receiver, or on more than 25 percent of any privately owned land surrounding the Site.                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Non-compliant     | On the basis that no monitoring has been undertaken, there is no verifiable evidence to demonstrate that AWMF operate within relevant air quality criteria. | Section 9.1                      |
|                   | Sch 4 C26 | The Proponent shall develop and implement a Greenhouse Gas Management Plan prior to the commencement of operations of the new landfill cells. The Plan shall include, as a minimum:<br>(a) proposed active landfill gas management system including flaring and/or combustion to reduce potential greenhouse gas emissions from the landfill;<br>(b) energy saving measures to be implemented;<br>(b) detail greenhouse gas monitoring program;<br>(c) a program to monitor the effectiveness of these measures; and<br>(d) a protocol to periodically review the Plan.<br>The Plan shall be documented in the Landfill Environmental Management Plan (see Condition 3 in Schedule 5). | Non-compliant     | The Greenhouse Gas Management Plan has not been reviewed or revised since its submission in 2014.                                                           | Section 6<br>Table 6.1.          |
|                   | Sch 4 C27 | Noise from the premises shall not exceed:<br>(a) an LA10(15 minute) noise emission criterion of 45dB(A) (7am to 6pm) Monday to Sunday;<br>(b) an LA10 (15 minute) noise emission criterion of 45 dB(A) during the evening (6pm to 10pm) Monday to Friday; and<br>(c) at all other times, an LA10 (15 minutes) noise emission criterion of 35dB(A), except as expressively provided by the EPL.<br>Noise from the Site is to be measured at any point within six (6) metres of the nearest effected residential receiver or other noise sensitive areas in the vicinity to determine compliance with this condition.                                                                    | Non-compliant     | On the basis no noise monitoring has been undertaken, there is no verifiable evidence to demonstrate that AWMF operate within noise limits.                 | Section 6.4                      |

| Relevant approval | REF       | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Compliance status | IEA Comment                                                                                                                                                                                                                                                                                                                                                                  | Where addressed in Annual Review |
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|                   | Sch 4 C29 | <p>The Proponent shall:</p> <ul style="list-style-type: none"> <li>(a) implement best management practice, including all reasonable and feasible noise management and mitigation measures to prevent and minimise operational, low frequency and traffic noise generated by the Project;</li> <li>(b) minimise the noise impacts of the Project during adverse meteorological conditions when noise criteria do not apply;</li> <li>(c) maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired; and</li> <li>(d) regularly assess noise monitoring data and relocate, modify and/or stop operations to ensure compliance with the relevant conditions of this consent.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Non-compliant     | The operational noise validation assessment was not undertaken during the audit period as required. It was to be undertaken by January 2016 and not completed until December 2021) and as such it is not able to be supported that the AWMF implements best management practice including implementing all reasonable and feasible noise management and mitigation measures. | Section 6.4                      |
|                   | Sch 4 C32 | <p>The Proponent shall prepare and implement an Operational Noise Management Plan for the Project in consultation with the EPA and to the satisfaction of the Director-General. The Plan shall:</p> <ul style="list-style-type: none"> <li>(a) be prepared and implemented by a suitably qualified and experienced person;</li> <li>(b) be submitted for approval by the Director-General prior to commencement of operations;</li> <li>(c) describe the measures that will be implemented to ensure: <ul style="list-style-type: none"> <li>• best management practice is being employed on site;</li> <li>• traffic management noise is effectively managed; and</li> <li>• the noise impacts of the Project are minimised during any meteorological conditions when the noise criteria in this consent do not apply;</li> </ul> </li> <li>• compliance with the relevant conditions of this consent.</li> <li>(d) describe the noise management system;</li> <li>(e) includes a noise monitoring program that: <ul style="list-style-type: none"> <li>• is capable of evaluating the performance of the Project;</li> <li>• includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and</li> <li>• adequately supports the noise management system; and</li> <li>• evaluates and reports on the effectiveness of the noise management system.</li> </ul> </li> </ul> <p>The Plan shall be documented in the Landfill Environmental Management Plan (see Condition 3 in Schedule 5).</p> | Non-compliant     | The Operational Noise Management Plan does not provide mitigation measures that include traffic management noise or minimising impacts during adverse meteorological conditions. No noise monitoring program is included.                                                                                                                                                    | Section 9.1.                     |

| Relevant approval | REF       | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Compliance status | IEA Comment                                                                                                                                                                                                                                                                                                                 | Where addressed in Annual Review |
|-------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                   | Sch 4 C37 | The Proponent shall ensure that:<br>(a) the internal roads and parking associated with the Project are constructed and maintained in accordance with the latest versions of AS 2890.1 and AS 2890.2; and (b) vehicles associated with the Project do not park or queue on the public road network.                                                                                                                                                                                                                                                                         | Non-compliant     | No verifiable evidence able to be provided confirming that internal roads and parking associated with the Project have been constructed and maintained in accordance with the latest versions of AS 2890.1 and AS 2890.2.                                                                                                   | Section 9.1                      |
|                   | Sch 4 C39 | The Proponent shall ensure that the lighting associated with the Project:<br>(a) complies with the latest version of AS 4282(INT)- Control of Obtrusive Effects of Outdoor Lighting; and<br>(b) is mounted, screened and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.                                                                                                                                                                                                                                | Non-compliant     | During the audit no evidence has been provided to support lighting associated with the project complies with the latest version of AS 4282(INT) - Control of Obtrusive Effects of Outdoor Lighting.                                                                                                                         | Section 9.1                      |
|                   | Sch 4 C41 | The Proponent shall store all chemicals, fuels and oils used on Site in appropriately bunded areas in accordance with the requirements of all relevant Australia Standards, and/or EPA's Storing and Handling Liquids: Environmental Protection – Participants Handbook.                                                                                                                                                                                                                                                                                                   | Non-compliant     | During the site inspection it was noted in some locations (such as the landfill gas energy plan) that chemical and hydrocarbon drums were not located within bunded areas.                                                                                                                                                  | Section 9.1                      |
|                   | Sch 4 C43 | The Proponent shall prepare and implement an Emergency Response Plan for the Project to the satisfaction of the Director-General. The Plan shall:<br>(a) be prepared and implemented by a suitably qualified and experienced person whose appointment has been approved by the Director-General;<br>(b) be submitted for approval by the Director-General prior to commencement of operations; and<br>(c) include a Bush Fire Emergency Evacuation Plan in accordance with the NSW Rural Fire Service document Guide for Developing a Bush Fire Emergency Evacuation Plan. | Non-compliant     | The Pollution Incident and Emergency Response Plan has not been prepared by a suitable qualified experience person that has been approved by the Director General. The Emergency and Pollution Response Plan does not include a Bushfire Evacuation Plan.                                                                   | Section 9.1                      |
|                   | Sch 4 C45 | The Proponent shall prepare and implement a Cultural Heritage Management Plan (CHMP) to the satisfaction of the Director-General. The Plan shall:<br>(a) be prepared in consultation with the OEH by a suitably qualified and experienced expert;<br>(b) be approved by the Director-General prior to the commencement of any ground disturbance or development works;<br>(c) be implemented in consultation with the registered Aboriginal parties;<br>(d) detail:                                                                                                        | Non-compliant     | No evidence has been provided to suggest the Cultural Heritage Management Plan has been implemented in consultation with the registered aboriginal parties. No evidence has been provided to suggest RAPs have been provided this opportunity walk the sewer pipeline route to undertake a final collection of any objects. | Section 9.1                      |

| Relevant approval                    | REF                                                                                                                                                                                              | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance status | IEA Comment                                                                                                                                                                                        | Where addressed in Annual Review |                 |                                      |                                                                                                                                                                                                  |     |        |               |                                                                                                                                                                                                                                                |                            |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
|                                      |                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>procedures for managing the Aboriginal cultural heritage values associated with the Project;</li><li>the involvement and responsibilities of the Aboriginal stakeholders in the implementation of all cultural heritage management actions;</li><li>the responsibilities of all other stakeholders;</li><li>all mitigation and management strategies (including monitoring program, further investigations etc);</li><li>procedures for the identification and management of previously unrecorded sites (including human remains);</li><li>an appropriate keeping place agreement with local Aboriginal community representatives for any Aboriginal objects salvaged through the development process;</li><li>the Aboriginal Cultural Heritage Education Induction Program for all contractors and personnel associated with construction activities; and</li></ul> <p>(f) compliance procedures in the unlikely event that non-compliance with the CHMP is identified.</p> |                   | No monitoring and collection protocol has been developed. No Aboriginal Site Impact Recording Forms have been sighted for any sites subjected to archaeological salvage works during construction. |                                  |                 |                                      |                                                                                                                                                                                                  |     |        |               |                                                                                                                                                                                                                                                |                            |
|                                      | Sch 4 C47                                                                                                                                                                                        | All Aboriginal sites impacts by the Project shall have an Aboriginal Site Impact Recording (ASIR) form completed and be submitted to the AHIMS Registrar within three (3) months of being impacted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Non-compliant     | No evidence of completed Aboriginal Site Impact Recording Forms could be provided for the Aboriginal sites impacted for construction.                                                              | Section 9.1                      |                 |                                      |                                                                                                                                                                                                  |     |        |               |                                                                                                                                                                                                                                                |                            |
|                                      | Sch 4 C50                                                                                                                                                                                        | <p>The Proponent shall implement the biodiversity offset strategy summarised in Table 3 and shown in Appendix 2 in accordance with the Biobanking Assessment Report prepared by Niche dated September 2013 to the satisfaction of the Director-General.</p> <p><i>Table 3: Biodiversity Offset Strategy</i></p> <table><tr><th>Offset Area</th><th>Offset Type</th><th>Ecosystem credits</th><th>Species credits</th></tr><tr><td>Lot 483 DP 1138964 (121.19 hectares)</td><td>Vegetation to be enhanced and retained including Smooth-barked Apple-Red Bloodwood open Forest and Scribbly Gum-Red bloodwood heath woodland communities and Tetraetha juncea (Black-eyed Susan)</td><td>392</td><td>33,653</td></tr></table> <p><i>Note: to see the areas referred to in Table 3 see the applicable figures in Appendix 2.</i></p>                                                                                                                                                                                  | Offset Area       | Offset Type                                                                                                                                                                                        | Ecosystem credits                | Species credits | Lot 483 DP 1138964 (121.19 hectares) | Vegetation to be enhanced and retained including Smooth-barked Apple-Red Bloodwood open Forest and Scribbly Gum-Red bloodwood heath woodland communities and Tetraetha juncea (Black-eyed Susan) | 392 | 33,653 | Non-compliant | The Biodiversity Offset Strategy has not been implemented during the audit period. Monitoring of the Awaba Biodiversity Conservation Area has not been carried out in accordance with the approved Awaba Conservation Area Plan of Management. | Section 6.7<br>Section 9.1 |
| Offset Area                          | Offset Type                                                                                                                                                                                      | Ecosystem credits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Species credits   |                                                                                                                                                                                                    |                                  |                 |                                      |                                                                                                                                                                                                  |     |        |               |                                                                                                                                                                                                                                                |                            |
| Lot 483 DP 1138964 (121.19 hectares) | Vegetation to be enhanced and retained including Smooth-barked Apple-Red Bloodwood open Forest and Scribbly Gum-Red bloodwood heath woodland communities and Tetraetha juncea (Black-eyed Susan) | 392                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 33,653            |                                                                                                                                                                                                    |                                  |                 |                                      |                                                                                                                                                                                                  |     |        |               |                                                                                                                                                                                                                                                |                            |



| Relevant approval | REF        | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Compliance status | IEA Comment                                                                                                                                                                     | Where addressed in Annual Review |
|-------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                   | Sch 4 C51  | Prior to construction, the Proponent shall prepare a Biodiversity Offset Management Plan for Lot 463 DP 1138964 in consultation with OEH and to the satisfaction of the Director-General.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Non-compliant     | No evidence has been provided to suggest the Biodiversity Offset Management Plan has been approved by the Director General.                                                     | Table 6.1.<br>Section 9.1        |
|                   | Sch 4 C51A | <p>Within 60 days of the commencement of vegetation clearance (other than for survey or conservation management purposes) under this Approval, a restriction on user burdening Lot 463 DP 1138964 retained to implement the Biodiversity Offset Strategy in Condition 50 shall be registered and inure in favour of the Minister for Planning and Infrastructure. The instrument shall be in or to the effect of the Restrictive Covenant annexed to these conditions as Appendix 9 and will affect the area of land referred to in that Appendix.</p> <p>It is a requirement that the restriction on user instrument not restrict or constrain the holder of an authority granted or renewed under the Mining Act 1992 or any Act consolidating or replacing that Act from carrying out on the subject land prospecting, mining operations, mining purposes and related improvements and activities authorised by or under any such authority.</p>                                                                                                                            | Non-compliant     | A restrictive covenant has not been placed on Lot 463 DP 1138964 as required.                                                                                                   | Section 9.1                      |
|                   | Sch 4 C 55 | <p>The Proponent shall prepare and implement a Vegetation and Fauna Management Plan for the Project to the satisfaction of the Director-General.</p> <p>The Plan shall:</p> <ul style="list-style-type: none"> <li>(a) be prepared by a suitably qualified and experienced expert in consultation with the OEH;</li> <li>(b) be reviewed by an independent agency that oversees land management outcomes in the region;</li> <li>(c) be approved by the Director-General prior to the commencement of construction;</li> <li>(d) map all identified vegetation cover and types;</li> <li>(e) describe methods for monitoring and controlling vegetation, including prevention of litter and weed invasion into the Offset Areas during construction and operation;</li> <li>(f) include a Vegetation Clearing Protocol;</li> <li>(g) identify measures to manage edge effects along the interface of the Offset Areas and landfill sites;</li> <li>(h) detail management of pest species; and</li> <li>(i) detail ecological monitoring programs to be implemented.</li> </ul> | Non-compliant     | The Vegetation and Fauna Management Plan has not been implemented during the audit period with no monitoring, weed or pest management or other elements of the plan undertaken. | Section 6.6<br>Section 9.1       |

| Relevant approval | REF              | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance status | IEA Comment                                                                                                                                                                                                                                                                                                                                                             | Where addressed in Annual Review       |
|-------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
|                   | Sch 4 C56        | <p>The Vegetation Clearing Protocol shall:</p> <p>(a) clearly identify the location and type of vegetation to be retained and to be removed from the Site;</p> <p>(b) detail measures that would be implemented for vegetation clearing;</p> <p>(c) ensure vegetation, including trees would not be pushed or felled into any retained bushland areas during the vegetation removal process; and</p> <p>(d) detail the staging of construction to avoid breeding times for key species on Site</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Non-compliant     | The Vegetation Clearing Protocol does not clearly identify the locations or the type of vegetation to be retained and to be removed from the Site as required.                                                                                                                                                                                                          | Section 6<br>Table 6.1.<br>Section 9.1 |
|                   | Sch 4 C57 and 58 | <p>The Proponent shall prepare and implement a Landfill Closure and Rehabilitation Management Plan for the Site to the satisfaction of the Director-General. The Plan shall:</p> <p>(a) be prepared in consultation with the EPA and other relevant agencies by suitably qualified and experienced expert;</p> <p>(b) be submitted to the Director-General for approval within 12 months upon commencement of this approval;</p> <p>(c) ensure that the final landform of the Site is consistent with the EA and Appendix 5 of this Consent; and</p> <p>The Proponent shall prepare and implement a Landfill Closure and Rehabilitation Management Plan for the Site to the satisfaction of the Director-General. The Plan shall:</p> <p>(a) be prepared in consultation with the EPA by a suitably qualified and experienced expert;</p> <p>(b) be submitted to the Director-General for approval within 12 months upon commencement of this approval;</p> <p>(c) define the objectives and criteria for rehabilitation and closure;</p> <p>(d) ensure that the final landform of the Site is consistent with the EA and Appendix 5 of this approval;</p> <p>(e) describe the measures that would be implemented to achieve the specified objectives and criteria for rehabilitation and closure;</p> <p>(f) calculate the cost of implementing these measures;</p> <p>(g) describe how the performance of these measures would be monitored over time; and</p> <p>(h) include details of the post closure management measures for all aspects of the Project.</p> | Non-compliant     | <p>A Landfill Closure and Rehabilitation Management Plan has not been prepared for the Project or submitted to the Director-General for approval within the required timeframe.</p> <p>A Landfill Closure and Rehabilitation Management Plan has not been prepared for the Project or submitted to the Director-General for approval within the required timeframe.</p> | Section 7<br>Section 9.1               |

| Relevant approval | REF      | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Compliance status | IEA Comment                                                                                                                 | Where addressed in Annual Review    |
|-------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                   | Sch 5 C3 | <p>The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <ul style="list-style-type: none"> <li>(a) detailed baseline data;</li> <li>(b) a description of: the relevant statutory requirements (including any relevant approvals, licences or lease conditions); <ul style="list-style-type: none"> <li>• any relevant limits or performance measures/criteria; and</li> <li>• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the Project or any management measures</li> </ul> </li> <li>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</li> <li>(d) a program to monitor and report on the: <ul style="list-style-type: none"> <li>• impacts and environmental performance of the Project;</li> <li>• effectiveness of any management measures (see c above);</li> </ul> </li> <li>(e) a contingency plan to manage any unpredicted impacts and their consequences;</li> <li>(f) a program to investigate and implement ways to improve the environmental performance of the Project over time;</li> <li>(g) a protocol for managing and reporting any: <ul style="list-style-type: none"> <li>• incidents;</li> <li>• complaints;</li> <li>• non-compliances with statutory requirements; and</li> <li>• exceedances of the relevant limits and/or performance measures / criteria; and</li> </ul> </li> <li>(h) a protocol for periodic review of the plan.</li> </ul> | Non-compliant     | A number of management plans required under this approval do not include all the relevant criteria and/or require revision. | Section 6 Table 6.1.                |
|                   | Sch 5 C5 | <p>Within 3 months of the submission of an: (a) audit under condition 9 of schedule 5;</p> <p>(b) incident report under condition 7 of schedule 5; and</p> <p>(c) annual review under condition 5 of schedule 5,</p> <p>(d) the Proponent shall review, and if necessary, revise the plans and programs required under this approval to the satisfaction of the Director-General</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Non-compliant     | Plans within the Soil, Water Management Plan were not revised within 3 months of submission of an incident report.          | Section 6 Table 6.1.<br>Section 9.1 |

| Relevant approval              | REF             | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Compliance status | IEA Comment                                                                                                                                                                                                                                                                                              | Where addressed in Annual Review |
|--------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                | Sch 5 C6        | The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the Project as soon as practicable after the Proponent becomes aware of the incident.<br><br>Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Non-compliant     | Seven incidents which occurred during the audit period were not reported to the Director General as required.                                                                                                                                                                                            | Section 9.1<br>Section 10        |
|                                | Sch 5 C7 and 10 | The Proponent shall provide regular reporting on the environmental performance of the Project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Director-General.<br><br>From the commencement of the construction of the Project, the Proponent shall make the following information publicly available on its website as it is progressively required by the approval:<br>(a) a copy of all current statutory approvals;<br>(b) a copy of the current plans and programs required under this approval;<br>(c) a summary of the monitoring results of the Project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;<br>(d) a complaints register, which is to be updated on a monthly basis;<br>(e) a copy of the Annual Reviews (over the last 5 years);<br>(f) a copy of any Independent Environmental Audit, and the Proponent's response to the recommendations in any audit; and<br>(g) any other matter required by the Director-General. | Non-compliant     | Monitoring results are not regularly updated to the LMCC website.<br><br>The following documents are not available as required on the LMCC website: Most recent Project Approval (PA 10_0139 MOD 1 dated August 2014), EPBC Approval 2011/5973, EPL 5873, the Annual Review and the Complaints Register. | Complete                         |
|                                |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Non-compliant     | Monitoring results are not regularly updated to the LMCC website.<br><br>The following documents are not available as required on the LMCC website: Most recent Project Approval (PA 10_0139 MOD 1 dated August 2014), EPBC Approval 2011/5973, EPL 5873, the Annual Review and the Complaints Register. | Complete                         |
| <b>EPL 5873 Non-compliance</b> |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |                                                                                                                                                                                                                                                                                                          |                                  |
|                                | L4              | Noise from the premises must not exceed:<br>a) an LA10 (15 minute) noise emission criterion of 45 dB(A) (7am to 6pm ) Monday to Sunday; and<br>b) an LA10 (15 minute) noise emission criterion of 45 dB(A) during the evening (6pm to 10pm) Monday to Friday; and<br>c) at all other times, an LA10 (15 minutes) noise emission criterion of 35 dB(A), except as expressly provided by this licence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Non-compliant     | Noise monitoring not undertaken at nearest affected residence or other.                                                                                                                                                                                                                                  | Section 9.1                      |

| Relevant approval | REF   | Condition description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Compliance status | IEA Comment                                                                                                                                                                                                                                                                                | Where addressed in Annual Review |
|-------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                   | 06.14 | Chemicals, fuels, oils and liquid waste must be;<br>a) stored in an impervious bund able to contain at all times 110% of the largest container stored within that bund; and<br>b) stored in a manner which prevents rain or water ingress into those containers; and<br>c) must be clearly labelled to identify their contents.                                                                                                                                                                                                                                                             | Non-compliant     | During the site inspection it was noted in some locations that chemical and hydrocarbon drums were not located within bunded areas.                                                                                                                                                        | Section 9.1                      |
|                   | M1.3  | The following records must be kept in respect of any samples required to be collected for the purposes of this licence:<br>a) the date(s) on which the sample was taken;<br>b) the time(s) at which the sample was collected;<br>c) the point at which the sample was taken; and<br>d) the name of the person who collected the sample.                                                                                                                                                                                                                                                     | Non-compliant     | Gas records do not record time of sample, and name of person who collected samples. Water monitoring does not provide time of sample.                                                                                                                                                      | Complete                         |
|                   | M6    | The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence. The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.<br><br>The preceding two conditions do not apply until 3 months after: the date of the issue of this licence. | Non-compliant     | No evidence that a dedicated complaints line has been set up for the AWMF and not made publicly available for the community informing them of the avenue to make complaints.                                                                                                               | Complete                         |
|                   | 6     | The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:<br>1. a Statement of Compliance,<br>2. a Monitoring and Complaints Summary,<br>3. a Statement of Compliance - Licence Conditions,<br>4. a Statement of Compliance - Load based Fee,<br>5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,<br>6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and<br>7. a Statement of Compliance - Environmental Management Systems and Practices.                      | Non-compliant     | It is understood this requirement was completed for agencies relevant at that time including consultation letters Appendix B and C of Biodiversity Management Plan 2015 AWMF, and consultation as noted in Appendix C and D of the Biodiversity Conservation Area Plan of Management 2015. | Complete                         |

| Relevant approval      | REF                  | Condition description                                                                                                                                                                                                                                                                                                                                                                                                       | Compliance status                 | IEA Comment              | Where addressed in Annual Review   |                                   |                          |                                    |                        |                      |  |  |  |    |  |                                                                                                                                                                                 |               |
|------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------|------------------------------------|-----------------------------------|--------------------------|------------------------------------|------------------------|----------------------|--|--|--|----|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|                        | L2.4                 | MP 6,7<br><b>POINT 6,7</b> <table border="1"> <thead> <tr> <th>Pollutant</th><th>Units of Measure</th><th>50 percentile concentration limit</th><th>90 percentile concentration limit</th><th>3DGM concentration limit</th><th>100 percentile concentration limit</th></tr> </thead> <tbody> <tr> <td>Total suspended solids</td><td>milligrams per litre</td><td></td><td></td><td></td><td>50</td></tr> </tbody> </table> | Pollutant                         | Units of Measure         | 50 percentile concentration limit  | 90 percentile concentration limit | 3DGM concentration limit | 100 percentile concentration limit | Total suspended solids | milligrams per litre |  |  |  | 50 |  | The 50mg/L limit was exceeded twice during the reporting period at MP7.<br>At MP7 on 1 May 2022, a result of 211 mg/L was recorded and on 12 October 2021 70 mg/L was recorded. | Section 6.1.5 |
| Pollutant              | Units of Measure     | 50 percentile concentration limit                                                                                                                                                                                                                                                                                                                                                                                           | 90 percentile concentration limit | 3DGM concentration limit | 100 percentile concentration limit |                                   |                          |                                    |                        |                      |  |  |  |    |  |                                                                                                                                                                                 |               |
| Total suspended solids | milligrams per litre |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                   |                          | 50                                 |                                   |                          |                                    |                        |                      |  |  |  |    |  |                                                                                                                                                                                 |               |

**Table 1.3** Compliance status key for Table 1.2

| Risk Level                    | Colour code   | Description                                                                                                                                                                                                                                  |
|-------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High                          | Non-compliant | Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence                                                                                                                         |
| Medium                        | Non-complaint | Non-compliance with: <ul style="list-style-type: none"> <li>– Potential for serious environmental consequences, but is unlikely to occur; or</li> <li>– Potential for moderate environmental consequences, but is likely to occur</li> </ul> |
| Low                           | Non-compliant | Non-compliance with: <ul style="list-style-type: none"> <li>– Potential for moderate environmental consequences, but is unlikely to occur; or</li> <li>– Potential for low environmental consequences, but is likely to occur</li> </ul>     |
| Administrative non-compliance | Non-compliant | Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)                                                         |



## 2. Introduction

### 2.1 Operations overview

Lake Macquarie City Council (LMCC) operates the Awaba Waste Management Facility (AWMF) located off Wilton Road, Awaba. The site is situated around 5 kilometres (km) to the east of the village of Awaba and 20 km southwest of Newcastle. The AWMF received NSW Environment Protection Authority (EPA) approval and commenced landfilling operations in circa 1986. The AWMF first accepted general putrescible and non-putrescible waste and was situated within unlined cells. The site operations expanded to incorporate all waste within the Lake Macquarie local government area (LGA) in line with the gradual closure of all other landfill sites operated by LMCC, culminating with the closure of the Redhead landfill in 1994.

In 2010, LMCC lodged a major project application under the now-repealed Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for expansion of the AWMF. This project approval (Project Approval 10\_0139) (PA), was granted by the NSW Planning Assessment Commission (PAC) in May 2013, allowing for the excavation of two additional landfill cells and continued emplacement over the existing landfill area, extending the lifespan of the landfill site by an estimated 20 years.

A modification (Mod 1) to the PA was granted in 2014, which made amendments to the PA in regard to the proposed staging of cell construction and landfilling, as well as leachate and stormwater management infrastructure.

Construction of the expansion project was completed in 2020 and operation of the expanded AWMF under the PA commenced on 11 August 2020.

As of July 2021, all operations are being undertaken in Cell 1. Works are underway to commission Cell 2, with completion expected by August 2022. Operations in Cell 2 will commence in Quarter 3 2022.

The AWMF operates in accordance with an approved Landfill Environmental Management Plan (LEMP), as required by Schedule 5, Condition 2 of the PA. The LEMP provides an overall framework for environmental management of the AWMF during operation.

The AWMF is licenced under Environment Protection Licence 5873 (EPL 5873) and currently accepts:

- General Waste:
  - Putrescible and non-putrescible
- Special waste:
  - asbestos, animals, quarantine waste and offensive waste

Green waste is processed at the adjacent Lake Macquarie Organics Resource Recovery Facility (ORRF) operated by a third party (Remondis) under a separate approval and under a separate Environment Protection Licence 20949 (EPL 20949).

The AWMF has a 32.5 hectare (ha) site area and is located in a broad, deep, south-facing amphitheatre between two spurs of a north-westerly trending ridgeline. Prior to filling, the base of the amphitheatre contained a gully that drained towards the south. The surrounding land acts as a buffer zone and it contains approximately 10 ha of native bushland.

## 2.2 Awaba Waste Management Facility (AWMF) contacts

Table 2.1 AWMF Contacts

| Position                           | Name           | Contact      |
|------------------------------------|----------------|--------------|
| Manager Waste Services             | Paul Collins   | 02 4921 0545 |
| Group Coordinator Waste Operations | David Brake    | 02 4921 0094 |
| Waste Site Coordinator             | Steven Merrett | 02 4921 0794 |
| Environmental Officer              | Bay Hornery    | 02 4921 0683 |

## 2.3 Purpose of this report

This Annual Review discusses the environmental performance of the AWMF, in relation to compliance with the conditions of the PA, and other relevant licences and approvals. It provides a summary of operational and environmental management activities undertaken at the AWMF during the reporting period (1 July 2021 to 30 June 2022) and provides a review against predicted impacts documented in the Additions to Awaba Waste Management Facility Environmental Assessment (EA) (Cardno, 2012). The Annual Review also covers community relations and addresses any rehabilitation undertaken during the reporting period.

The Annual Review has been prepared to satisfy the conditions of the PA (in particular Schedule 5, Condition 4). Key requirements of the approval are described in Table 2.2. A map illustrating the locality and project approval boundary is provided in Figure 2.1, while the site layout is shown in Figure 2.2.

Table 2.2 Annual Review requirements

| Approval                 | Section Reference       | Requirement                                                                                                                                                                                                                                                                                                                                                                   | Reference in this report |
|--------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Project Approval 10_0139 | Schedule 5, Condition 4 | <b>Annual Review</b><br>One year after the commencement of operations, and annually thereafter, the Proponent shall review the environmental performance of the Project to the satisfaction of the Director-General. The review shall:                                                                                                                                        | Section 4                |
|                          |                         | a. describe the operations that were carried out in the past year;                                                                                                                                                                                                                                                                                                            |                          |
|                          |                         | b. analyse the monitoring results and complaints records of the Project over the past year, which includes a comparison of these results against the: <ul style="list-style-type: none"> <li>relevant statutory requirements, limits or performance measures/criteria;</li> <li>monitoring results of previous years; and</li> <li>relevant predictions in the EA;</li> </ul> | Section 6 and 8.2.       |
|                          |                         | c. Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;                                                                                                                                                                                                                                                  | Section 1 and 10         |
|                          |                         | d. Identify any trends in the monitoring data over the life of the Project; and                                                                                                                                                                                                                                                                                               | Section 6                |
|                          |                         | e. Describe what measures will be implemented over the next year to improve the environmental performance of the Project.                                                                                                                                                                                                                                                     | Section 6 and 11.        |

## 2.4 Scope and limitations

This report: has been prepared by GHD for Lake Macquarie City Council and may only be used and relied on by Lake Macquarie City Council for the purpose agreed between GHD and Lake Macquarie City Council as set out in this report.

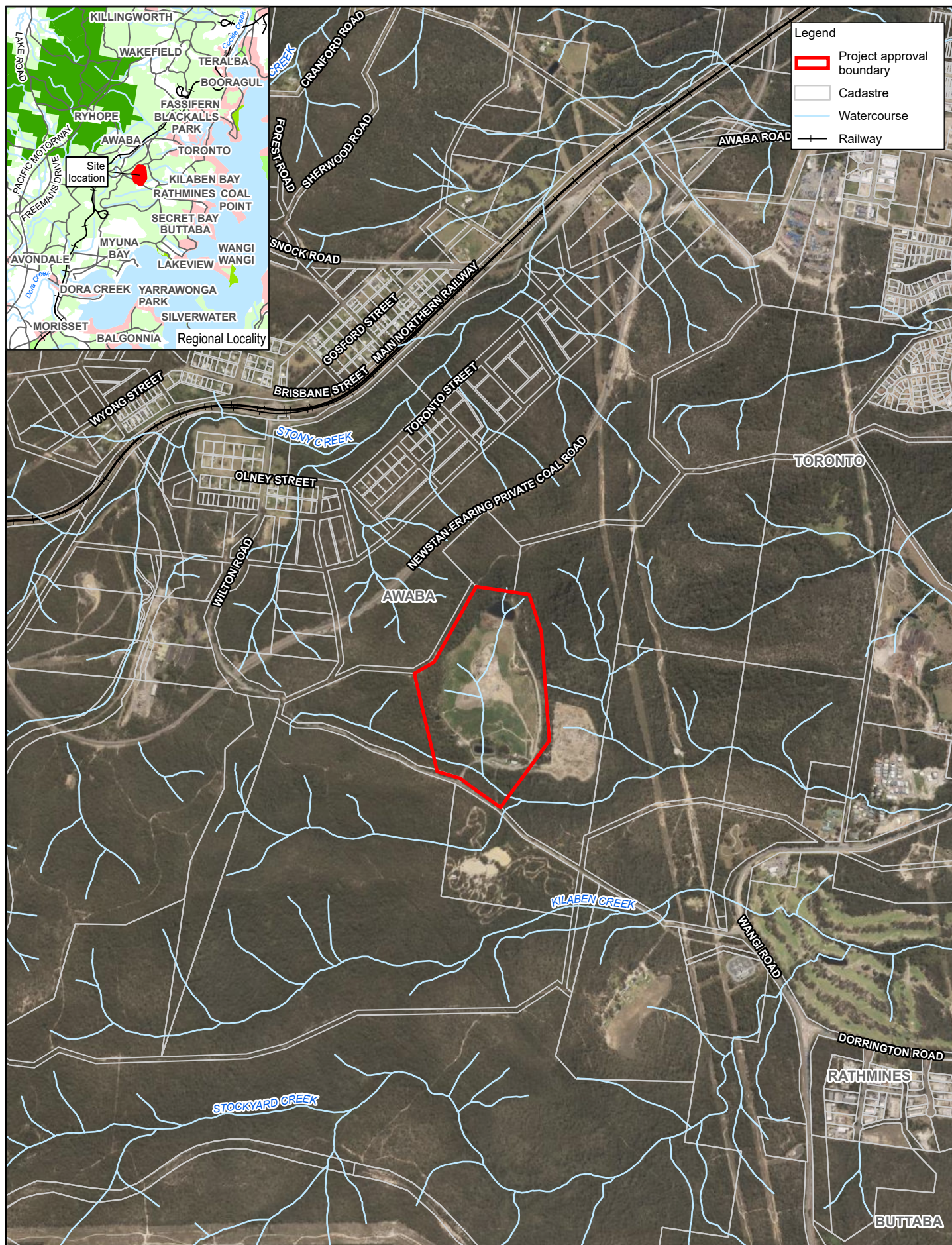
GHD otherwise disclaims responsibility to any person other than Lake Macquarie City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

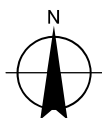
The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.





Paper Size ISO A4  
0 0.1 0.2 0.3 0.4  
Kilometres

Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



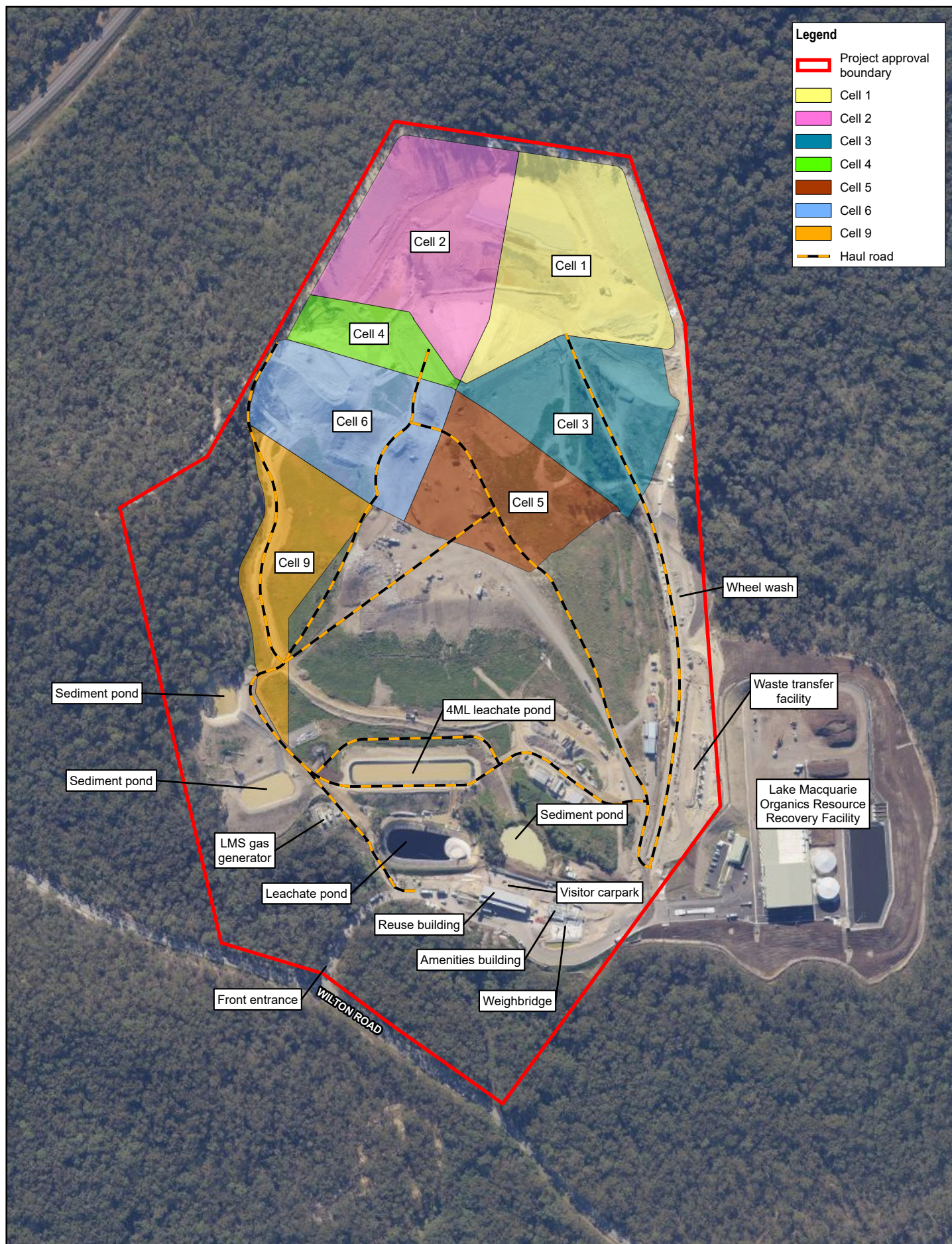
Lake Macquarie City Council  
Awaba Waste Management Facility  
Annual Review

Project No. 12552705  
Revision No. 0  
Date 09/08/2021

Locality map

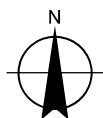
**FIGURE 2-1**





Paper Size ISO A4  
0 30 60 90 120  
Metres

Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



Lake Macquarie City Council  
Awaba Waste Management Facility  
Annual Review

Project No. 12552705  
Revision No. 0  
Date 09/08/2021

Site layout

**FIGURE 2-2**



## **3. Approvals and licences**

### **3.1 Project Approval 10\_0139**

Project approval was granted on 8 May 2013 for the expansion of the AWMF.

A modification (Mod 1) to the PA was granted in 2014, which made amendments to the PA in regard to the proposed staging of cell construction and landfilling, as well as leachate and stormwater management infrastructure.

No changes or modifications to the PA occurred during the current reporting period.

### **3.2 Environment Protection Licence (EPL) 5873**

LMCC operates the AWMF under EPL 5873, with an anniversary date of 13 October. The AWMF operated under EPL 5873 prior to commencement of operations of the expansion of the AWMF under the PA. Variations to EPL 5873 have been granted by the NSW Environment Protection Authority (EPA) to incorporate the expansion of the AWMF, which continues to operate under EPL 5873. Monitoring results are reported to the EPA in accordance with the EPL and are published on the LMCC website.

Activities to which the EPL applies are 'composting and waste disposal by application to land'.

No variations to EPL 5873 occurred during the current reporting period.

### **3.3 Trade waste agreement**

Prior to the expansion of the AWMF under the PA, a sewer connection was established to the Hunter Water Corporation (HWC) reticulated sewage system as a due diligence action pending the PA. Discharge to the sewer is governed by the concentration limits imposed by HWC through the Trade Waste Agreement (TWA) (Consent no: 2014-1036/9) granted on 23 March 2018.

An amendment was made to the TWA during the reporting period. The TWA was changed to permit an increase of ammonia discharge mass load to 27kg/day.

## 4. Summary of operations

### 4.1 Operational activities

#### 4.1.1 Waste handling and recovery

##### Acceptance of waste

The AWMF includes a landfilling operation, which is the main function of the site. The landfill is licensed to accept the following wastes for waste disposal by application to land:

- Asbestos waste
- General solid waste (non-putrescible)
- General solid waste (putrescible)

Waste arrives at the AWMF from a variety of sources, including LMCC collection vehicles, waste collection contractors, and waste self-hauled by businesses and residents. Upon entering the AWMF, the waste is classified and charged based on the type and quantity of the waste to be disposed.

A waste transfer station located to the east of the main internal site road allows members of the public to drop off their mixed residual waste for landfilling, as well as specific materials for recovery, such as green waste, timber, concrete, mattresses or metals. Green waste is transferred to the ORRF and this process is further discussed below.

Monitoring of waste is undertaken in accordance with the approved Waste Screening, Acceptance and Resource Monitoring Programme, which details the screening and acceptance procedures and the monitoring requirements for waste and resource recovery.

##### Special waste

The AWMF has additional acceptance requirements in relation to wastes classified by the AWMF as “special waste.” Waste is classified “special waste” if the site supervisor considers that the waste requires special handling by the operators at the tip face, and immediate covering to prevent possible environmental or occupational impacts (e.g. from dust or odour), or for confidential reasons.

These special wastes generally refer to asbestos, dead animals, sewage sludge, and confidential documents.

The procedure for acceptance of these special wastes is as follows:

- The site supervisor is notified of the type and quantity of special waste. A date and time is scheduled for the disposal of the special waste. The special waste must arrive onsite before 12.00 pm Monday to Friday.
- The special waste is brought to the facility and then screened and weighed.
- The special waste is then disposed of in a safe manner usually in a designated area away from the tip face and covered immediately after disposal.

##### Community Recycling Centre

The Community Recycling Centre (CRC) provides the community with a safe way to dispose of problem household waste, free of charge. Problem household waste is accepted and disposed of via the NSW EPA's contractor (Cleanaway). These wastes include:

- Paint - oil and water based (in liquid form only)
- Gas cylinders
- Fire extinguishers
- Fluorescent light globes and tubes
- Household batteries
- Motor oils
- Other oils
- Smoke detectors



LMCC also receives the following waste items at the CRC:

- Co-mingled household recyclables
- Electronic waste
- Polystyrene
- Vehicle batteries

Vehicle batteries are collected by LMCC which are sold for scrap metal content (lead). Other items consisting of non-ferrous metals may be processed onsite (not as part of the CRC operations) to ensure maximum value is achieved for scrap, including removal of ferrous fasteners and sorting of metal categories.

## Food and garden organics

A contractor-built and operated ORRF for Food Organics and Garden Organics (FOGO) processing has been constructed on a site adjacent to the AWMF. Source separated FOGO waste entering the facility is directed to the organic waste processing facility. The ORRF is operated and maintained by a third party (Remondis) under a separate approval and EPL and does not form part of the expanded AWMF under the PA.

## Quantities and types of waste received

The AWMF is approved to accept no more than 150,000 tonnes of waste per annum. This limit may be exceeded only in accordance with extraordinary conditions outlined in the site EPL. The quantities and types of waste received during the reporting period are provided in Table 4.1.

**Table 4.1** Summary of waste received during the reporting period

| Waste                                          | Approved limit                                                                  | Previous reporting period | This reporting period (tonnes) |
|------------------------------------------------|---------------------------------------------------------------------------------|---------------------------|--------------------------------|
| Municipal                                      | Maximum of 150,000 tonnes in total of all waste types may be disposed per annum | 55,754                    | 56,228.36                      |
| Construction and demolition                    |                                                                                 | 12,549                    | 8,766.66                       |
| Commercial and industrial                      |                                                                                 | 2,266                     | 2,093.16                       |
| Recovered material from landfill for recycling |                                                                                 | Not previously reported   | -1,263.50                      |
| Landfill alternative cover material            |                                                                                 | Not previously reported   | 63.82                          |
| <b>Total</b>                                   |                                                                                 | <b>70,569</b>             | <b>65,887.82</b>               |

## Resource recovery

The effectiveness of resource recovery at the AWMF is monitored in accordance with the approved Waste Screening, Acceptance and Resource Monitoring Programme. The effectiveness of resource recovery measures is analysed through benchmarking against previous years' recovery rates and reported annually through LMCC's State of the Environment Report. The 2021-2022 State of the Environment Report was published during the reporting period and includes analysis of the effectiveness of resource recovery measures up to the end of the 2021-2022 financial year. The effectiveness of resource recovery measures at the AWMF up to the end of the 2021-2022 financial year is summarised in Table 4.2.

**Table 4.2** Summary of waste diverted from landfill

|                                                                   | 2007-2008 | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 |
|-------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Total waste received (t)                                          | 160,335   | 93,518    | 86,494    | 91,875    | 93,728    | 107,996   | 65,887.82 |
| On-site use for operations (t)                                    | 32,040    | 5,338     | 3,110     | 5,337     | 3,924     | 4,831     | 2,853.92  |
| Green waste and recyclables diverted from landfill (t)            | 10,105    | 27,742    | 26,643    | 23,696    | 39,758    | 40,451.5  | 64,979.47 |
| Waste to Landfill (t) (excluding cover material)                  | 118,190   | 84,557*   | 80,663*   | 85,740*   | 63,360*   | 62,245    | 70,538    |
| ABS - revised resident population (ABS March 2019)                |           | 201,811   | 202,847   | 203,502   | 204,914   | 205,901   | 213,845   |
| Waste to landfill generated per capita (kg)                       | 615       | 419       | 398       | 421       | 309       | 302       | 308kg     |
| Compared to 2007-2008 waste reduction baseline (615kg per capita) | baseline  | ↓31.87%   | ↓35.28%   | ↓31.60%   | ↓49.75%   | ↓50.89%   | ↓50%      |

## 4.1.2 Landfill operations

The landfill operations are undertaken in accordance with the Fill-Out Plan, which forms part of the LEMP.

Landfill operations are carried out in accordance with Schedule 4, Condition 7 of the PA and Conditions O6 and O7 of EPL 5873, which includes the following:

- Minimise the exposed or cleared areas at the landfill.
- Progressively revegetate all completed areas of the landfill and stabilise any exposed areas that are not required for operational purposes for a period greater than 90 days.
- Minimise the tracking of mud and waste from the site on public roads.
- Fill the landfill cells in a systematic manner as detailed in the Fill-Out Plan.
- Maximise landfill compaction rates ( $\geq 0.75 \text{ t/m}^3$  required, goal of achieving  $0.85 \text{ t/m}^3$ ).
- Cover the active landfill area at the end of daily waste disposal and compaction activities with either:
  - Minimum 150 millimetres (mm) of virgin excavated natural material (VENM) soil.
  - An EPA approved synthetic cover.
  - Biodegradable plastic sheeting.
- Progressively cap the landfill cells with a capping layer approved by the EPA.
- Revegetate the covered landfill cells following the capping of each cell once they reach their final design height.

All waste is compacted as it is tipped in the landfill. The working face is covered with alternative daily cover (spray cover) on a daily basis, as approved by the EPA.

Intermediate cover is used to provide a more effective barrier between refuse and the environment during extended periods of time. VENM soil is applied to a minimum depth of 250 mm (inclusive of any daily cover already in place) over all surfaces of the landfill that will be exposed for more than 90 days.

Intermediate cover includes a top layer of dredging materials which readily self-seeds providing vegetation protection from wind and water erosion.

Landfill cells are progressively capped during operations, and specifically when the level of waste reaches final heights within each landfill cell.

Final capping comprises five layers, including:

- Seal bearing surface
- Gas drainage layer
- Sealing layer
- Infiltration layer
- Revegetation layer

The cap is graded to a degree to facilitate appropriate stormwater flow off site (clean water) or to a sedimentation pond, reducing the potential for ponding onsite (dirty water).

The vegetation layer is maintained at all times to ensure the cap remains in a working condition and stormwater is draining from the affected area.

During the reporting period, all landfilling operations in the original cell were completed. As of July 2021, all operations are being undertaken in Cell 1. Cell 2 was commissioned on 8 August 2022. Operations in Cell 2 will commence in Quarter 3, 2022.

### 4.1.3 Hours of operation

The AWMF operates within the following hours in accordance with Schedule 4, Condition 30 of the PA:

- Monday to Friday 8:00 am – 4:00 pm
- Weekend & Public Holidays 8:00 am – 4:00 pm
- Christmas Day Closed

### 4.1.4 Equipment

Sufficient and appropriate plant, equipment and machinery is used onsite and maintained to meet operational requirements. This includes equipment for:

- Dust suppression (i.e. water cart)
- Fire control and fire-fighting
- Waste inspection
- Waste handling
- Environmental monitoring
- The proper and efficient operation of the AWMF

In accordance with Schedule 3, Condition 13 of the PA, LMCC ensure that all plant and equipment used for operation of the AWMF is:

- Maintained in a proper and efficient condition
- Operated in a proper and efficient manner

A list of key equipment used on site is provided in Table 4.3.

**Table 4.3**      *Equipment at AWMF during the reporting period*

| Description                                | Number on site |
|--------------------------------------------|----------------|
| Traxcavators                               | 2              |
| Landfill Compactor                         | 1              |
| Alternate Daily Cover Vehicle / Water Cart | 1              |
| Steel Drum Roller                          | 1              |
| Gas Monitor                                | 1              |
| Flexi Drive Pumps                          | 3              |
| Diesel Pumps                               | 3              |
| 2 Tonne Tipper                             | 1              |
| 4 Wheel Drive dual cab utility             | 1              |
| Portable handheld radios                   | 3              |
| Base Station Radio                         | 1              |
| Fire Extinguishers                         | 20             |
| Fire Hose Reels                            | 2              |
| Wash Down Hose Reels                       | 8              |
| Fire Blankets                              | 3              |
| Eyewash Stations                           | 6              |
| Avant 750 Loader                           | 1              |

| Description                     | Number on site |
|---------------------------------|----------------|
| Hook Lift Trucks                | 2              |
| Transfer Station Hook Lift Bins | 7              |
| Dirt Hook Lift Bins             | 2              |
| Subaru Outback Wagon            | 1              |

## 4.1.5 Hazard and risk management

### Chemicals, fuels and oils

All chemicals, fuels and oils used on site are stored in appropriately bunded areas in accordance with the requirements of all relevant Australia Standards, and the EPA's Storing and Handling Liquids: Environmental Protection – Participants Handbook.

### Fire management

Fires are managed in accordance with the Fire Management Plan for the site, which includes measures to minimise the risk of fire onsite. Adequate firefighting capacity is maintained onsite to ensure that any fires are extinguished promptly.

LMCC record details of all fires at the site in accordance with Condition R4 of EPL 5873.

One fire was recorded onsite during the reporting period.

On 31 August 2021, a fire was noticed on the covered floor area of the current tipping face. The fire was not authorised and ignition source unknown. The fire was firstly smothered with VENM prior to the onsite water cart fully extinguishing the fire with water. This was notified to the EPA via telephone call on the 3:07 pm 31 August 2021, with the subsequent report submitted the same day.

### Incident and emergency response

Incidents and emergency response are managed in accordance with the Awaba Waste Pollution Incident and Emergency Response Plan, which forms Appendix F of the LEMP.

## 4.1.6 Construction activities

In order to more effectively manage leachate, the following new infrastructure items were constructed during the report period as part of the southern leachate migration project:

- A Western Leachate Bleed diversion drain was constructed and completed last year.
- A new Leachate Tankering Bunded area was completed for use in July 2022.
- Groundwater monitoring bores have been installed to further monitor potential leachate as follows:
  - One borehole (GW1) at the northern site boundary
  - Four boreholes (GW2 to GW5), along the north edge of the main leachate pond

In addition, a roof over the transfer station was constructed during the report period.



## 5. Actions required from previous annual review

This is the second Annual Review completed by LMCC for the AWMF. As such, the status of outstanding activities from the 2020/2021 reporting period is required to be provided in this Annual Review.

Activities that were proposed for this Annual Review reporting period are detailed in Table 5.1.

**Table 5.1** *Activities proposed from previous Annual Review*

| Activities proposed during last reporting period                                                                             | 2020/2021 Target Completion Date | Status as of 2021/2022 reporting period              |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------|
| Continue landfilling in cell 1                                                                                               | Ongoing                          | Ongoing                                              |
| Construction of a weather shelter over the plant maintenance slab                                                            | June 2022                        | Incomplete                                           |
| Construction of a leachate tankering bunded area                                                                             | June 2022                        | Completed. Operator training to be undertaken 9/8/22 |
| Undertake leachate aeration trial.                                                                                           | Ongoing                          | Ongoing                                              |
| Undertake landfill access road rehabilitation.                                                                               | June 2022                        | Complete                                             |
| Continue ongoing investigation of southern leachate migration and implementation of associated mitigation measures           | Ongoing                          | Ongoing. See Section 6.1.1.                          |
| Continue long term leachate management investigation and implementation                                                      | Ongoing                          | Ongoing. See Section 6.1.1.                          |
| Undertake commissioning of cell 2                                                                                            | June 2022                        | Commissioning commenced 8/8/22                       |
| Independent Environmental Audit                                                                                              | October 2021                     | Completed                                            |
| Operational noise validation                                                                                                 | December 2021                    | Completed in December 2021                           |
| Implement the annual monitoring program as required by the Awaba Biodiversity Conservation Area Plan of Management (ABCAPoM) | Ongoing                          | Refer to Section 6.7                                 |
| Implement the annual monitoring program as required by the CHMP                                                              | Ongoing                          | Refer to Section 6.8                                 |

## 6. Environmental management and performance

Environmental management at the AWMF is undertaken in accordance with the site LEMP. This section details the implementation and effectiveness of the management measures identified in the LEMP and issue-specific-sub-plans.

The following issue-specific sub-plans are implemented under the over-arching LEMP:

- Soil, Water and Leachate Management Plan
- Greenhouse Gas Management Plan
- Air Quality and Odour Management Plan
- Operational Noise Management Plan
- Biodiversity Management Plan
- Biodiversity Conservation Area Plan of Management
- Cultural Heritage Management Plan

The LEMP also includes measures for the control of:

- Pests, vermin and noxious weeds
- Litter

The IEA conducted during the reporting period identified the need for several LEMP sub-plans to be reviewed and updated. These updates will be staged for completion prior to 23 November 2022. Staging of the completion of each plan is outlined below in Table 6.1.

**Table 6.1**      *Staging of sub-plans*

| Sub-plan                                       | Schedule and condition  | Proposed Completion date / Staging requirements <sup>1</sup> |
|------------------------------------------------|-------------------------|--------------------------------------------------------------|
| Soil, Water and Leachate Management Plan       | Schedule 4 condition 19 | 23 November 2022                                             |
| Air Quality and Odour Management Plan          | Schedule 4 condition 25 | 23 November 2022                                             |
| Greenhouse Gas Management Plan                 | Schedule 4 condition 26 | 23 November 2022                                             |
| Operational Noise Management Plan              | Schedule 4 condition 32 | 23 November 2022                                             |
| Emergency Response Management Plan             | Schedule 4 condition 43 | Revised 6 June 2022                                          |
| Cultural Heritage Management Plan              | Schedule 4 condition 45 | 23 November 2022                                             |
| Biodiversity Conservation Area Management Plan | Schedule 4 condition 51 | 23 November 2022                                             |
| Vegetation and Fauna Management Plan           | Schedule 4 condition 55 | 23 November 2022                                             |
| Landfill Environmental Management Plan         | Schedule 5 condition 2  | 23 November 2022                                             |

<sup>1</sup> Detailed staging plan to be completed on appointment of suitable consultants

The following sections aim to provide:

- A comprehensive review of the monitoring results of the project over the past year, which includes a comparison of these results against the:
  - the relevant statutory requirements, limits or performance measures/criteria
  - the monitoring results of previous years
  - the relevant predictions in the EA
- Trends in the monitoring data over the life of the project.
- Discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies.
- Measures which will be implemented over the next year to improve the environmental performance of the project.

## 6.1 Soil, water and leachate

### 6.1.1 Environmental management

Soil, water and leachate management at AWMF is undertaken in accordance with the approved Soil, Water and Leachate Management Plan (SWLMP), which has been prepared in accordance with the PA. The IEA identified the need for the SWLMP to be updated by 23 November 2022 in line with Schedule 4 Condition 19. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans.

The SWLMP acts as the overarching document governing water management at AWMF and includes the following subplans:

- Surface Water Management Plan (SWMP), including an Erosion and Sediment Control Plan (ESCP)
- Leachate Management Plan (LMP)
- Surface Water, Groundwater and Leachate Monitoring Program
- Surface Water, Groundwater and Leachate Response Plan

Stormwater is managed at the AWMF in accordance with the SWMP. The key objectives of stormwater management at AWMF are to:

- Minimise erosion and sediment generation at the source
- Maintain discharge levels to pre-development values
- Divert runoff from disturbed areas through sediment basins prior to discharge offsite

These objectives are achieved through the following approach:

- Minimise the volume of clean surface water running onto the site from off site.
- Minimise the extent of disturbed areas.
- Minimise surface water from running onto disturbed areas of the site by staging operations and, where necessary, utilising surface water diversion drains and bunds for disposal and processing areas.
- The perimeter of landfilled areas must be contoured to mitigate stormwater running onto these surfaces in all rainfall events less than or equal to the 1 in 10 year 24 hour duration event.
- Minimise erosion of disturbed areas by utilising at source control measures.
- Ensure all surface water runoff from disturbed areas of the site is managed prior to reuse or discharge offsite.
- Ensure all erosion and sediment controls are properly maintained by implementing an inspection and monitoring schedule.
- Separate 'clean' and 'dirty' water, where possible.
- Fast-track rehabilitation of capped areas to expedite diversion off-site.
- Install retarding features for discharge offsite to control peak flow discharge.
- Provide surface water drainage in the trafficked impervious areas.
- Provide staff education and adopting strategies for early identification of potential surface water issues.

Erosion and sediment control at AWMF is guided by the ESCP, and is consistent with the "Blue Book" – *Managing Urban Stormwater, Soils and Construction, Volume 1* (Landcom, 2004). The key objectives of erosion and sediment control at AWMF are to:

- Prevent soil erosion.
- Minimise generation of sediment laden water and prevent sediment laden water from discharge off site.
- Prevent surface water contamination by sediment.

These objectives are achieved through the following approach:

- Minimise stormwater (clean water) (volume and velocity) from running onto downstream works by appropriate staging of the work and, where necessary, utilising existing site or temporary stormwater diversion drains and bunds.
- Minimise erosion of disturbed areas by utilising erosion control measures, including:
  - Wheel wash
  - Water carts
  - Sediment fencing
- Maximise the potential for stormwater runoff from disturbed areas of the site to be treated to an acceptable standard prior to reuse or discharge offsite, by utilising the following sediment control measures:
  - Diversion drains and rock check dams
  - Sediment ponds
  - Outlet energy dissipaters/level spreaders
- Minimise the amount of stormwater runoff leaving the site by maximising reuse on-site.
- Manage all erosion and sediment controls so that they are properly maintained by implementing an inspection and monitoring schedule.
- Manage stockpiles so that they are appropriately constructed and managed to maximise reuse of topsoil.
- Provide stormwater devices in trafficked areas.

Leachate at AWMF is managed in accordance with the LMP. The key objectives of leachate management at AWMF are to:

- Prevent groundwater pollution by leachate
- Prevent surface water pollution by leachate
- Prevent amenity impacts to nearby waterways

These objectives are achieved through the following approach:

- Minimise leachate generation through the following strategies:
  - The size of the active face and subsequent daily cover footprint is minimised as far as practical to reduce the portion of rainfall able to infiltrate through cover into the waste.
  - Final capping is installed once areas have reached final levels to reduce the portion of rainfall able to infiltrate through cover into the waste.
  - Landfill development is efficiently staged to maximise the amount of final capped areas in comparison to the landfill footprint.
  - Designing and commissioning new cells is staged in a manner which maximises the separation of stormwater and leachate for as long as possible.
  - Establishing perimeter diversion drains with each new cell, and maintaining those around existing cells, to direct site stormwater around the landfill areas.
- Effectively contain and collect leachate through the following strategies:
  - All future landfill cells will include a leachate barrier system and associated leachate collection system.
  - Leachate will continue to be collected from the unlined areas and quarry cell as they are progressively capped.
- Dispose of leachate via:
  - the sewer connection as per the Trade Waste Agreement with HWC.
  - Tankering leachate to HWC's Edgeworth Wastewater Treatment Works under an agreement with HWC. LMCC is continuing to engage with HWC regarding future TWA's. LMCC is awaiting further feedback from DPE regarding this matter.
- Monitoring leachate quantities and quality.

## Surface water, groundwater and leachate monitoring program

LMCC undertakes a Surface Water, Groundwater and Leachate Monitoring Program to implement the ongoing monitoring of potential environmental impacts of the AWMF on surface and ground water quality. The monitoring program allows LMCC to comply with regulatory requirements for monitoring, including the monitoring requirements of EPL 5873, identify and address potential issues based on performance trends and respond to unforeseen environmental incidents.

The locations of monitoring points as specified in Clause P1 of EPL 5873 are summarised in Table 6.2 and shown on Figure 6.1. These include five groundwater quality monitoring points, two wet weather discharge and surface water quality monitoring points, two other surface water quality monitoring points and one leachate quality monitoring point

**Table 6.2** Discharge and monitoring point locations

| EPA identification number | Type of monitoring/discharge point                                                                                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1                         | Groundwater quality monitoring upgradient of the site                                                                               |
| 2 to 5                    | Groundwater quality monitoring downgradient of the site                                                                             |
| 6 and 7                   | Wet weather discharge<br>Surface water quality monitoring                                                                           |
| 8 and 9                   | Surface water quality monitoring                                                                                                    |
| 10                        | Leachate quality monitoring                                                                                                         |
| Site 8B                   | Surface water quality monitoring - this site replaces MP8, which has been discontinued. Site 8B was dry during the reporting period |

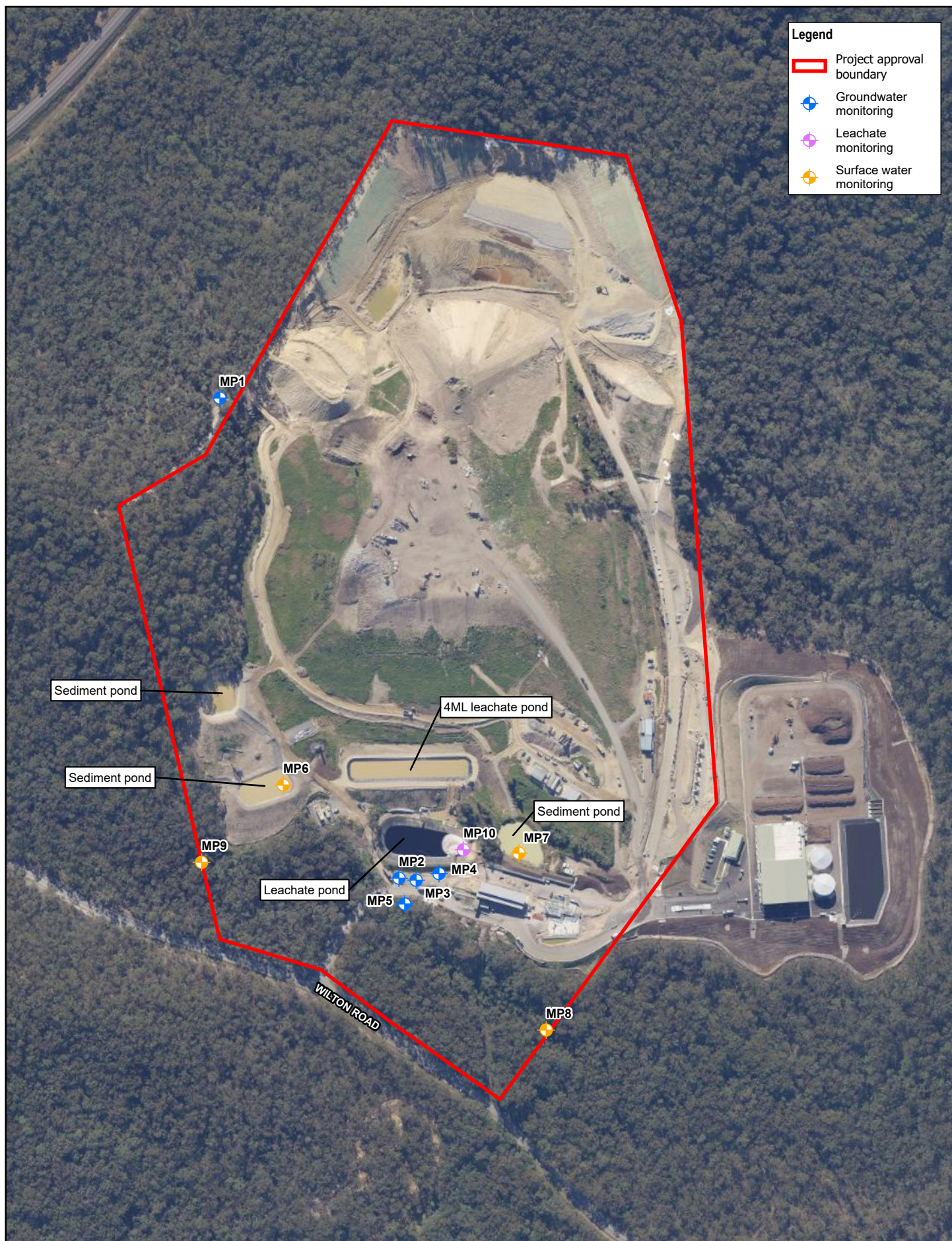
Groundwater, surface water and leachate samples are analysed for a broad chemical suite. Table 6.3 details the water quality indicator parameters tested for surface water, groundwater and leachate samples.

**Table 6.3** Water quality testing parameters

| Parameter                         | Monitoring point (MP)<br>2021 | 2022                                     | Frequency |
|-----------------------------------|-------------------------------|------------------------------------------|-----------|
| Alkalinity (as calcium carbonate) | 1, 2, 3, 4, 5, 7, 8 and 10    | 1, 2, 3, 4, 6, 7, 8, 9, 10, 10A and 10A1 | Quarterly |
| Aluminium                         | 1, 2, 3, 4, 5, 7 and 8        | None                                     | Yearly    |
| Ammonia                           | 1, 2, 3, 4, 5, 7, 8 and 10    | 1, 2, 3, 4, 6, 7, 8, 9, 10, 10A and 10A1 | Quarterly |
| Arsenic                           | 1, 2, 3, 4, 5 and 8           | None                                     | Yearly    |
| Barium                            | 1, 2, 3, 4, 5, 7 and 8        | None                                     | Yearly    |
| Benzene                           | 1, 2, 3, 4, 5, 8 and 10       | 10                                       | Yearly    |
| BOD                               | 1, 2, 3, 4, 5, 7, 8 and 10    | 10, 10A and 10A1                         | Yearly    |
| Cadmium                           | 1, 2, 3, 4, 5, 7 and 8        | None                                     | Yearly    |
| Calcium                           | 1, 2, 3, 4, 5, 7, 8 and 10    | 1, 2, 3, 4, 6, 7, 8, 9 and 10            | Quarterly |
| Chloride                          | 1, 2, 3, 4, 5, 7, 8 and 10    | 1, 2, 3, 4, 6, 7, 8, 9 and 10            | Quarterly |
| Chlorinated volatile compounds    | 1, 2, 3, 4, 5, 6, 7, 8 and 9  | None                                     | Yearly    |
| Chromium (hexavalent)             | 1, 2, 3, 4, 5, 6, 7, 8 and 9  | None                                     | Yearly    |
| Chromium (total)                  | 1, 2, 3, 4, 5, 7 and 8        | None                                     | Yearly    |
| Cobalt                            | 1, 2, 3, 4, 5, 7 and 8        | None                                     | Yearly    |
| Conductivity                      | 1, 2, 3, 4, 5, 7 and 8        | 1, 2, 3, 4, 6, 7, 8, 9 and 10            | Quarterly |
| Copper                            | 1, 2, 3, 4, 5, 7 and 8        | 1, 2, 3, 4, 6, 7, 8, 9 and 10            | Yearly    |

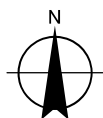
| Parameter                           | Monitoring point (MP)<br>2021       | 2022                                       | Frequency |
|-------------------------------------|-------------------------------------|--------------------------------------------|-----------|
| Ethyl benzene                       | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| Fluoride                            | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Iron                                | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Lead                                | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| Magnesium                           | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Manganese                           | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Mercury                             | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| Nitrate                             | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Organochlorine pesticides           | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Organophosphate pesticides          | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| PCBs                                | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| pH                                  | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9,10, 10A<br>and 10A1 | Quarterly |
| Phosphate                           | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| Polycyclic aromatic<br>hydrocarbons | 1, 2, 3, 4, 5, 7 and 8              | None                                       | Yearly    |
| Potassium                           | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Sodium                              | 1, 2, 3, 4, 5, 7 and 8              | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Sulfate                             | All                                 | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Toluene                             | 1, 2, 3, 4, 5, 6, 7, 8,9 and 10     | None                                       | Yearly    |
| Total dissolved solids              | 1, 2, 3, 4, 5, 6, 7, 8 and 9        | None                                       | Yearly    |
| Total organic carbon                | 1, 2, 3, 4, 5, 6, 7, 8, 9 and<br>10 | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Total petroleum<br>hydrocarbons     | 1, 2, 3, 4, 5, 6, 7, 8, 9 and<br>10 | None                                       | Yearly    |
| Total Phenolics                     | 1, 2, 3, 4, 5, 7, 8 and 10          | 1, 2, 3, 4, 6, 7, 8, 9 and 10              | Quarterly |
| Total Suspended Solids              | None                                | None                                       | Quarterly |
| Zinc                                | 1, 2, 3, 4, 5, 6, 7 and 8           | None                                       | Yearly    |





Paper Size ISO A4  
0 30 60 90 120  
Metres

Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



Lake Macquarie City Council  
Awaba Waste Management Facility  
Annual Review

Project No. 12552705  
Revision No. 0  
Date 09/08/2021

Monitoring point locations

FIGURE 6-1



## **Water quality criteria**

EPL 5873 restricts the discharge of surface water from the site to 50 mg/L of total suspended solids. This concentration limit is only permitted to be exceeded at the discharge point of the two final sedimentation dams (MP6 and MP7) for the duration of the overflow “whenever a wet weather overflow is occurring due to stormwater events greater than or equal to a 90<sup>th</sup> percentile 5 day rainfall duration”.

No other criteria are specified in EPL 5873 or PA as environmental discharges are not permitted from the site. All groundwater and surface water results are benchmarked against ANZECC Guidelines for Freshwater 95% protection level trigger values (assessment criteria) in accordance with the approved SWLMP.

Quality of leachate is required to be monitored under EPL 5873 (at MP10 as shown on Figure 6.1), although environmental discharges are not permitted. For this reason, there are no benchmark levels that must be considered under EPL 5873.

## **6.1.2 Environmental performance**

LMCC measures some analytes against ANZECC 95% freshwater guidelines. Results above the assessment criteria of these guidelines do not represent exceedances of license conditions. LMCC reports values above the ANZECC 95% fresh guidelines to the EPA as a precaution only. Only values above the EPL 5873 limit of 50 mg/L of total suspended solids are reportable exceedances of license conditions.

## **Historic monitoring**

Surface water, groundwater and leachate quality monitoring in accordance with EPL 5873 has been undertaken at the AWMF since 2000 prior to the operation of the expansion project. This monitoring program has been continued for the expansion project and includes monitoring locations established to assess impacts associated with the existing operation of the AWMF prior to the operation of the expansion project. As such the results of the monitoring program during the reporting period represent the cumulative impacts of operation of both the existing AWMF and the expansion project under the PA.

In July 2020 LMCC commenced a review of the monitoring program, with the aim of investigating elevated ammonia concentrations in groundwater downgradient of the existing AWMF site (GHD, 2020). The review included a statistical summary of monitoring data from April 2012 to April 2020 (see Appendix A). This summary provides an indication of the historical range of water quality parameters detected at the AWMF prior to the commencement of operations of the expansion project under the PA, and therefore associated with existing operations rather than the expansion project. This data has been included to provide a comparison between monitoring data for the reporting period with existing conditions at the AWMF prior to operations of the expansion project under the PA commencing and will be referred to in the following sections. Data from the previous 2020/2021 reporting period will also be used for comparison purposes. This comparison is provided below in Section 6.1.2.

## **Monitoring during the reporting period**

Four monitoring events occurred during the reporting period on the following dates:

- 30 September 2021 (MP6 and MP9 were dry)
- 12 October 2021 (MP6 and MP9 were dry)
- 16 February 2022 (MP5 was inaccessible due to wet weather)
- 27 May 2022 (MP5 was inaccessible due to wet weather)

Results of the monitoring program during the reporting period are provided in Appendix B, while time series graphs of quarterly monitored parameters with detections above the limit of reporting (LOR) are provided in Appendix C.

Groundwater monitoring was undertaken at locations MP1, MP2, MP3, MP4 and MP5 during the report period, in accordance with EPL requirements. A review of the groundwater monitoring results found the following:

- Groundwater at all monitoring locations was slightly acidic with pH ranging from 5.19 to 6.58 across all monitoring points. This is generally consistent with historical monitoring data.
- Electrical conductivity values detected during the reporting period were generally within the range of the historical monitoring data, ranging from 1130 to 1240  $\mu\text{S}/\text{cm}$  at MP1, 1270 to 2060  $\mu\text{S}/\text{cm}$  at MP2, 1460 to 3380  $\mu\text{S}/\text{cm}$  at MP3, 750 to 1890  $\mu\text{S}/\text{cm}$  at MP4 and 6210 to 6760  $\mu\text{S}/\text{cm}$  at MP5.
- Concentrations of ammonia were above the assessment criteria (0.9 milligrams per litre (mg/L) at MP3 (range: 7.43 to 48.9mg/L), MP4 (range: 2.37 to 17.4 mg/L), at all monitoring events during the reporting period. Ammonia concentrations were below the assessment criteria at MP1 and MP2 throughout the reporting period. MP5 was only sampled in 2021 and was inaccessible due to wet weather in 2022. No values above the assessment criteria were recorded at MP5 in 2021. Historically, ammonia concentrations have been elevated at MP3 and to a lesser extent MP4, which is consistent with monitoring results from this reporting period.
- Nitrate concentrations were below the assessment criteria (0.7 mg/L) at all locations throughout the reporting period. Values have historically been elevated at MP4.
- Concentrations of metals were above the assessment criteria at several locations during the reporting period, including:
  - Zinc (assessment criteria: 0.008 mg/L) at MP1 (0.04 mg/L in October 2021), MP2 (0.031 mg/L in October 2021) and MP5 (0.029 mg/L in October 2021) No zinc values were recorded above the assessment criteria in 2022 at any monitoring points.
  - Copper (assessment criteria: 0.0014 mg/L) at MP3 (0.002 mg/L in October 2021) and MP4 (0.003 mg/L in October 2021).
  - Lead (assessment criteria: 0.001 mg/L): no values above the assessment criteria were recorded during the reporting period.
  - Aluminium (assessment criteria: 0.01 mg/L): values greater than the assessment criteria were recorded at MP2 (0.39 mg/L in October 2021).
  - Chromium (assessment criteria: 0.001 mg/L): values greater than the assessment criteria were recorded at MP3 (0.002 mg/L in October 2021).
- Metal concentrations have been historically high at all monitoring points, including MP1, which is located upgradient from the site. This suggests a background source of elevated metal concentrations in local groundwater.
- Major ions were generally consistent with historical monitoring data with the following exceptions:
  - Calcium concentrations at MP3 (74 mg/L in February 2022) and MP4 (79 mg/L in February 2022) were higher than the historic maximum (58 mg/L).
  - Bicarbonate and total alkalinity at MP3 (511 mg/L in September 2021, 553 mg/L in October 2021, 453 mg/L in February 2022 and 377 mg/L in May 2022) and MP4 (368 mg/L in September 2022, 317 mg/L in October 2021, 507 mg/L in February 2022 and 256 mg/L in May 2022) were above the historic maximum (177 mg/L).
- Concentrations of total petroleum hydrocarbons (TPH) were below the LOR at all locations during the reporting period, with the exception of MP4. MP4 recorded values greater than the assessment criteria in 2021.
- All other parameters were below the LOR during the reporting period.

Surface water monitoring was undertaken at locations MP6, MP7, MP8 and MP9 during the report period, in accordance with EPL requirements. A review of the surface water monitoring results found that:

- Surface water at MP6 (pH ranged from 7.79 to 8.23) and MP7 (7.54 to 7.84) was close to neutral. Surface water at MP8 (6.63 to 6.61) and MP9 (6.22 – 6.44) was slightly acidic. This is generally consistent with historical monitoring data, with the exception of MP8, which was more acidic than the historical monitoring data at this location, which ranges from 6.22 to 6.44.

- Electrical conductivity values at MP7 (379  $\mu\text{S/cm}$  to 519  $\mu\text{S/cm}$ ) generally within the range of the historical monitoring data during the reporting period. Electrical conductivity values at MP6 (447  $\mu\text{S/cm}$  to 487  $\mu\text{S/cm}$ ), MP8 (150  $\mu\text{S/cm}$  to 211  $\mu\text{S/cm}$ ) and MP9 (192  $\mu\text{S/cm}$  to 277  $\mu\text{S/cm}$ ) were slightly lower than the range of the historical monitoring data at these locations during the reporting period.
- Concentrations of total suspended solids exceeded the concentration limit of 50 mg/L prescribed in EPL 5873 at MP7 (70 mg/L in October 2021 and 211 mg/L in May 2022).
- Ammonia values were recorded above the assessment criteria (0.9mg/L) at MP7 (1.21 to 2.45 mg/L) in February and May 2022. Both MP6 and MP9 were dry in 2021 and sampled instead in 2022. No values above the assessment criteria were found in MP6 or MP9. Ammonia levels at MP8 were below assessment criteria levels throughout the reporting period. Historically, ammonia concentrations have been elevated at MP7, which is consistent with monitoring results in the reporting period.
- Nitrate concentrations were above the assessment criteria (0.7 mg/L) at MP7 in September 2021 (3.02 mg/L), October 2021 (2.11 mg/L) and May 2022 (1.86 mg/L). Nitrate concentrations were also above the assessment criteria in the previous reporting period at MP8. Nitrate concentrations have historically been elevated at all surface water monitoring locations.
- Metals concentrations were not analysed at MP9 during the monitoring period. Concentrations of several metals were above the assessment criteria at MP7 and MP8 during the reporting period, including:
  - Zinc (assessment criteria: 0.008 mg/L) at MP8 (0.092 mg/L in October 2021). No zinc values greater than the assessment criteria were reported in 2022.
  - Copper (assessment criteria: 0.0014 mg/L) at MP7 (0.002 mg/L in October 2021) and MP8 (0.002 mg/L in October 2021).
- Chromium (assessment criteria: 0.001 mg/L): no surface water values were greater than the assessment criteria during the reporting period. Metal concentrations at MP6 during the reporting period, were within the historic range at these locations.
- Major ions were generally consistent with historical monitoring data with the following exceptions:
  - Sodium concentrations were lower than the historical range at MP7 in October 2021 (34 mg/L), March 2022 (22 mg/L) and May 2022 (34 mg/L), at MP8 in September 2021 (20 mg/L), October 2021 (13 mg/L), March 2022 (22 mg/L) and May 2022 (19 mg/L), and at MP9 in March 2022 (35 mg/L) and May 2022 (25 mg/L).
  - Potassium concentrations were lower than the historical range at MP7 in October 2021 (9mg/L), March 2022 (11 mg/L) and May 2022 (13 mg/L), MP8 at all four monitoring events (2 mg/L) throughout the reporting period and at MP9 in both monitoring events in 2022 (3 mg/L).
  - Magnesium concentrations were lower than the historical range at all sites across all monitoring events in the reporting period.
  - Chloride concentrations were lower than the historical range at MP6 in March 2022 (48 mg/L), MP7 in October 2021 (53 mg/L), March 2022 (26 mg/L) and May 2022 (40 mg/L), MP8 in September 2021 (38 mg/L), October 2021 (22 mg/L), March 2022 (39 mg/L) and May 2022 (32 mg/L), and MP9 in May 2022 (41 mg/L).
  - Sulphate concentrations were lower than the historical range at MP7 in March 2022 (15 mg/L) and May 2022 (13 mg/L), at MP8 in September 2021 (13 mg/L), October 2021 (14 mg/L), March 2022 (less than LOR) and May 2022 (8 mg/L) and at MP9 in March 2022 (12mg/L) and May 2022 (12 mg/L).
  - Bicarbonate and total alkalinity were lower than the historical range at all monitoring sites across the whole reporting period.
- All other parameters were below the LOR during the reporting period.

Leachate monitoring was undertaken at MP10 during the annual review period in accordance with EPL requirements. A review of the leachate (MP10) monitoring results found that:

- Leachate was slightly alkaline during the reporting period, with pH ranging from 8.22 to 8.51 at MP10. This is generally consistent with historical monitoring data.
- Ammonia concentrations ranged from 515 to 856 mg/L at MP10 during the reporting period. This is within the range of historic monitoring data.

- Bicarbonate alkalinity was higher than previous monitoring data at MP10 (ranging from 2840 mg/L in September 2021 to 3550 mg/L in May 2022).
- Nitrate concentrations ranged from <0.1 mg/L to 0.16 mg/L during the reporting period. This is lower than the range of historic monitoring data.
- All major ions were within the range of the historic monitoring data during the reporting period.
- TPH (C10-C36 total) ranged from 1060 to 2510 µg/L. This is consistent with the range of the historical monitoring data.
- BTEXN (benzene, toluene, ethylbenzene, xylenes and naphthalene) and organochlorine pesticides were below LOR throughout the reporting period.

## **Comparison to 2020/2021 results**

The 2021/2022 monitoring results can be compared to the 2020/2021 monitoring period as well as the historical monitoring data.

### **Groundwater**

- pH was slightly more alkaline, but generally in range with the previous monitoring period's results.
- Ammonia, Zinc, Copper and Chromium results were generally in range of the previous monitoring period's results.
- Nitrate, Aluminium, Calcium and Bicarbonate results were all higher than the previous reporting period's results.
- Lead results contained values above previous monitoring data.
- TPH results were generally consistent with previous monitoring.

### **Surface water**

- pH results were more alkaline than the previous reporting period with the exception of MP 8, which recorded slightly more acidic values.
- Electrical conductivity values were lower across all sites.
- Ammonia concentrations were generally consistent with previously reported values.
- All Nitrate, Zinc and Copper values were elevated from the last monitoring period.
- Sodium, Potassium, Magnesium, Chloride, Sulphate and Bicarbonate values were all lower during this reporting period compared to the previous monitoring period.
- Aluminium and Chromium values were generally consistent with previous results.

### **Leachate**

- Leachate values were recorded at MP10 in 2021 and 2022.
- pH values at MP10 were alkaline and within the previously recorded range.
- Ammonia and nitrate values recorded were lower than the previous range.
- The previous 2021 Bicarbonate range for MP10 was 2960 mg/L to 4800 mg/L. Values recorded for the 2021/2022 recording period fell within this range.
- TPH values were lower at MP10 during the current reporting period than the previous one.

## **6.1.3 Improvement and initiatives**

Prior to operation of the expanded AWMF commencing under the PA, LMCC had identified the potential risk of leachate contaminated groundwater migrating offsite and has been proactively investigating this risk with the aim of implementing an effective solution.

Monitoring identified high ammonia concentrations in the western sediment ponds, indicating leachate seepage from the western slope of the landfill. LMCC constructed a sub-surface interception trench drain between the landfill and the sediment ponds. The trench drain intercepted sub-surface leachate flows and assists with dewatering of the landfill mass to reduce leachate levels. The trench drain provided a preferential pathway for leachate to move into instead of surcharging into surface water drainage and the sediment ponds. The effectiveness of this measure will be assessed through ongoing monitoring.

Historically, the AWMF disposed of leachate by spray irrigation over landfilled areas to facilitate evapotranspiration. Prior to the expansion of the AWMF, a sewer connection was constructed to allow for the discharge of leachate to sewer in accordance with a HWC Trade Waste Agreement as a due diligence action pending the PA. LMCC has continued to discharge leachate to sewer and tanker to HWC's Edgeworth Wastewater Treatment Works to avoid the need to irrigate leachate onsite. LMCC is continuing to engage with HWC regarding future TWA's and is awaiting further DPE feedback on this issue.

LMCC are currently investigating and implementing a number of initiatives to improve water and leachate management performance onsite.

During the 2021/2022 reporting period, the following improvements relating to soil and water monitoring were undertaken:

- A Western Leachate Bleed diversion drain was constructed and completed last year
- A new Leachate Tankering Bunded area was completed for use in July 2022
- Groundwater monitoring bores have been installed to further monitor potential leachate

## Monitoring Improvements

LMCC undertook investigative work in 2020 (GHD, 2020) to determine the potential migration pathways for leachate from the site. Investigations aimed to identify potential options for improvements to the surface water and groundwater monitoring program and ultimately develop potential remediation options to address this issue. Stage 1 comprised of a desktop review investigating leachate migration, completed in June 2020.

In 2022, GHD was engaged to conduct further investigation of leachate migration. The Stage 2 borehole investigation was undertaken between 24 February and 1 March 2022. The Stage 2 investigations involved the installation of additional groundwater monitoring wells and subsequent monitoring in order to better delineate the lateral and southern extension of leachate. The Stage 2 report was completed and submitted to LMCC in late June 2022 and, as such, any actions occurring as a result of the recommendations provided in the report will be discussed in the next Annual Review.

### 6.1.4 Values above ANZECC criteria

The below values do not represent exceedances of license conditions. They were reported to the EPA as a precaution only.

On 12 May 2022, LMCC notified the EPA of water quality monitoring values above the criteria of the ANZECC 95% Fresh Water Trigger Values. These events occurred on 16 February 2022 and 15 March 2022 for the following analytes and sites as detailed below:

pH:

- MP1 = 6.08 (guideline min pH 6.5)
- MP2 = 5.21 (guideline min pH 6.5)
- MP6 = 8.23 (guideline max pH 8.0)
- MP8 = 6.33 (guideline min pH 6.5)
- MP9 = 6.22 (guideline min pH 6.5)

Ammonia (mg/L):

- MP3 = 7.43 (guideline level 2.46)
- MP4 = 17.4 (guideline level 2.38)
- MP7 = 1.21 (guideline level 1.18)



## 6.1.5 Exceedances of EPL

EPL 5873 restricts the discharge of surface water from the site to 50 mg/L of total suspended solids. This concentration limit is only permitted to be exceeded at the discharge point of the two final sedimentation dams (MP6 and MP7) for the duration of the overflow “whenever a wet weather overflow is occurring due to stormwater events greater than or equal to a 90<sup>th</sup> percentile 5 day rainfall duration”.

The 50mg/L limit was exceeded twice during the reporting period at MP7. 211 mg/L was recorded on 1/05/22 and 70mg/L was recorded on 12/10/2021 and were reported to EPA on 10/05/2022 and 2/12/2021 respectively. No further actions were required as a result of EPA review of the exceedances.

## 6.2 Greenhouse gases/landfill gas

### 6.2.1 Environmental management

Greenhouse gas (GHG) and landfill gas emissions are managed at the AWMF in accordance with the approved Greenhouse Gas Management Plan (GGMP). The IEA undertaken during the reporting period identified the need for the GGMP to be updated by 23 November 2022 in line with Schedule 4 Condition 26. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans. Greenhouse gas management at AWMF aims to:

- Reduce potential greenhouse gas emissions from the operation of the facility.
- Continue to progressively apply existing landfill gas management measures across the existing and future landfill areas.

Greenhouse gas emission estimates for the AWMF from the EA (Cardno, 2012) suggest that landfill methane emissions are likely to constitute >99% of total GHG emission from the AWMF. Greenhouse gas management at the AWMF therefore focusses on the management of landfill gas. Landfill gas management measures at the AWMF include:

- Progressive installation and operation of a landfill gas collection and treatment system.
- Completion of a regular program for monitoring landfill gas.
- Daily and intermediate covering of the landfilled waste to minimise the rate of landfill gas generation and to minimise uncontrolled fugitive emissions to the atmosphere.
- Placement of only a limited quantity of waste below prevailing ground level to reduce the potential for lateral subsurface landfill gas emissions.
- All buildings on-site are designed and constructed so as to minimise the likelihood of landfill gas entering and accumulating within them.

Landfill gas generated at the AWMF is currently managed by an active landfill gas collection and treatment system that is designed, installed and operated by a specialist contactor, LMS Energy. Landfill gas is extracted from the waste mass using a fan (or blower), which directs the extracted gas to the treatment plant (flare or engine). Landfill gas treatment at the AWMF is predominately undertaken at the Awaba Renewable Energy Facility (REF) via combustion in a landfill gas fuelled reciprocating engine that drives a generator to create renewable electricity (which is ultimately exported to the electricity grid). During periods of engine downtime, or when otherwise required, landfill gas can be directed to a landfill gas flare located at the AWMF.

### Greenhouse gas monitoring

Gas combustion at the Awaba Renewable Energy Facility (REF) and gas flare is reported under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) by LMS Energy.

## Landfill gas monitoring

LMCC implements a landfill gas monitoring program in accordance with the requirements of EPL 5873, including:

- Monitoring of landfill gas across areas of the AWMF where intermediate or final cover materials have been placed.
- Monitoring of landfill gas inside all buildings / structures.

Surface landfill gas emissions are monitored monthly in accordance with the landfill gas monitoring program. Monitoring is undertaken in accordance with the techniques identified within Benchmark Technique 17 of the *NSW EPA Environmental Guidelines: Solid Waste Landfills (1996)* to measure methane gas concentrations. Samples of the atmosphere are taken 5 centimetres (cm) above the landfill surface in any areas with intermediate or final cover and any new cells where cover material has been applied to a depth exceeding 300 mm.

For landfill gas surface emissions monitoring, the threshold for corrective action is methane concentrations exceeding 500 parts per million (ppm) at any point on the landfill surface for intermediate and finally-capped areas.

Landfill gas accumulation monitoring is implemented to demonstrate that gas is not accumulating at dangerous levels in enclosed spaces on or near the landfill. The gas accumulation monitoring program consists of monthly methane monitoring in all buildings and other enclosed structures within 250 metres (m) of the landfill. The threshold level for further investigation and corrective action is detection of methane at concentrations above 25 % of the lower explosive limit (LEL) or 12,500 ppm.

## 6.2.2 Environmental performance

### Greenhouse gas monitoring

Landfill gas combustion monitoring results at the Awaba REF and gas flare during the reporting period year are provided in Table 6.4. A total of 34,716.47 tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) methane was combusted at the Awaba REF during the reporting period, generating 6,112,179 kilowatt hours (KWH) of renewable energy. An additional 1,548.7 tonnes of CO<sub>2</sub>e methane was combusted via the gas flare during the reporting period.

**Table 6.4** Landfill gas combustion monitoring during the reporting period

| Month         | Volume of landfill gas flow (scm) |                  |                  | CO <sub>2</sub> e (tonnes) |                  | Exported KWH     |
|---------------|-----------------------------------|------------------|------------------|----------------------------|------------------|------------------|
|               | Flares                            | REF              | Total            | Flares                     | REF              |                  |
| Jul           | 9,405                             | 368,369          | 377,774          | N/A                        | 3,349.64         | 593,996          |
| Aug           | 3,925                             | 396,046          | 399,971          | N/A                        | 3,235.66         | 577,592          |
| Sep           | 30,655                            | 320,273          | 350,928          | 274.33                     | 2,635.12         | 456,798          |
| Oct           | 34,987                            | 310,288          | 345,275          | 277.79                     | 2,676.01         | 446,625          |
| Nov           | 5,677                             | 389,373          | 395,050          | N/A                        | 3,105.48         | 551,422          |
| Dec           | 8,560                             | 395,535          | 404,095          | N/A                        | 3,241.23         | 581,921          |
| Jan           | 63,794                            | 310,431          | 374,225          | N/A                        | 2,576.48         | 432,912          |
| Feb           | 27,518                            | 321,404          | 348,922          | N/A                        | 2,662.52         | 460,937          |
| Mar           | 590                               | 393,715          | 394,305          | N/A                        | 3,353.90         | 602,140          |
| Apr           | 102,634                           | 351,010          | 379,552          | 996.62                     | 2,045.41         | 365,324          |
| May           | 28,542                            | 351,010          | 379,552          | N/A                        | 3,073.25         | 546,566          |
| Jun           | 27,010                            | 334,460          | 361,470          | N/A                        | 2,761.77         | 495,946          |
| <b>TOTALS</b> | <b>343,297</b>                    | <b>4,108,729</b> | <b>4,452,026</b> | <b>1,548.74</b>            | <b>34,716.47</b> | <b>6,112,179</b> |

## Landfill gas monitoring

Landfill gas surface emissions monitoring events for the reporting period were undertaken monthly in accordance with the GGMP. Results of landfill gas surface monitoring are placed on the LMCC website in accordance with EPL 5873. No reportable exceedances of the methane concentration threshold level (500 ppm) were recorded in the reporting period.

Where minor, unreportable detections of landfill gas are encountered, such as in September, October, November 2021 and January, March, May and July 2022, these are rectified through application and compaction of additional cover material.

Results for the monthly landfill gas accumulation monitoring are placed on the LMCC website in accordance with EPL 5873. Methane concentrations for all enclosed spaces within 250 m of the landfill were negligible during the reporting period and therefore were below the prescribed detection threshold levels.

## 6.3 Air quality and odour

### 6.3.1 Environmental management

Air quality and odour management at the AWMF is undertaken in accordance with the approved Air Quality and Odour Management Plan (AQOMP). The IEA undertaken during the reporting period identified the need for the AQOMP to be updated by 23 November 2022 in line with Schedule 4 Condition 25. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans. The objectives of the AQOMP are to:

- Prevent air pollution
- Prevent amenity impacts from odour and dust

These objectives are achieved through the implementation of a range of management measures aimed at reducing dust emissions, minimisation of combustion by-products and odour management.

Dust management strategies at the AWMF include:

- Designated vehicle routes to limit airborne dust generation.
- Wheel wash facility to prevent build-up of dust on sealed roads.
- Sealing of access roads and operational areas where practical.
- Regular sweeping of sealed roads.
- A water tanker is permanently located onsite to wet down unsealed roads and stockpiles as required.
- Soil stockpiles or intermediate landfill cover are managed to encourage grass cover to reduce the likelihood of wind erosion.

Combustion by-products at the AWMF include emissions from methane combustion for electricity generation or flaring and exhaust emissions from plant and equipment. Emissions from these sources are managed through the following strategies:

- Electricity generation and gas flaring plant and equipment is maintained to minimise undesirable combustion by-products.
- All plant and equipment used at the AWMF is maintained with pollution control equipment in good working order to manufacturer's specification.
- Any plant or equipment observed to be producing excessive exhaust emissions is taken off-line until necessary repairs or modifications are completed.

Potential odour sources at the AWMF include waste at the active landfill tip-face, and leachate storage treatment and irrigation. Odours from these sources are managed through the following strategies:

- Minimising the active area of the tip-face to that required to accommodate anticipated vehicles tipping at any one time.
- Daily cover is used to temporarily cap the active tip face when not in active use.
- Aeration of leachate storage ponds to prevent anaerobic conditions which can increase potential for odours.
- Any leachate that has been stored in anaerobic conditions is not used for irrigated on site.

The AQOMP also includes a number of pre-emptive and reactive based measures to reduce the impact of dust and odours during adverse meteorological conditions and other extraordinary events.

No quantitative air quality monitoring is required by the approved AQOMP.

Complaints relating to dust and odour are investigated and actioned in accordance with Awaba Waste Management Facility / Green Waste Processing Facility – Complaints Management Procedure.

## 6.3.2 Environmental performance

Potential air quality and odour impacts from the AWMF were assessed as part of the EA (PAE Holmes, 2012). The primary objective of the assessment was to assess the potential air quality and odour impacts from the expanded AWMF through:

- A quantitative assessment of the potential air quality and odour impacts of the project, including cumulative impacts.
- A demonstration that the ongoing operation of the AWMF is able to comply with the provisions of the *Protection of the Environment Operations Act 1997* (POEO Act) and *Protection of the Environment Operations (Clean Air) Regulation 2010*.

The assessment found that the bushland buffer surrounding the AWMF provides significant protection of receivers from dust and odour impacts. Modelling estimates that odour impact assessment criteria is not exceeded beyond 250 m from the facility and dust deposition will be minor beyond 100 m. No sensitive receivers were identified within these distances. The assessment determined that operational air quality and odour emissions are predicted to be well within acceptable criteria when current management practices are correctly applied. The predicted odour ground level concentrations are below the most stringent air quality goals at all residential receivers.

Based on a worst case assessment of the onsite power generation plant, air pollutant levels (as indicated by nitrogen dioxide (NO<sub>2</sub>) concentrations) due to the gas turbines and excess flaring of landfill gas are predicted to be 12.5 µg/m<sup>3</sup> at the nearest residential receiver, which is well below the assessment criteria of 246 µg/m<sup>3</sup>. Similarly, concentrations of carbon monoxide (CO), volatile organic compounds (VOCs) and sulphur dioxide (SO<sub>2</sub>) are predicted to be negligible.

The maximum predicted 24-hour PM<sub>10</sub> concentration at a residence is 7.1 µg/m<sup>3</sup> which is well below the assessment criteria of 50 µg/m<sup>3</sup>. All annual average predictions are well below 1 µg/m<sup>3</sup>, which is well below the assessment criteria of 30 µg/m<sup>3</sup>. Dust deposition levels are predicted to be below 0.6 g/m<sup>2</sup>/month, which is well below the assessment criteria of 2 g/m<sup>2</sup>/month.

Dust levels during site operation are predicted to be low and controllable through good site environmental practice and commonly applied dust management measures as identified in Section 6.3.1.

LMCC receives all complaints relating to both the AWMF and the adjacent ORRF, which is operated by a third party (Remondis) and is subject to a separate approval and EPL. During the reporting period, LMCC received 106 complaints related to odour. Based on a review of the complaints these odour complaints are attributable to the ORRF and not related to operation of the AWMF. Further details about these complaints are provided in Section 8.2.

The management measures identified in the AQOMP are considered to be effective and will continue to be employed during the next reporting period.

### 6.3.3 Improvement and initiatives

While not related to the performance of the expanded AWMF, LMCC provides operational assistance to Remondis to assist in managing the odour performance of the ORRF. This includes, receiving and investigating odour complaints, before forwarding to Remondis for action, and working cooperatively with Remondis and the EPA regarding odour complaint management and mitigation measures. This is an independent facility subject to a separate EPL.

## 6.4 Operational noise

### 6.4.1 Environmental management

Operational noise management at the AWMF is undertaken in accordance with the approved Operational Noise Management Plan (ONMP). The IEA undertaken during the reporting period identified the need for the ONMP to be updated by 23 November 2022 in line with Schedule 4 Condition 32. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans. The objective of the ONMP are to ensure that noise emissions from activities associated with the operation of the AWMF do not result in adverse impacts on neighbouring sensitive receivers by:

- Identifying legislative obligations and noise targets for environmental noise control.
- Identification of significant noise generating activities and surrounding sensitive noise receivers.
- Providing guidance on appropriate measures to reduced operational noise emissions.
- Providing a framework for noise complaint investigation and response.
- Identifying responsibilities for implementation of noise control measures.

Operational noise management measures identified in the ONMP and implemented at the AWMF include the following:

- Plant and equipment is selected for use on site with consideration to acoustic performance.
- Plant and equipment used on site has noise control devices fitted at all times.
- Plant and equipment used on site is maintained in good working order.
- Any equipment identified as being responsible for exceeding specified noise limits or resulting in a noise complaint is removed from service where maintenance and repair are required to prevent elevated noise emission.
- Truck drivers and plant operators are made aware of relevant noise minimisation practices including adherence to the site speed limit, minimising the use of engine brakes while descending the haul road, and observing operational time restrictions.
- Noisy activities outside typical operational practices that have potential to impact on nearby residences are only conducted for short durations and/or incorporate additional noise management practices such as additional muffling of equipment or installation of temporary noise barriers.
- Any significant construction works have a project specific Construction Noise Management Plan prepared prior to commencement.

#### Noise monitoring

Due to the appreciable buffer to the worst effected sensitive noise receiver regular acoustic measurements are not required as part of the ONMP to monitor the operational noise performance of the AWMF.

Performance is gauged by monitoring of complaint history and feedback from community engagement undertaken in line with the Community Education Program (see Section 8).

Any significant upward trend in noise complaints received by LMCC must initiate a review of noise management measures at the AWMF and update of ONMP as required.

Complaints regarding alleged noise from the AWMF are managed in line with LMCC's established customer service protocols and in line with LMCC's Customer Charter.

## 6.4.2 Environmental performance

The AWMF is bounded by a sizable bushland buffer however there are various commercial, industrial and residential land uses in the surrounding environment which are within the acoustic range of the facility.

Based on the nature of surrounding development, sensitive noise receivers identified in the ONMP that warrant consideration are limited to:

- Residential premises in Awaba township located approximately 800 m to the north.
- Toronto Adventist Primary School located approximately 1.3 km to the east.
- Leisure Life Caravan Village (manufactured homes estate) located approximately 1.3 km to the east.
- Toronto residential areas located approximately 1.7 km to the northeast.

The conditions of the PA specify that operational noise from the AWMF shall not exceed:

- a. an LA10(15 minute) noise emission criterion of 45dB(A) (7am to 6pm) Monday to Sunday;
- b. an LA10 (15 minute) noise emission criterion of 45 dB(A) during the evening (6pm to 10pm) Monday to Friday; and
- c. at all other times, an LA10 (15 minutes) noise emission criterion of 35dB(A), except as expressly provided by the EPL.

Operational noise of the expanded AWMF was assessed in the EA (Cardno, 2012). The assessment concluded that the operation of the expanded AWMF was not significantly different from the existing facility and would not result in any net increase in noise impact on surrounding receivers.

Routine noise generating activities at the AWMF include truck movements between the waste transfer station and the tip face, and heavy earth moving machinery and compaction of the active landfill cell.

Due to shielding of residential premises in Awaba by a ridgeline beyond the western boundary of the AWMF site, the most effected noise receivers are predicted to be the school and manufactured home estate located 1.3 km to the east.

Predicted sound power levels from heavy machinery used at the AWMF are shown in Table 6.5. This accounts for the highest level of noise generating activity during typical operation of the AWMF.

**Table 6.5** Predicted equipment noise levels dB(A)

| Plant type      | Model                       | Indicative Sound Power Level – SWL dB(A) | Predicted Noise Level at 1300 m dB(A) (School & Manufactured Home Estate) |
|-----------------|-----------------------------|------------------------------------------|---------------------------------------------------------------------------|
| Traxcavator     | Liebherr LR634              | 110                                      | 40                                                                        |
| Compactor       | Tana E520                   | 110                                      | 40                                                                        |
| Truck           | Isuzu FX2 240 350 (23T GVM) | 107                                      | 37                                                                        |
| Combined level* |                             |                                          | 44                                                                        |

\*\*assuming simultaneous operation of 1 compactor, 1 truck, and 1 traxcavator.

The predicted noise levels are derived from linear distance attenuation predictions, which do not account for various other losses including ground loss, vegetation and shielding topography that would reduce received noise levels further. Accordingly, the actual maximum noise levels at the nearest sensitive receivers are predicted to be significantly lower than shown in Table 6.5.

Additionally, the predicted levels represent maximum predicted noise levels, being more stringent than the regulatory noise targets which are based on an  $L_{10}$  (15 min) statistical calculation (noise level exceeded 10% of the time).

The predicted noise levels indicate that noise targets set out in the PA conditions for the AWMF will be achieved.

No complaints relating to operational noise were received during the reporting period. The management measures identified in the ONMP are considered to be effective and will continue to be employed during the next reporting period.



Additional assessment of operational noise impacts was undertaken during 2021/2022, to determine whether the noise limits set out in the PA would be achieved. The findings of this assessment are summarised below.

## Operational noise validation

Schedule 4, Condition 28 of the PA required LMCC to undertake operational noise validation prior to 21 January 2016. Operation of the expanded AWMF under the PA commenced on 11 August 2020. On 9 June 2021, LMCC informed DPE of failure to undertake the operational noise validation as required by the PA. In response, the DPE required LMCC to undertake an operational noise validation prior to the end of the 2021 calendar year. Accordingly, the Operational Noise Validation Report (ONVR) was completed by GHD in December 2021.

As part of the works completed for the ONVR, operator attended noise measurements were conducted on site as well as three (3) sensitive receiver locations surrounding the site on Thursday 11 November 2021. The operator attended operational noise monitoring showed that the noise contributions from the facility comply with the Project Approval 10\_0139 noise criteria of 45 dBA  $L_{A10(15 \text{ minute})}$  at all monitoring locations.

An operational noise model of the facility was created and validated based on measurements taken on site. Using the noise model an operational noise assessment was undertaken based on a worst-case operating scenario, with all equipment operating and noise enhancing atmospheric conditions present.

The results of the model indicated that noise levels associated with the operation of the facility are predicted comply with the Project Approval noise criterion of 45 dBA  $L_{A10(15 \text{ minute})}$  during the day at all nearby sensitive receivers.

No additional noise mitigation measures were recommended by the ONVR.

## 6.5 Litter control

### 6.5.1 Environmental management

Litter control at the AWMF is undertaken in accordance with the approved LEMP and aims to:

- Prevent spread of litter off site to the environment.
- Prevent amenity impacts from litter.
- Maintain site visual appeal.

Measures to control litter onsite include:

- Cover and compact waste daily.
- Litter fences around part of the perimeter of the active landfill area.
- Signs to advise drivers of their responsibility to ensure material does not fall from their vehicles and litter public roads.
- Daily inspection and clearance (as resources permit) of the site (and if necessary, surrounding area) of litter resulting from the landfilling operations.

The IEA identified the need for the Litter section of the LEMP (Section 9.7.2) to be updated. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans to be undertaken in 2022.

### 6.5.2 Environmental performance

During the reporting period, litter control performance was monitored daily through visual inspections and resources allocated to manual litter patrols on an as needs basis.

The IEA undertaken during the reporting period identified non-compliances relating to litter and breaches of NC-08 Schedule 4 Condition 9. In response to these breaches, LMCC is obligated to conduct a thorough litter clean-up and complete a daily litter record. A warning letter concerning these breaches was issued to AWMF on 25 March 2022. Further details about this warning letter are provided in Section 10.1.

## 6.6 Pest, vermin and weeds

### 6.6.1 Environmental management

Pest, vermin and noxious weed management at the AWMF is undertaken in accordance with the approved LEMP and aims to:

- Minimise the sources of food and habitat for pests and vermin
- Use professional pest exterminators/controllers if an outbreak is detected
- Prevent spread of weeds off site to the surrounding areas

Measures to control pests, vermin and noxious weed onsite include:

- Cover and compact waste daily.
- Inspect the site on a regular basis to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard, or cause the loss of amenity in the surrounding area.
- Signs to advise drivers of their responsibility to ensure material does not fall from their vehicles and litter public roads.
- Control weeds by the use of chemical herbicides and pesticides on an as needs basis (determined by the LMCC Vegetation and Pest Management Coordinator).

### 6.6.2 Environmental performance

Pests, vermin and noxious weed control performance was monitored periodically through visual inspections during the reporting period and resources allocated to manage on an as needs basis.

No pest, vermin and noxious weed related incidents at AWMF were recorded during the reporting period.

During the report period and in response to IEA outcomes, weed and pest inspections were arranged with the Council Biosecurity. The first inspection was scheduled for 13 July 2022. This inspection was postponed due to rain and was rescheduled for week ending 29 July 2022. Outcomes of weed and pest monitoring will be reported in the next reporting period.

## 6.7 Biodiversity

### 6.7.1 Environmental management

Biodiversity impacts at the AWMF are managed in accordance with the approved Biodiversity Management Plan (BMP). The IEA undertaken during the reporting period identified the need for the BMP to be updated by 23 November 2022 in line with Schedule 4 Condition 51. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans.

The BMP includes measures to manage biodiversity impacts during both construction and operation of the expanded AWMF.

The BMP identifies specific plans and protocols required to manage flora and fauna impacts, in accordance with the conditions of the PA. Including incorporation of a Vegetation and Fauna Management Plan and a Translocation Plan.

The Vegetation and Fauna Management Plan and translocation plan apply for the operational life of the expanded AWMF, whereas the protocols relating to the construction stage only cease to have effect following the completion of construction.



The ABCAPoM includes a flora and fauna survey and monitoring program, which is required to be reported on annually to evaluate the effectiveness of management measures at maintaining the biodiversity value of the land.

## 6.7.2 Environmental performance

No impacts to biodiversity outside of those predicted in the EA have occurred during the reporting period. No clearing of vegetation was undertaken onsite during the reporting period. The management strategies specified by the BMP and implemented across the site are considered adequate to address potential biodiversity impacts within the project approval boundary and will continue to be implemented during the next reporting period.

No monitoring of the Awaba Biodiversity Conservation Area was recorded during the reporting period. Non-compliances relating to biodiversity were identified by the IEA. LMCC have advised that internal discussions are currently being undertaken to verify if monitoring has been completed, in accordance with the Biodiversity Conservation Area Plan of Management. Details of these non-compliances as well as proposed responses are detailed in Section 9.1.

## 6.8 Heritage

### 6.8.1 Environmental management

Cultural heritage management at AWMF is undertaken in accordance with the approved Cultural Heritage Management Plan (CHMP), which has been prepared in accordance with the PA. The IEA undertaken during the reporting period identified the need for the CHMP to be updated by 23 November 2022 in line with Schedule 4 Condition 45. Table 6.1 provides the staging plan for the updates to the LEMP and sub-plans.

The objective of the CHMP is to provide guiding policies and principles for the management of Aboriginal heritage and cultural values and historic heritage, within the AWMF site. The CHMP provides the framework for the protection of cultural values throughout construction and operation of the expanded AWMF under the PA.

The CHMP includes a range of management measures to protect cultural heritage values during both construction and operation of the expanded AWMF, including:

- Incident and complaint management
- Site inductions
- Procedures for discovery of previously unknown heritage objects
- Procedures for discovery of potential human remains
- Protection of cultural heritage sites
- Repatriation of salvaged sites
- Procedures for any works within the biodiversity offset area

Prior to construction commencing, an Aboriginal archaeological salvage program was undertaken in accordance with the approved CHMP. The salvage program included repatriation of one salvaged culturally modified tree (45-7-0332) and other artefacts uncovered during the salvage program. Additionally, one culturally modified tree (45-7-0331) was retained and protected onsite.

The CHMP requires ongoing monitoring of any repatriation location site protection measures to be undertaken by LMCC on an annual basis to ensure that any necessary repairs to fencing work is undertaken in a timely manner.

The CHMP also requires ongoing monitoring of 45-7-0331, including periodic inspection by an arborist to assess the health of the tree.

## 6.8.2 Environmental performance

No consultation or salvage activities were undertaken during the reporting period, as no excavation or land clearing has occurred in previously undisturbed areas. Additionally, no areas have been disturbed outside of the approved project boundary and there have therefore been no impacts to cultural heritage during the reporting period.

No arborist inspections were undertaken during the 2021/2022 reporting period. The culturally modified tree (45-7-0331) will be assessed by an arborist during the next reporting period.

Inspection of the repatriation site for the culturally modified tree (45-7-0332) was not undertaken during the reporting period. The site will be inspected during the next reporting period.

An IEA recommendation (ID30) also identified the need for signage to be installed for the culturally modified tree. This will be undertaken by LMCC during the next reporting period. Further detail is provided in Section 9.1.

## 7. Rehabilitation

Schedule 4, Conditions 57 and 58 of the PA require LMCC to prepare a Landfill Closure and Rehabilitation Management Plan for the expanded AWMF within 12 months of the commencement of the PA.

LMCC wrote to the DPE on 8 July 2021 to request clarification on this condition, given that the operational life of the AWMF is expected to be in the order of 30 years and the rehabilitation activities would not commence until closer to this time. Due to anticipated changes in legislation, technology and community expectation, any rehabilitation and closure management plan developed at this time would likely be subject to significant variation and redundancy in contrast to any plan developed closer to the end of the site's operational life.

DPE approved the requested extension to the preparation of the Landfill Closure and Rehabilitation Management Plan. LMCC has engaged a consultant to assist with the preparation of the Rehabilitation Management Plan. This Plan was completed and submitted to DPE on 5 August 2022.

No rehabilitation activities were undertaken during the reporting period.



## 8. Community

### 8.1 Engagement activities or initiatives

LMCC prepared a Community Education Program in accordance with the Schedule 5, Condition 11 of the PA. The Community Education Program guided engagement activities to encourage use of the CRC and to promote resource recovery.

Opportunities for community engagement activities promoting resource recovery at the Awaba Waste Management site were affected during 2021/22 due to public health restrictions as a result of the COVID-19 pandemic.

A Community Waste Survey was undertaken during October 2021. Some of the key findings indicated 72% of households suggested they would be likely / very likely to use the Awaba Waste Facility Community Recycling Centre (CRC) for problem waste items; and 90% of residents stated they have done at least one activity in the last 12 months that reduces the amount of unnecessary materials going to landfill. The survey results will assist with opportunities to improve waste behaviours in regard to resource recovery initiatives.

Four shopping centre pop up stalls were held at locations across the Lake Macquarie LGA (Cardiff, Toronto, Charlestown and Belmont) in November 2021. These stalls promoted the Awaba Facility CRC.

Other presentations occurred during the year when possible including to schools and community organisations.

### 8.2 Complaints

Complaints handling and management at the AWMF is undertaken in accordance with the approved Complaints Handling and Investigation Procedure, which forms part of the LEMP.

The purpose of the procedure is to manage complaints received by LMCC regarding the environmental performance of both the AWMF and the ORRF, which is operated by the third party contractor, Remondis under a separate approval and EPL.

Both LMCC and Remondis have obligations under their respective EPL's to record, investigate and report pollution incidents and complaints at the time they are identified.

Generally, the public assume both facilities are operated by LMCC, and will forward inquiries to LMCC regarding the operations of both facilities. It is therefore important that initially the inquiry is assessed and assigned to the correct organisation, in a timely manner, to record, investigate, report and respond to such inquiries.

Following receipt of a complaint an initial investigation is undertaken to determine the source of the complaint and to assign the complaint to either the AWMF, the ORRF or another relevant entity within LMCC.

Further investigation is then undertaken to:

- Determine the cause of the incident
- Implement controls to manage the incident
- Implement controls to reduce the risk of it occurring again
- Consult with relevant LMCC staff

The complainant is then updated regarding the outcome of the investigation.

During the reporting period, LMCC received 106 complaints relating to environmental concerns. All of these complaints were related to odour. Based on a review of the spreadsheet logging the complaints as well as historical complaints, LMCC have advised that all of these odour complaints are attributable to the ORRF and not related to operation of the expanded AWMF. A total of 9 of these complaints mentioned the AWMF regarding odour, but may have been referring to the ORRF. All 9 were actioned through either a site visit, phone call or email.

LMCC received an additional 108 complaints attributable to the AWMF during the reporting period. All of these complaints were related to the level of service provided by the AWMF, a council decision or response times. No complaints related to the environmental performance of the AWMF were received during the reporting period.

## 9. Independent audit

An IEA was completed in March 2022 by Umwelt Environmental and Social Consultants.

The audit consisted of a detailed desktop review of documentation, interviews with key AWMF staff and a field inspection of the AWMF. The audit was conducted in accordance with DPE Independent Audit – Post Approval Requirements dated May 2020 (Independent Audit Requirements) and AS/NZS ISO 19011:2014 Australian/New Zealand Standard: Guidelines for Guidelines for Auditing Management Systems.

The audit concluded that on the ground environmental management practices being applied at AWMF were in need of attention in some areas. During the site inspection, areas of the site were observed to be not appropriately managed with litter encroaching into surrounding bushland, weed management issues and hydrocarbon management measures not being undertaken. The active cell areas assessed during the field inspection however were observed to be well managed. The audit also found the community recycling centre onsite was also well maintained and kept to a high standard with waste clearly located in bunded areas and firefighting equipment clearly accessible.

A number of non-compliances have been identified during this audit and are summarised in Section 9.1. A series of recommendations arising from a review of environmental management documentation, the audit site inspection and identified non-compliances was provided.

### 9.1 Actions required from independent audit

The audit made a number of recommendations, which are outlined in Table 9.1 below. LMCC's responses to each recommendation are also provided in the table.

Table 9.1 Actions required from the IEA

| Condition/issue                                                | ID  | Recommendation                                                                                                                                                                                                                                   | Council response to Auditor's recommendations                                                                                                                                                                                                                   | Progress against recommendation                                                                                                                                                                    |
|----------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PA10_0139 (MOD 1)</b>                                       |     |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                    |
| <b>NC - 03<br/>Schedule 3<br/>Condition 6</b>                  | ID1 | LMCC should seek to engage with DPIE to confirm the status of the existing consents and if they have not been surrendered LMCC should surrender the development consents identified in Table 1 of the project approval as required.              | Council will undertake this recommendation before the close of the next auditing period.                                                                                                                                                                        | A request has been sent to LMCC Planning team to confirm what consents are still current, and that historical consents be surrendered if not already done so.                                      |
| <b>Improvement Opportunity<br/>Schedule 3<br/>Condition 13</b> | ID2 | It is recommended AWMF develop a system to regulate and alert management of plant and equipment issues and the relevant course of actions, timing and responsibilities are recorded.                                                             | Council considers the existing management systems in place are adequate to regulate and alert management of plant and equipment issues. Council's procedure for regulating non-compliance is via Council's Hazards Incidents and Non-conformance (HINC) system. | No further action required.                                                                                                                                                                        |
| <b>Improvement Opportunity<br/>Schedule 4<br/>Condition 5</b>  | ID3 | It is noted the Waste and Resource Recovery Monitoring Program included in the LEMP is labelled as a Draft. It is recommended the program be reviewed and a final copy be included in the LEMP.                                                  | Council will undertake this recommendation before the close of the next auditing period. See further references to document and compliance management system.                                                                                                   | See Table 6.1.                                                                                                                                                                                     |
| <b>NC – 07<br/>Schedule 4<br/>Condition 6</b>                  | ID4 | It is recommended LMCC continue consultation with Hunter Water and reach an agreement for a new Trade Waste agreement which would cover the life of the Project or alternative seek DPIE's approval that rolling annual licences are acceptable. | Trade waste agreement is currently in place for defined terms. Council and HWC negotiate subsequent term agreements to ensure continuity of the agreement.                                                                                                      | Council has requested DPE approval for rolling annual licenses in its Response to Audit Recommendations (RAR) for the 2022 Audit. Council is continuing to engage with HWC regarding future TWA's. |
| <b>NC - 08<br/>Schedule 4<br/>Condition 9</b>                  | ID5 | A thorough clean-up of all litter, focusing on offsite areas within the surrounding bushland environment needs to be undertaken as a matter of priority. Then daily inspections need to be implemented as required.                              | Council will undertake a clean-up of litter as resources permit. Daily record of litter inspections will be noted in the site daily operations diary.                                                                                                           | AWMF to implement daily diary entry of inspections and cleanups where appropriate, commencing August 2022.                                                                                         |
|                                                                | ID6 | It is recommended Section 9.7.2 in the LEMP be revised and a litter monitoring/control program to be developed and implemented to control litter effectively across onsite and offsite.                                                          | LEMP section 9.7.2 will be revised to control litter more effectively.                                                                                                                                                                                          | See Table 6.1.                                                                                                                                                                                     |
|                                                                | ID7 | It is also recommended a formal process documenting daily inspections be created and undertaken to show compliance with this condition.                                                                                                          | Daily record of litter inspections will be noted in the site daily operations diary.                                                                                                                                                                            | AWMF to implement daily diary entry of inspections and cleanups where appropriate, commencing August 2022.                                                                                         |

| Condition/issue                                            | ID   | Recommendation                                                                                                                                                                                                                                         | Council response to Auditor's recommendations                                                                                                                                    | Progress against recommendation                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NC - 09</b><br><b>Schedule 4</b><br><b>Condition 10</b> | ID8  | A focused weed spraying program should be commissioned to bring current weed infestations at the site under control with a focus on areas surrounding the sites perimeter to prevent weeds spreading to nearby bushland areas as a matter of priority. | Council will commission a weed spraying program to bring weed infestations under control, with a focus on areas surrounding the landfilling area.                                | Council's biosecurity officer has attended site and devised a suitable 3 monthly program of weed inspections and spraying. The first of the treatments through application of herbicides was undertaken on 3/08/22 with ongoing visits planned at 3 monthly intervals. Biosecurity officer to provide a report on completion. |
|                                                            | ID9  | It is recommended LMCC revise the LEMP to align with current operations and develop a formal reporting process for the inspection and management of pests, vermin and/or noxious weeds                                                                 | LEMP will be revised to develop a formal reporting process for inspection and management of pests vermin and/or noxious weeds.                                                   | See Table 6.1.                                                                                                                                                                                                                                                                                                                |
| <b>NC - 12</b><br><b>Schedule 4</b><br><b>Condition 11</b> | ID10 | It is recommended the confirmation letter received from the Mine Subsidence Board confirming their approval of cell designs be submitted to the Director General and EPA for their records as required by this condition.                              | Council will supply the letter to the department.                                                                                                                                | Council's records services department will be engaged to provide this correspondence.                                                                                                                                                                                                                                         |
| <b>NC - 13</b><br><b>Schedule 4</b><br><b>Condition 18</b> | ID11 | LMCC should engage with DPIE in order to confirm if the ongoing regular trucking of leachate from AWMF to Hunter Water's Edgeworth WWTW is currently approved. If not, this activity should cease until appropriate approvals are in place.            | Council seeks approval from DPE for trucking of leachate to an approved wastewater treatment facility if not already covered by existing conditions within the project approval. | DPE has investigated this matter, council has responded to the enquiry. Council is awaiting further feedback from the DPE.                                                                                                                                                                                                    |
|                                                            | ID12 | It is recommended the transfer of leachate into trucks for disposal offsite only to occur in a bunded area                                                                                                                                             | Bunded area constructed. Council will use the bunded area upon completion of pumping infrastructure. Expected completion during May 2022.                                        | Pumping infrastructure installed. Councils waste team have requested confirmation of practical completion from Councils city projects department to commence operation.                                                                                                                                                       |

| Condition/issue                                                            | ID   | Recommendation                                                                                                                                                                                                                                                                                        | Council response to Auditor's recommendations                                                                                                                                                                                    | Progress against recommendation                                                                                                                                                                                                     |
|----------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NC - 14</b><br><b>Schedule 4</b><br><b>Condition 19</b>                 | ID13 | The Water Quantity and Quality Assessment prepared by Cardno dated December 2011 does not assess the current layout of the AWMF. It is recommended the assessment be revised or removed from the SWLMP as it is not considered to adequately assess the as built design.                              | Council will review the SWLMP. The Water Quantity and Quality Assessment dated December 2011 will be updated or removed.                                                                                                         | See Table 6.1.                                                                                                                                                                                                                      |
|                                                                            | ID14 | It is recommended the SWLMP and its respective plans be revised to reflect current operations and the Surface Water, Groundwater and Leachate Monitoring Program revised to include relevant EPL criteria.                                                                                            | Council will review the SWLMP to reflect current operations and the Surface Water, Groundwater and Leachate Monitoring Program revised to include relevant EPL criteria.                                                         | See Table 6.1.                                                                                                                                                                                                                      |
|                                                                            | ID15 | LMCC should seek to engage with the EPA and DPIE with regard to the ongoing exceedances of groundwater criteria and undertake further investigations to determine the cause and develop effective mitigation measures to address.                                                                     | Council is continuing to engage with NSW EPA regarding ongoing exceedances of groundwater criteria.<br><br>Please indicate if DPE wishes to be included in correspondence in this regard.                                        | Council will include DPE in correspondence regarding exceedance of monitoring criteria, and other reportable incidents, as was done with the recent fire incident in July 2022.                                                     |
| <b>NC - 16</b><br><b>Schedule 4</b><br><b>Condition 22</b>                 | ID16 | It is suggested LMCC seek to engage with DPIE and EPA regarding the intent of this condition and either seek to have reference to the dust criteria removed or if required by DPIE/EPA undertake monitoring of dust in order to be able to demonstrate that the project does not exceed the criteria. | Monitoring has not been undertaken as no direction given under the approval to do so. Council has not received any dust complaints directed at the AWMF or other reason or trigger to believe these criteria are being exceeded. | Council does not intend to undertake dust monitoring unless directed or required in response to a specific complaint. Councils dust management practices are considered sufficient and has not received any dust relate complaints. |
| <b>Improvement Opportunity</b><br><b>Schedule 4</b><br><b>Condition 25</b> | ID17 | It is recommended the Air Quality and Odour Management Plan be revised to include the relevant conditions of this approval and a protocol to periodically review the plan to ensure Air Quality and Odour Management Plan is kept up to date with current best practice.                              | Council will review the existing AQOMP to ensure it aligns with current best practice.                                                                                                                                           | See Table 6.1.                                                                                                                                                                                                                      |
|                                                                            | ID18 | It is recommended the management system for air quality and odour be clearly defined in the Air Quality and Odour Management Plan and include timing, roles and responsibilities of personnel                                                                                                         | Council will review the existing AQOMP to ensure it aligns with current best practice.                                                                                                                                           | See Table 6.1.                                                                                                                                                                                                                      |
| <b>NC - 17</b><br><b>Schedule 4</b><br><b>Condition 26</b>                 | ID19 | The Greenhouse Gas Management Plan should be subject to periodical review and revision as required.                                                                                                                                                                                                   | Council will undertake this review before the close of the next auditing period.                                                                                                                                                 | See Table 6.1.                                                                                                                                                                                                                      |

| Condition/issue                                            | ID   | Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Council response to Auditor's recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Progress against recommendation                                                                                                                                                                                                                |
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| <b>NC - 18</b><br><b>Schedule 4</b><br><b>Condition 27</b> | ID20 | It is recommended noise monitoring be undertaken on a periodic basis to verify the development complies with the specified noise emission criteria. As required by this condition noise monitoring must be measured at any point within six (6) metres of the nearest effected residential receiver or other noise sensitive areas in the vicinity to determine compliance with this condition.                                                                                                                                    | Operational noise validation undertaken by GHD and submitted to the department December 2021, and found site operations to be compliant with stated noise criteria.<br><br>Additional noise monitoring can be undertaken in response to any complaint received (no complaints have been received) or following any substantial change in site operations                                                                                                                                                                                     | ONVR Completed in December 2021.                                                                                                                                                                                                               |
| <b>NC - 20</b><br><b>Schedule 4</b><br><b>Condition 29</b> | ID21 | It is recommended the Operational Noise Management Plan be revised to include mitigation measures in minimising noise impacts during adverse meteorological conditions, include mitigation measures for traffic impacts and to detail requirements for noise monitoring as required to demonstrate compliance with the monitoring requirements under Condition 27. Further the update should include all of the recommended mitigation measures included in the Operational Noise Validation Assessment prepared in December 2021. | The Operational Noise Management Plan will be updated to include mitigation measures to minimise noise impacts during adverse meteorological conditions and traffic impacts. The plan will also be updated to include measures noted in the Operational Noise Validation. Additional monitoring has not been undertaken. Council has not received any noise complaints directed at the AWMF or any other reason or trigger to believe noise criteria are being exceeded. Please confirm if DPE requires ongoing monitoring to be undertaken. | See Table 6.1.                                                                                                                                                                                                                                 |
| <b>NC - 22</b><br><b>Schedule 4</b><br><b>Condition 32</b> | ID22 | It is recommended to effectively manage and ensure noise criteria is within limits, periodic noise monitoring is undertaken.                                                                                                                                                                                                                                                                                                                                                                                                       | Please confirm if DPE requires ongoing monitoring to be undertaken.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ONVR completed in December 2021, AWMF operations found to be compliant with relevant noise criteria. Council does not intend to undertake periodic monitoring unless directed to do so, or in as required in response to a specific complaint. |
| <b>NC - 23</b><br><b>Schedule 4</b><br><b>Condition 37</b> | ID23 | LMCC should seek to confirm that the internal roads and parking areas have been constructed and maintained in accordance with the latest versions of AS 2890.1 and AS 2890.2 and keep a record of this for future audits.                                                                                                                                                                                                                                                                                                          | Council will determine if roads have been constructed, and are being maintained in accordance with the latest versions of AS 2890.1 and AS 2890.2 and will keep a record of this for future audits.                                                                                                                                                                                                                                                                                                                                          | A request has been sent to councils city projects team to verify records.                                                                                                                                                                      |
| <b>NC - 25</b><br><b>Schedule 4</b><br><b>Condition 39</b> | ID24 | LMCC should seek to confirm that lighting associated with the project complies with the latest version of AS 4282(INT) - Control of Obtrusive Effects of Outdoor Lighting and keep a record of this for future audits.                                                                                                                                                                                                                                                                                                             | Council will determine if lighting complies with the latest version of AS 4282(INT) - Control of Obtrusive Effects of Outdoor Lighting and will keep a record of this for future audits.                                                                                                                                                                                                                                                                                                                                                     | A request has been sent to councils city projects team to verify records.                                                                                                                                                                      |

| Condition/issue                                                            | ID   | Recommendation                                                                                                                                                                                                                                                                                                                                                  | Council response to Auditor's recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Progress against recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>NC - 26</b><br><b>Schedule 4</b><br><b>Condition 41</b>                 | ID25 | It is recommended management procedures are revised to ensure all employees know all chemicals, oils should be located within a bunded area and that regular site inspections include relevant checks for appropriate management and storage of hydrocarbons.                                                                                                   | It is understood the contractor operated LMS power station site was the area of concern identified in the Audit. Future site inspections will include the LMS power station and the contractor will be notified of chemicals, fuels and oils that are observed to not be contained appropriately. Oils and chemicals stored outside bunded areas are small quantities only, used for mowing equipment, pump/generator fuel etc. Council will review current storage practices to ensure they are managed in accordance with relevant Australian Standards and/or EPA's Storing and Handling Liquids: Environmental Protection – Participants Handbook. | Council have liaised with LMS regarding oil and chemicals handling and storage practices.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>NC - 27</b><br><b>Schedule 4</b><br><b>Condition 43</b>                 | ID26 | It is recommended LMCC to seek approval from the Director General of a suitability qualified and experienced person to revise the Pollution Incident & Emergency Response Management Plan and that once revised the plan is provided to the Director General for approval. The revised plan should include the Bush Fire Emergency Evacuation Plan as required. | Pollution Incident & Emergency Response Management Plan (PIRMP) was submitted to DPE as LEMP Appendix F, under request for approval to commence operations on 6 July 2019 and Council was granted approval on the 04 October 2019.                                                                                                                                                                                                                                                                                                                                                                                                                     | The Bushfire Emergency Evacuation Plan will be appended to the PIRMP during its review in August 2022.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Improvement Opportunity</b><br><b>Schedule 4</b><br><b>Condition 44</b> | ID27 | It is recommended the Aboriginal stakeholders consultation log be updated to include all ongoing correspondence between LMCC and the Registered Aboriginal Parties that has occurred since the submission of the plan.                                                                                                                                          | The Aboriginal stakeholder's consultation log will be updated to include all ongoing correspondence between LMCC and Registered Aboriginal Parties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | There have been no consultation log updates, as it is understood there has been no further correspondence required between council and Registered Aboriginal Parties. There has been no activity beyond previously disturbed areas of the landfill site where a risk exists for damaging areas or items of aboriginal heritage since submission of the plan. The proposed future landfilling footprint is also within existing disturbed and landfilled areas of the site.<br><br>Action is considered closed out.<br><br>. |



| Condition/issue                                          | ID   | Recommendation                                                                                                                                                                                                                                                                                                                    | Council response to Auditor's recommendations                                                                                                                                                                                                                                                                                                              | Progress against recommendation                                                                                                                                                                       |
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| <b>NC 28</b><br><b>Schedule 4</b><br><b>Condition 45</b> | ID28 | It is recommended the CHMP is revised and updated to reflect changes and existing operations. As part of this review and revision a monitoring and collection protocol should be prepared in consultation with the RAPs and included the revised management plan. The revised CHMP should be sent to the Department for approval. | CHMP can be revised and updated to reflect changes and existing operations. A monitoring and collection protocol will be prepared in consultation with RAPs. The plan will be sent to the DEP for approval.                                                                                                                                                | See Table 6.1.                                                                                                                                                                                        |
|                                                          | ID29 | LMCC to confirm a report was prepared as part of the salvage for AWMF that detailed the methodology and results of the salvage of Aboriginal archaeological sites on the AWMF. This should be provided to relevant agencies and RAPs if not already distributed. If not prepared the report needs to be prepared.                 | It is understood a Salvage of Aboriginal Ecological Sites report was prepared, Council will confirm if a report was prepared in consultation with RAPs.                                                                                                                                                                                                    | A request has been sent to Council's city projects team to verify records.                                                                                                                            |
|                                                          | ID30 | Signage should be installed at the culturally modified tree (Site 45-7-0331) and all other identified sites within the AWMF as required by the Cultural Heritage Management Plan                                                                                                                                                  | Signage will be installed at the culturally modified tree (Site 45-7-0331).                                                                                                                                                                                                                                                                                | Council to install sign indicating presence of the culturally modified tree.                                                                                                                          |
| <b>NC 30</b><br><b>Schedule 4</b><br><b>Condition 47</b> | ID31 | LMCC to confirm Aboriginal Site Impact Recording forms have been completed and submitted to AHIMS as required and a record of this be kept onsite.                                                                                                                                                                                | Council will confirm if Aboriginal Site Impact Recording forms have been completed and submitted to AHIMS.                                                                                                                                                                                                                                                 | A request has been sent to Council's city projects team to verify records.                                                                                                                            |
| <b>NC 31</b><br><b>Schedule 4</b><br><b>Condition 50</b> | ID32 | It is recommended LMCC undertake all monitoring and management actions as required in the Biodiversity Conservation Area Plan of Management during the next reporting period and include a summary in the Annual Review.                                                                                                          | Council will undertake the monitoring and management actions as required in the Biodiversity Conservation Area Plan of Management.                                                                                                                                                                                                                         | LMCC have advised that internal discussions are being held to verify if monitoring has been undertaken, in accordance with Biodiversity Conservation Area Plan of Management actions.                 |
| <b>NC 32</b><br><b>Schedule 4</b><br><b>Condition 51</b> | ID34 | It is recommended the Biodiversity Offset Management Plan be submitted to the Director General for review and approval.                                                                                                                                                                                                           | Biodiversity Offset Management Plan and Biodiversity Conservation Area Plan of Management submitted to DPE as LEMP Appendix I – Biodiversity Management Plan, Appendix J – Biodiversity Conservation Area Plan of Management, under approval to request commencement of operations on 6 July 2019 and Council was granted approval on the 04 October 2019. | Noted that Council has asked for DPE to please review and confirm if the Management Plans have been prepared to the satisfaction of the Director General as noted in RAR. Awaiting response from DPE. |

| Condition/issue                                                                                                    | ID   | Recommendation                                                                                                                                                                                                                           | Council response to Auditor's recommendations                                                                                                                                                                                                                                                                                                                                                                | Progress against recommendation                                                                                                                                                                                                                                                                                                                                                      |
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| <b>NC 33</b><br><b>Schedule 4</b><br><b>Condition 51A</b><br><b>EPBC</b><br><b>2011/5973</b><br><b>Condition 1</b> | ID35 | It is recommended a restrictive covenant be placed on Lot 463 DP 1138964 and include all of the requirements of Condition 51A.                                                                                                           | Council will confirm whether a restrictive covenant has been placed on Lot 463 DP 1138964 including requirements of Condition 51A. Council will place the covenant on Lot 463 if not already complete.                                                                                                                                                                                                       | A request has been sent to Council's development assessment and certification team to verify records.                                                                                                                                                                                                                                                                                |
| <b>Improvement Opportunity</b><br><b>Schedule 4</b><br><b>Condition 54</b>                                         | ID36 | It is recommended the translocation plan be revised and include contingency measures and reporting requirements of translocation <i>Tetratheca Juncea</i>                                                                                | No further <i>Tetratheca Juncea</i> is expected to be disturbed within the footprint of the operations under the current approval. Expansion civil works have been completed and a new project approval, including revision of the translocation plan would be undertaken to manage risks associated with further site expansion where relevant.                                                             | Noted request in RAR for DPE to confirm if Council is required to undertake a review of the translocation plan.<br><br>There has been no activity beyond previously disturbed areas of the landfill site where a risk exists for disturbing <i>Tetratheca Juncea</i> . The proposed future landfilling footprint is also within existing disturbed and landfilled areas of the site. |
| <b>NC -34</b><br><b>Schedule 4</b><br><b>Condition 55</b>                                                          | ID37 | It is recommended monitoring of the biodiversity offset area be undertaken during the next reporting period and reported in the Annual Review.                                                                                           | Monitoring of the biodiversity offset area will be undertaken during the next reporting period.                                                                                                                                                                                                                                                                                                              | LMCC have advised that internal discussions are being held to verify if monitoring has been undertaken, in accordance with Biodiversity Conservation Area Plan of Management actions.                                                                                                                                                                                                |
| <b>NC 35</b><br><b>Schedule 4</b><br><b>Condition 56</b>                                                           | ID38 | It is recommended the Vegetation Clearing Protocol within the Biodiversity Management Plan be revised and clearly detail location and type of vegetation to be retained and removed.                                                     | No further remnant vegetation is expected to be disturbed within the footprint of the current operations under the current approval. It is unclear how the Vegetation Clearing Protocol would be revised (designed to mitigate impacts during construction) given expansion works have been completed and a new approval would likely be required for vegetation clearing as part of further site expansion. | Council noted in its RAR a request to DPE to confirm if the Vegetation Clearing Protocol within the Biodiversity Management Plan should be revised, noting a review of the Biodiversity Management Plan will be undertaken. Council is awaiting a response from the DPE.                                                                                                             |
| <b>NC 36 and NC 37</b><br><b>Schedule 4</b><br><b>Condition 57 and 58</b>                                          | ID39 | It is recommended LMCC continue to engage with DPIE in order to confirm the required timing of preparing the Landfill Closure and Rehabilitation Management Plan and provide this plan to DPIE for approval within the agreed timeframe. | Council currently undertaking work on the Landfill Closure and Rehabilitation Management Plan in accordance with advice from DPE.                                                                                                                                                                                                                                                                            | LMCC requested an extension to the due date for the submission of the Closure and Rehabilitation Plan. The Plan is due 5 August 2022. This date is outside the current reporting period.                                                                                                                                                                                             |

| Condition/issue                                       | ID   | Recommendation                                                                                                                                                                                                                              | Council response to Auditor's recommendations                                                                                                                                                                                                     | Progress against recommendation |
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| <b>Improvement Opportunity Schedule 5 Condition 2</b> | ID40 | It is recommended the LEMP be updated to include a procedure outlining how complaints are received.                                                                                                                                         | The LEMP will be updated to include further detail on how complaints are received.                                                                                                                                                                | See Table 6.1.                  |
| <b>NC 39 Schedule 5 Condition 3</b>                   | ID41 | It is recommended LMCC include relevant findings from the Operational Noise Validation (including record of baseline) within the Operational Noise Management Plan.                                                                         | Findings from the ONV will be included in the update to the Operational Noise Management Plan.                                                                                                                                                    | See Table 6.1.                  |
|                                                       | ID42 | It is recommended the Air Quality and Odour Management Plan and the Biodiversity Management Plan be revised to include relevant statutory requirements of and include relevant limits or performance criteria as outlined in this approval. | The Air Quality and Odour Management Plan, as well as the Biodiversity Management Plan will be revised to ensure relevant statutory requirements and limits and performance criteria are included.                                                | See Table 6.1.                  |
|                                                       | ID43 | The Air Quality and Odour Management Plan, Biodiversity Management Plan and the Operational Noise Management Plan include a program to measure the impacts and effectiveness of environmental performance                                   | Air Quality and Odour Management Plan, as well as the Biodiversity Management Plan will be revised to include a program to measure the impacts and effectiveness of environmental performance.                                                    | See Table 6.1.                  |
|                                                       | ID44 | It is recommended a contingency program to manage unpredicted impacts e.g. weed infestations be included within the Biodiversity Management Plan.                                                                                           | A review of the biodiversity management plan will include consideration of a contingency program in any revision.                                                                                                                                 | See Table 6.1.                  |
|                                                       | ID45 | It is recommended Greenhouse Gas Management Plan, Biodiversity Management Plan and Biodiversity Conservation Area Management Plan be revised to include a protocol for reporting non-compliances and complaints                             | The Greenhouse Gas Management Plan, Biodiversity Management Plan and Biodiversity Conservation Area Management Plan will be reviewed and will include consideration of inclusion of a protocol for reporting non-compliances and complaints.      | See Table 6.1.                  |
|                                                       | ID46 | It is recommended Air Quality and Odour Management Plan, the Biodiversity Management Plan and Soil, Water and Leachate Management Plan are updated to ensure appropriate review protocol is in place.                                       | The Air Quality and Odour Management Plan, the Biodiversity Management Plan and Soil, Water and Leachate Management Plan will be reviewed and will include consideration of inclusion of a protocol for reporting non-compliances and complaints. | See Table 6.1.                  |
|                                                       | ID47 | It is recommended the Air Quality and Odour Management Plan and the Biodiversity Management Plan be revised to include a program to investigate improvements in environmental performance.                                                  | The Air Quality and Odour Management Plan and the Biodiversity Management Plan will be reviewed and will include a program to investigate improvements in environmental performance in any revision.                                              | See Table 6.1.                  |

| Condition/issue                             | ID   | Recommendation                                                                                                                                                                                                                                                                          | Council response to Auditor's recommendations                                                                                                                                                                                                            | Progress against recommendation                                                                                                                                                                                                                                                        |
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|                                             | ID48 | It is recommended a compliance system be created to ensure management plans are reviewed in accordance with their respective protocols.                                                                                                                                                 | Council will establish a compliance management system to ensure management plans are reviewed in accordance with their respective protocols, and will include protocols for ensuring regular review of management plans and programs.                    | Council is yet to implement a compliance management system. Council will be including a compliance management component in the scope of works for the upcoming review of AWMF Management Plans.                                                                                        |
|                                             | ID49 | It is recommended all relevant management plans/programs required under this approval be subject to regular review and revision as required in order to reflect current operations and statutory requirements to ensure they remain current and effectively manage environmental risks. |                                                                                                                                                                                                                                                          | See Table 6.1.                                                                                                                                                                                                                                                                         |
| <b>NC 40<br/>Schedule 5<br/>Condition 5</b> | ID50 | It is recommended all plans within the Soil, Water and Leachate Management Plan be revised as required to ensure consistent with the updates made to main document.                                                                                                                     | All plans within the Soil Water and Leachate Management Plan will be revised.                                                                                                                                                                            | See Table 6.1.                                                                                                                                                                                                                                                                         |
| <b>NC 41<br/>Schedule 5<br/>Condition 6</b> | ID51 | LMCC should seek to engage with DPIE to provide them a briefing on the above incidents that have occurred and confirm if they require them to be reported retrospectively. If required incident report(s) should be provided to meet DPIE's requirements.                               | It is understood the department would be up to date with all AWMF reportable incidents, as referenced in the 2021 AWMF Annual Review.                                                                                                                    | Noted in RAR, no further correspondence received from the DPE in regard to this matter. New incidents are now being reported to DPE in additions to NSW EPA                                                                                                                            |
|                                             | ID52 | It is recommended LMCC revise their reporting procedure and ensure relevant authorities including the DPIE are notified of all relevant incidents.                                                                                                                                      | Previous practices allowed for reporting of incidents to NSW EPA (all incidents reported), current practice is to include DPE in relevant reportable incidents.<br><br>Further consultation with DPE required as to what items are reportable incidents. | The Pollution Incident Emergency Response Management Plan (PIERMP) was updated in June 2022. Incidences have been reported to the relevant authorities as required. New incidents are now being reported to DPE in additions to NSW EPA, as per contractor fire incident in July 2022. |

| Condition/issue                                                            | ID   | Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Council response to Auditor's recommendations                                                                                                                                                                                            | Progress against recommendation                                                                                                  |
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| <b>NC 42 and NC 43</b><br><b>Schedule 5</b><br><b>Condition 7 and 10</b>   | ID53 | <p>It is recommended all missing data is uploaded to the website as required and that LMCC implement a procedure / process to ensure that all data as required be regularly uploaded to the LMCC website.</p> <p>The audit has identified the following documents that need to be uploaded to the LMCC website:</p> <ul style="list-style-type: none"> <li>– recent Project Approval (PA 10_0139 MOD 1 dated August 2014)</li> <li>– EPBC Approval 2011/5973</li> <li>– EPL 5873</li> <li>– the Annual Review</li> <li>– Complaints Register</li> <li>– All monitoring results</li> </ul> | AWMF will work with Council IT support to ensure items referred to below, that have not already been updated are uploaded to the website, and that new items are uploaded to the website as required.                                    | Complaints line has been added to website, GHD have been advised that links to the documents are also included on the website.   |
|                                                                            | ID54 | The complaints line should also be made available and referenced clearly on the website so that members of the public understand how they can make complaints.                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>Council complaints line is available and clearly visible on the website.</p> <p><a href="https://www.lakemac.com.au/Venues/Awaba-Waste-Management-Facility">https://www.lakemac.com.au/Venues/Awaba-Waste-Management-Facility</a></p> | Complete                                                                                                                         |
| <b>Improvement Opportunity</b><br><b>Schedule 5</b><br><b>Condition 11</b> | ID55 | It is recommended that LMCC update the Waste Education Plan in the LEMP to confirm the scope of it is to continue to run during the operational phase of the project.                                                                                                                                                                                                                                                                                                                                                                                                                     | Council will review the Waste Education program to ensure relevance to current operations and revise where required.                                                                                                                     | Council's sustainability engagement team will be engaged to undertake a review of the Waste Education program.                   |
| <b>Condition L2</b>                                                        | ID56 | LMCC should seek to engage with the EPA and DPIE with regard to the ongoing exceedances of groundwater criteria and undertake further investigations to determine the cause and develop effective mitigation measures to address.                                                                                                                                                                                                                                                                                                                                                         | Council is in regular contact with NSW EPA regarding ongoing works and investigations in relation into exceedances of groundwater monitoring criteria.                                                                                   | Council has regular engagement with NSW EPA and DPE. Council will continue to engage with NSW EPA and DPE regarding this matter. |
| <b>Condition L4</b>                                                        | ID57 | It is recommended that LMCC undertake noise monitoring as required under the EPL to demonstrate compliance with noise criteria.                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Operational Noise validation undertaken 2021, compliant with relevant criteria.                                                                                                                                                          | Complete                                                                                                                         |

| Condition/issue            | ID   | Recommendation                                                                                                                                                                                                                                                | Council response to Auditor's recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Progress against recommendation                                                                                                                                  |
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| <b>Condition 06.14</b>     | ID58 | It is recommended management procedures are revised to ensure all employees know all chemicals, oils should be located within a bunded area and that regular site inspections include relevant checks for appropriate management and storage of hydrocarbons. | It is understood the contractor operated LMS power station site was the area of concern identified in the Audit. Future site inspections will include the LMS power station and the contractor will be notified of chemicals, fuels and oils that are observed to not be contained appropriately.<br><br>Oils and chemicals stored outside bunded areas are small quantities only, used for mowing equipment, pump/generator fuel etc. Council will review current storage practices to ensure they are managed in accordance with relevant Australian Standards and/or EPA's Storing and Handling Liquids: Environmental Protection – Participants Handbook | See Table 6.1.                                                                                                                                                   |
| <b>Condition M1.3</b>      | ID59 | Gas monitoring should record the time of sample and name of person who collects the sample as required.<br><br>Water monitoring should record the time of sample as required.                                                                                 | Gas monitoring results will record time of each sample and the name of sampler.<br><br>Water monitoring Chain of Custody sheets show time of sample collection. Sample times will also be recorded on the results spreadsheet.                                                                                                                                                                                                                                                                                                                                                                                                                               | Gas monitoring and water sampling sheets show the name of sample collector and time of collection. This action is therefore considered to be complete.           |
| <b>Condition M6</b>        | ID60 | LMCC should confirm that a dedicated complaints line is available and that it is communicated to members of the community so they are informed how they can make complaints.                                                                                  | Council complaints line is available and clearly visible on the AWMF website.<br><br><a href="https://www.lakemac.com.au/Venues/Awaba-Waste-Management-Facility">https://www.lakemac.com.au/Venues/Awaba-Waste-Management-Facility</a>                                                                                                                                                                                                                                                                                                                                                                                                                       | Complete                                                                                                                                                         |
| EPBC 2011/5973             |      |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                  |
| <b>Condition 6</b>         | ID61 | It is recommended a report addressing compliance of the conditions outlined in the EPBC approval be prepared, submitted to DAWE and published on the LMCC website.                                                                                            | It is understood this requirement was completed for agencies relevant at that time including consultation letters Appendix B and C of Biodiversity Management Plan 2015 AWMF, and consultation as noted in Appendix C and D of the Biodiversity Conservation Area Plan of Management 2015.                                                                                                                                                                                                                                                                                                                                                                   | Complete                                                                                                                                                         |
| Environmental Performance  |      |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                  |
| <b>Document Management</b> | ID62 | LMCC should review <b>the document management system</b> in place for the AWMF and ensure all relevant staff are trained in its use.                                                                                                                          | Council will review the document management system to ensure items required to be reviewed are captured in the system. Also refer to below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Council manages documents in accordance with Council's corporate records management and correspondence procedures. This action is therefore considered complete. |

| Condition/issue                            | ID   | Recommendation                                                                                                                                                                                                                                                                                                                                                              | Council response to Auditor's recommendations                                                                                                                                                                  | Progress against recommendation                                                                                                                                                                                             |
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| <b>Compliance Management</b>               | ID63 | It is recommended that a compliance management system be developed for the AWMF to capture all compliance requirements for the site. The CMS should establish actions to be undertaken to maintain compliance, define responsibilities and required timeframes to complete and include a mechanism to keep records demonstrating that they have been completed as required. | Council will establish a compliance management system to capture the items referred to, including maintaining currency of management plans.                                                                    | Council is yet to implement a compliance management system. Council will be including a compliance management component in the scope of works for the upcoming review of AWMF Management Plans.                             |
| <b>Site Induction</b>                      | ID64 | It is recommended that the induction process be revised to include an overview of all relevant environmental management requirements as outlined in this approval PA 10_0139.                                                                                                                                                                                               | The site induction process can be amended to include further awareness of relevant environmental management requirements items as noted in the approval.                                                       | Councils waste operations team will review the induction process and revise where required.                                                                                                                                 |
| <b>Environmental Inspections</b>           | ID65 | LMCC develop an environmental management inspections procedure which captures all of the site's environmental management and monitoring commitments (from approvals and management plans) and ensures that these are captured in routine inspections and findings and actions formally documented.                                                                          | This item will be included in review current practice and as part of the compliance management system.                                                                                                         | Council is yet to implement a compliance management system. Council will be including a compliance management component in the scope of works for the upcoming review of AWMF Management Plans.                             |
| <b>Monitoring of Clean Water Diversion</b> | ID66 | It is recommended a surface monitoring point be established and subject to routine monitoring at the clean water diversion drain outlet to monitor and verify no contamination occurs as a result of the drain running under the waste cells.                                                                                                                               | Council is currently working with consultant GHD, in consultation with NSW EPA on the water monitoring program for the site, as part of the larger project of improving site ground and surface water quality. | Two stages of investigative work have been carried out by GHD and a range of improvements and measures have been suggested. Further details about the ongoing water monitoring improvements are discussed in Section 6.1.1. |



## 10. Incidents and non-compliances

As identified in Table 1.2 of the Statement of Compliance, low risk non-compliances occurred during the reporting period. The incidents and non-compliances detail regarding the non-compliances are listed in Table 1.2 and Table 9.1 and discussed, as required.

The non-compliances identified in addition to those identified from the IEA include two non-compliances relating to water monitoring. These exceedances were of EPL Condition L2.4. Monitoring of MP7 exceeded the allowable 50 mg/L limit from Condition L2.4 on 1 May 2022 and 12 October 2021. These non-compliances have been reported to EPA as required.

No penalty infringement notices were received during the reporting period.

### 10.1 Fire incident

On 31 August 2021, a fire was noticed on the covered floor area of the current tipping face. The fire was not authorised and ignition source unknown. The fire was firstly smothered with VENM prior to the onsite water cart fully extinguishing the fire with water. This was notified to the EPA via telephone call on the 3:07 pm 31 August 2021, with the subsequent report submitted the same day.

### 10.2 Actions required by DPE

Of the 43 non-compliances identified, DPE has determined to further investigate the following non-compliances identified in the IEA:

- NC – 05 (Schedule 3 condition 11)
- NC – 06 (Schedule 3 condition 12)
- NC – 08 (Schedule 4 condition 9)
- NC – 12 (Schedule 4 condition 16)
- NC – 13 (Schedule 4 condition 18)
- NC – 30 (Schedule 4 condition 47)
- NC – 33 (Schedule 4 condition 51A)
- NC – 41 (Schedule 5 condition 6)

Table 10.1 below summarises the warning letters received by the AWMF.

**Table 10.1** Summary of warning letters received by the AWMF

| Non-compliance                                                                                      | ID           | Action taken by DPE                 | How non-compliance is being addressed                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------|--------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 4.2 of the <i>Environmental Planning and Assessment Act 1979</i><br>Schedule 3 condition 11 | ID48, 63, 65 | Warning letter issued 25 March 2022 | Following the completion of the audit, LMCC have committed to improving record keeping practices to reduce the likelihood of future non-compliances with this condition.                                                                                                                                                                                                  |
| Section 4.2 of the <i>Environmental Planning and Assessment Act 1979</i><br>Schedule 4 condition 9  | ID5, 6, 7    | Warning letter issued 25 March 2022 | The Response to Auditor Recommendations submitted by LMCC has committed to undertaking the following:<br>A clean-up of all litter, focusing on off-site areas and surrounding bushland;<br>Daily litter inspections as required to reduce the likelihood of continued litter impact; and<br>Revising the Landfill Environmental Management Plan to better control litter. |

| Non-compliance                                                                                      | ID            | Action taken by DPE                                            | How non-compliance is being addressed                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 4.2 of the <i>Environmental Planning and Assessment Act 1979</i><br>Schedule 5 condition 6  | ID51 , 52     | Warning letter issued 25 March 2022                            | LMCC have committed to an update of internal incident reporting protocol to include the department as per the condition.                                                                                                                                                                                             |
| Section 4.2 of the <i>Environmental Planning and Assessment Act 1979</i><br>Schedule 3 condition 12 | ID48 , 63, 65 | Warning letter issued 25 March 2022                            | The demolition works occurred in 2018 and no incidents or known harm occurred as a result of the works having no evidence of being undertaken in accordance with the standard; and LMCC have committed to improving record keeping across the project to reduce the likelihood of similar non-compliances occurring. |
| Section 4.2 of the <i>Environmental Planning and Assessment Act 1979</i><br>Schedule 4 condition 16 | ID10          | Correspondence received on 20/06/2022                          | No action to be taken                                                                                                                                                                                                                                                                                                |
| Section 4.2 of the <i>Environmental Planning and Assessment Act 1979</i><br>Schedule 4 condition 18 | ID11 , 12     | Notice to furnish information and records received on 16/06/22 | Council responded on 30/06/2022, no further response received from DPE                                                                                                                                                                                                                                               |

No follow up correspondence has been received to date for the following two non-compliances:

- NC – 30 (Schedule 4 condition 47) – (Aboriginal Site Impact Recording Forms)
- NC – 33 (Schedule 4 condition 51A) – (Restrictive Covenant on Biodiversity Offset area)

# 11. Activities proposed for next reporting period

Activities proposed for the next reporting period are described in Table 11.1.

**Table 11.1** Actions proposed for 2022/2023 reporting period

| Activities proposed for next reporting period     | Target completion date                                         |
|---------------------------------------------------|----------------------------------------------------------------|
| Commissioning of Cell 2                           | August 2022                                                    |
| Operation of Cell 2                               | After August 2022                                              |
| Construction of a leachate tankering bunded area. | Construction complete- likely to be operational Quarter 3 2022 |

Completion of remaining IEA recommendations in the next reporting period including:

- LMCC to liaise with internal sub-contractors regarding oil and chemicals handling and storage practices.
- Further documentation requirements such as:
  - A review of the Waste Education Program
  - Updating management plans (see Table 6.1)
  - AWMF to implement daily diary entry of litter inspections and cleanups where appropriate, commencing August 2022
- Further inspection / monitoring including:
  - Biodiversity monitoring in accordance with Biodiversity Conservation Area Plan of Management
  - Arborist inspection of culturally modified tree
  - Weed, pest and vermin inspection
- Further system requirements including:
  - Implementation of a compliance management system
  - A review of the site induction process
- Infrastructure requirements:
  - Council to install sign indicating presence of the culturally modified tree
  - Installation of water management infrastructure (if required) based on investigations and assessments completed by consultants
- Engagement with DPE:
  - Regarding rolling annual licenses and HWC regarding future TWAs
  - Implementation of audit actions per Table 9.1

## 12. References

Cardno (2012), *Additions to Awaba Waste Management Facility Environmental Assessment*, prepared for Lake Macquarie City Council

GHD (2020), *Awaba Waste Management Facility Investigation of leachate migration Stage 1: Desktop Review*

GHD (2022). *Awaba Waste Management Facility Stage 2 Investigation, Monitoring Well Installation Report*

Landcom (2004), *Managing Urban Stormwater: Soils and Construction (the Blue Book) Volume 1*

PAE Holmes (2012), *Air Quality and Odour Assessment – Awaba Landfill Extension*. Report prepared for Cardno on behalf of Lake Macquarie City Council

Umwelt (2022), *Independent Environmental Audit of Awaba Waste Management Facility, FINA*. Report prepared for Lake Macquarie City Council

# Appendices

# **Appendix A**

**Summary of historic water quality  
monitoring data**

Table A.1 Statistical summary of groundwater quality monitoring data 2012 to 2020 (source: GHD, 2020)

| Analytes                          | Units | MP1    |        |        | MP2     |         |         | MP3    |        |        | MP4    |        |        | MP5    |        |        |
|-----------------------------------|-------|--------|--------|--------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                   |       | Min    | Max    | Median | Min     | Max     | Median  | Min    | Max    | Median | Min    | Max    | Median | Min    | Max    | Median |
| <b>Physio-chemical parameters</b> |       | n(31)  |        |        | n(33)   |         |         | n(33)  |        |        | n(26)  |        |        | n(31)  |        |        |
| pH Value                          |       | 5.91   | 6.48   | 6.23   | 4.96    | 5.82    | 5.29    | 6.52   | 7.17   | 6.71   | 5.78   | 6.5    | 6.19   | 5.9    | 6.36   | 6.03   |
| Electrical Conductivity           | µS/cm | 1040   | 1450   | 1210   | 1660    | 9530    | 6030    | 566    | 5070   | 3480   | 1880   | 2320   | 2170   | 4510   | 8600   | 6820   |
| <b>Nutrients</b>                  |       | n(31)  |        |        | n(33)   |         |         | n(33)  |        |        | n(26)  |        |        | n(31)  |        |        |
| Ammonia as N                      | mg/L  | 0.03   | 0.18   | 0.06   | 0.05    | 2.23    | 0.11    | 0.88   | 116    | 44.2   | 0.5    | 8.42   | 1.73   | 0.13   | 0.87   | 0.49   |
| Nitrite as N                      | mg/L  | 0.01   | 1.07   | 0.04   | 0.01    | 0.18    | 0.03    | 0.02   | 3.06   | 0.04   | 0.01   | 0.06   | 0.02   | 0.01   | 0.21   | 0.02   |
| Nitrate as N                      | mg/L  | 0.02   | 0.37   | 0.08   | 0.02    | 0.46    | 0.045   | 0.01   | 49.7   | 0.02   | 0.01   | 0.46   | 0.02   | 0.01   | 0.7    | 0.035  |
| Nitrite + Nitrate as N            | mg/L  | 0.03   | 1.35   | 0.08   | 0.02    | 0.46    | 0.055   | 0.01   | 52.8   | 0.03   | 0.01   | 0.47   | 0.02   | 0.01   | 0.7    | 0.04   |
| <b>Mayor Anions</b>               |       | n(31)  |        |        | n(33)   |         |         | n(33)  |        |        | n(26)  |        |        | n(31)  |        |        |
| Sodium                            | mg/L  | 111    | 199    | 148    | 314     | 1770    | 977     | 104    | 646    | 415    | 252    | 486    | 299    | 798    | 1510   | 1150   |
| Potassium                         | mg/L  | 8      | 12     | 10     | 6       | 32      | 16      | 6      | 128    | 52     | 7      | 11     | 9      | 15     | 28     | 19     |
| Calcium                           | mg/L  | 12     | 20     | 15     | 3       | 30      | 16      | 1      | 276    | 38     | 5      | 58     | 12     | 18     | 38     | 30     |
| Magnesium                         | mg/L  | 32     | 48     | 39     | 22      | 212     | 120     | 3      | 119    | 66     | 37     | 54     | 46     | 89     | 174    | 143    |
| Bicarbonate Alkalinity            | mg/L  | 54     | 152    | 91     | 10      | 47      | 23      | 97     | 1540   | 567    | 23     | 177    | 110    | 125    | 208    | 145    |
| Carbonate Alkalinity              | mg/L  | 1      | 1      | 1      | 1       | 1       | 1       | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| Chloride                          | mg/L  | 256    | 444    | 307    | 505     | 3220    | 1520    | 60     | 1170   | 734    | 469    | 690    | 604    | 1300   | 2530   | 1940   |
| Sulphate                          | mg/L  | 11     | 35     | 28     | 134     | 321     | 239     | 1      | 127    | 13     | 3      | 225    | 16     | 163    | 279    | 213    |
| Hydroxide Alkalinity              | mg/L  | <1     | <1     | <1     | <1      | <1      | <1      | <1     | <1     | <1     | <1     | <1     | <1     | <1     | <1     | <1     |
| Total Alkalinity                  | mg/L  | 54     | 152    | 91     | 10      | 47      | 23      | 97     | 1540   | 567    | 23     | 177    | 110    | 125    | 208    | 145    |
| <b>Dissolved metals</b>           |       | n(31)  |        |        | n(33)   |         |         | n(33)  |        |        | n(26)  |        |        | n(31)  |        |        |
| Manganese                         | mg/L  | 1.1    | 2.8    | 1.8    | 0.1     | 0.9     | 0.5     | 0.0    | 1.5    | 0.5    | 0.1    | 0.6    | 0.2    | 0.3    | 0.7    | 0.5    |
| Iron                              | mg/L  | 0.004  | 12.4   | 2.0    | 0.0     | 54.2    | 0.05    | 0.0    | 123.0  | 3.9    | 0.1    | 94.4   | 40.6   | 0.01   | 10.8   | 2.0    |
| <b>Total metals</b>               |       | n(7)   |        |        | n(7)    |         |         | n(7)   |        |        | n(7)   |        |        | n(6)   |        |        |
| Manganese                         | mg/L  | 2.02   | 2.29   | 2.16   | 0.42    | 0.88    | 0.65    | 0.89   | 1.07   | 0.98   | 0.26   | 0.30   | 0.28   | 0.49   | 0.53   | 0.51   |
| Iron                              | mg/L  | 1.3    | 8.3    | 3.8    | 52.3    | 93.5    | 71.7    | 151.0  | 163.0  | 156.0  | 98.4   | 175.0  | 130.0  | 6.7    | 14.2   | 8.7    |
| Aluminium                         | mg/L  | 0.12   | 0.23   | 0.13   | 0.002   | 66.1    | 33.1    | 0.00   | 31.1   | 20.8   | 13.5   | 175.0  | 17.7   | 6.0    | 20.2   | 10.2   |
| Arsenic                           | mg/L  | ND     | ND     | ND     | 0.023   | 0.056   | 0.032   | 0.01   | 0.015  | 0.014  | 0.006  | 0.031  | 0.010  | 0.002  | 0.008  | 0.005  |
| Barium                            | mg/L  | 0.136  | 0.181  | 0.164  | 0.031   | 0.119   | 0.095   | 0.328  | 1.23   | 1.055  | 0.273  | 1.990  | 0.480  | 0.023  | 0.076  | 0.051  |
| Cadmium                           | mg/L  | 0.0001 | 0.0001 | 0.0001 | 0.030   | 0.030   | 0.030   | 0.000  | 0.017  | 0.009  | 0.0001 | 0.0001 | 0.0001 | 0.020  | 0.020  | 0.020  |
| Chromium                          | mg/L  | 0.001  | 0.001  | 0.001  | 0.018   | 0.049   | 0.033   | 0.002  | 0.030  | 0.021  | 0.012  | 0.135  | 0.014  | 0.005  | 0.017  | 0.009  |
| Cobalt                            | mg/L  | 0.008  | 0.034  | 0.028  | 0.011   | 0.063   | 0.043   | 0.002  | 0.008  | 0.006  | 0.001  | 0.007  | 0.002  | 0.001  | 0.003  | 0.002  |
| Copper                            | mg/L  | 0.005  | 0.009  | 0.007  | 0.013   | 0.023   | 0.016   | 0.012  | 0.027  | 0.021  | 0.008  | 0.056  | 0.009  | 0.005  | 0.006  | 0.006  |
| Lead                              | mg/L  | 0.008  | 0.021  | 0.010  | 0.022   | 0.052   | 0.033   | 0.034  | 0.072  | 0.054  | 0.028  | 0.341  | 0.049  | 0.009  | 0.018  | 0.012  |
| Mercury                           | mg/L  | 0.0001 | 0.0001 | 0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0001 |
| Zinc                              | mg/L  | 0.007  | 0.123  | 0.088  | 0.034   | 0.341   | 0.234   | 0.041  | 0.148  | 0.066  | 0.031  | 0.349  | 0.065  | 0.023  | 0.075  | 0.044  |

n(number): number of data per site and group of chemicals



Table A.2 Statistical summary of surface water and leachate quality monitoring data 2012 to 2020 (source: GHD, 2020)

| Analytes                          | Units | MP6     |         |         | MP7     |         |         | MP8     |         |         | MP9     |         |         | MP10                                |                   |        | Assessment Guidelines |
|-----------------------------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------------------------------------|-------------------|--------|-----------------------|
|                                   |       | Min     | Max     | Median  | Min     | Max     | Median  | Min     | Max     | Median  | Min     | Max     | Median  | Min                                 | Max               | Median |                       |
| <b>Physio-chemical parameters</b> |       | n(19)   |         |         | n(11)   |         |         | n(2)    |         |         | n(31)   |         |         | n(32 <sup>a</sup> ,1 <sup>b</sup> ) |                   |        | ANZECC DGV            |
| pH Value                          |       | 8.03    | 8.99    | 8.25    | 7.09    | 8.6     | 8.1     | 7.12    | 7.24    | 7.18    | 5.78    | 7.23    | 5.94    | 7.51                                | 8.46              | 8.11   | 6.5-8                 |
| Electrical Conductivity           | µS/cm | 1400    | 11800   | 3910    | 348     | 1820    | 933     | 396     | 1860    | 1128    | 286     | 1630    | 333     | 14900                               | 14900             | 14900  |                       |
| <b>Nutrients</b>                  |       | n(19)   |         |         | n(11)   |         |         | n(2)    |         |         | n(31)   |         |         | n(31)                               |                   |        |                       |
| Ammonia as N                      | mg/L  | 0.06    | 74.3    | 1       | 0.03    | 27.5    | 1.55    | 0.4     | 0.69    | 0.545   | 0.06    | 3.2     | 1.63    | 1.34                                | 1470              | 745    | 0.9                   |
| Nitrite as N                      | mg/L  | 0.05    | 6.28    | 0.92    | 0.01    | 2.37    | 0.12    | 0.02    | 0.13    | 0.075   | 0.2     | 0.2     | 0.2     | 0.05                                | 628               | 54.4   | 0.7                   |
| Nitrate as N                      | mg/L  | 2.92    | 94.6    | 31      | 0.05    | 13.6    | 0.94    | 0.18    | 1.36    | 0.76    | 4.94    | 4.94    | 4.94    | 0.02                                | 193               | 4.3    |                       |
| Nitrite + Nitrate as N            | mg/L  | 3.02    | 98.4    | 32      | 0.06    | 16      | 1.06    | 0.18    | 1.49    | 0.835   | 5.14    | 5.14    | 5.14    | 0.02                                | 780               | 66.35  |                       |
| <b>Mayor Anions</b>               |       | n(19)   |         |         | n(11)   |         |         | n(2)    |         |         | n(31)   |         |         | n(31)                               |                   |        |                       |
| Sodium                            | mg/L  | 193     | 2030    | 515     | 44      | 219     | 82      | 60      | 283     | 171.5   | 42      | 212     | 45      | 399                                 | 2540              | 1205   |                       |
| Potassium                         | mg/L  | 84      | 877     | 223     | 9       | 104     | 20      | 19      | 66      | 42.5    | 4       | 52      | 4       | 215                                 | 1150              | 566.5  |                       |
| Calcium                           | mg/L  | 31      | 140     | 59      | 18      | 60      | 46      | 7       | 26      | 16.5    | 3       | 24      | 5       | 55                                  | 158               | 105    |                       |
| Magnesium                         | mg/L  | 27      | 148     | 56      | 10      | 31      | 24      | 6       | 31      | 18.5    | 7       | 28      | 8       | 47                                  | 142               | 98.5   |                       |
| Bicarbonate Alkalinity            | mg/L  | 239     | 1530    | 477     | 38      | 392     | 250     | 34      | 248     | 141     | 13      | 186     | 15      | 1080                                | 6760              | 4040   |                       |
| Carbonate Alkalinity              | mg/L  | 1       | 357     | 29      | ND      | ND      | ND      | ND      | ND      | ND      | ND      | ND      | ND      | 92                                  | 550               | 100    |                       |
| Chloride                          | mg/L  | 268     | 2870    | 736     | 42      | 309     | 131     | 76      | 422     | 249     | 65      | 317     | 70      | 190                                 | 2570              | 1820   |                       |
| Sulphate                          | mg/L  | 2       | 40      | 17      | 27      | 87      | 46      | 15      | 15      | 15      | 13      | 30      | 15      | 1                                   | 82                | 10     |                       |
| Hydroxide Alkalinity              | mg/L  | <1      | <1      | <1      | <1      | <1      | <1      | <1      | <1      | <1      | <1      | <1      | <1      | <1                                  | <1                | <1     |                       |
| Total Alkalinity                  | mg/L  | 239     | 1880    | 486     | 38      | 392     | 250     | 34      | 248     | 141     | 13      | 186     | 15      | 1080                                | 6760              | 4040   |                       |
| <b>Dissolved metals</b>           |       | n(19)   |         |         | n(11)   |         |         | n(2)    |         |         | n(31)   |         |         | n(31)                               |                   |        |                       |
| Manganese                         | mg/L  | 0.01    | 8.09    | 0.08    | 0.02    | 0.40    | 0.11    | 0.01    | 0.25    | 0.13    | 0.03    | 0.28    | 0.07    | 0.028                               | 0.727             | 0.472  | 1.9                   |
| Iron                              | mg/L  | 0.25    | 52.30   | 0.57    | 0.07    | 3.14    | 0.25    | 0.60    | 5.92    | 3.26    | 0.19    | 0.67    | 0.42    | 0.12                                | 6760 <sup>c</sup> | 6.56   |                       |
| <b>Total metals</b>               |       | n(3)    |         |         | n(2)    |         |         | n(1)    |         |         | n(1)    |         |         | n(0)                                |                   |        |                       |
| Manganese                         | mg/L  | 0.095   | 0.095   | 0.095   | 0.55    | 0.55    | 0.55    | ND      | ND      | ND      | ND      | ND      | ND      | ND                                  | ND                | ND     |                       |
| Iron                              | mg/L  | ND      | ND      | ND      | 0.57    | 0.89    | 0.73    | ND      | ND      | ND      | ND      | ND      | ND      | ND                                  | ND                | ND     |                       |
| Aluminium                         | mg/L  | 0.130   | 1.030   | 0.240   | 0.5     | 0.65    | 0.575   | 0.44    | 0.44    | 0.44    | <0.01   | <0.01   | <0.01   | ND                                  | ND                | ND     | 0.055                 |
| Arsenic                           | mg/L  | 0.007   | 0.027   | 0.009   | 0.005   | 0.008   | 0.007   | 0.004   | 0.004   | 0.004   | <0.001  | <0.001  | <0.001  | ND                                  | ND                | ND     | 0.013                 |
| Barium                            | mg/L  | 0.146   | 0.215   | 0.204   | 0.080   | 0.112   | 0.096   | 0.174   | 0.174   | 0.174   | 0.149   | 0.149   | 0.149   | ND                                  | ND                | ND     |                       |
| Cadmium                           | mg/L  | 0.000   | 0.001   | 0.001   | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | ND                                  | ND                | ND     | 0.0002                |
| Chromium                          | mg/L  | 0.012   | 0.066   | 0.038   | 0.001   | 0.002   | 0.002   | 0.013   | 0.013   | 0.013   | <0.001  | <0.001  | <0.001  | ND                                  | ND                | ND     | 0.001                 |
| Cobalt                            | mg/L  | 0.012   | 0.042   | 0.023   | 0.001   | 0.002   | 0.002   | 0.009   | 0.009   | 0.009   | 0.023   | 0.023   | 0.023   | ND                                  | ND                | ND     |                       |
| Copper                            | mg/L  | 0.018   | 0.045   | 0.026   | 0.002   | 0.004   | 0.003   | 0.003   | 0.003   | 0.003   | <0.001  | <0.001  | <0.001  | ND                                  | ND                | ND     | 0.0014                |
| Lead                              | mg/L  | 0.001   | 0.005   | 0.003   | 0.002   | 0.003   | 0.003   | 0.003   | 0.003   | 0.003   | <0.001  | <0.001  | <0.001  | ND                                  | ND                | ND     | 0.0034                |
| Mercury                           | mg/L  | <0.0001 | <0.0001 | <0.0001 | 0.550   | 0.550   | 0.550   | <0.0001 | <0.0001 | <0.0001 | 0.0001  | 0.0001  | 0.0001  | ND                                  | ND                | ND     | 0.0006                |
| Zinc                              | mg/L  | 0.052   | 0.118   | 0.089   | 0.012   | 0.084   | 0.048   | 0.011   | 0.011   | 0.011   | 0.019   | 0.019   | 0.019   | ND                                  | ND                | ND     | 0.008                 |

n(number): number of data per site and group of chemicals

# **Appendix B**

**Water quality monitoring data**

| Awaba Waste Management Facility |       |     |                                  |             |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |          |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Analyte                         | Units | LOR | ANZECC 95% fresh water guideline | Groundwater |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |          |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                 |       |     |                                  | MP1         |            |            |            |            |            | MP2        |            |            |            |            |            | MP3        |            |            |            |            |            | MP4        |            |            |            |            |            | MP5        |            |            |            |            |            |            |            |            |            |            |          |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                 |       |     |                                  | 12/10/2020  | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | Site dry | Site dry |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Physicochemical parameters      |       |     |                                  |             |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |          |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

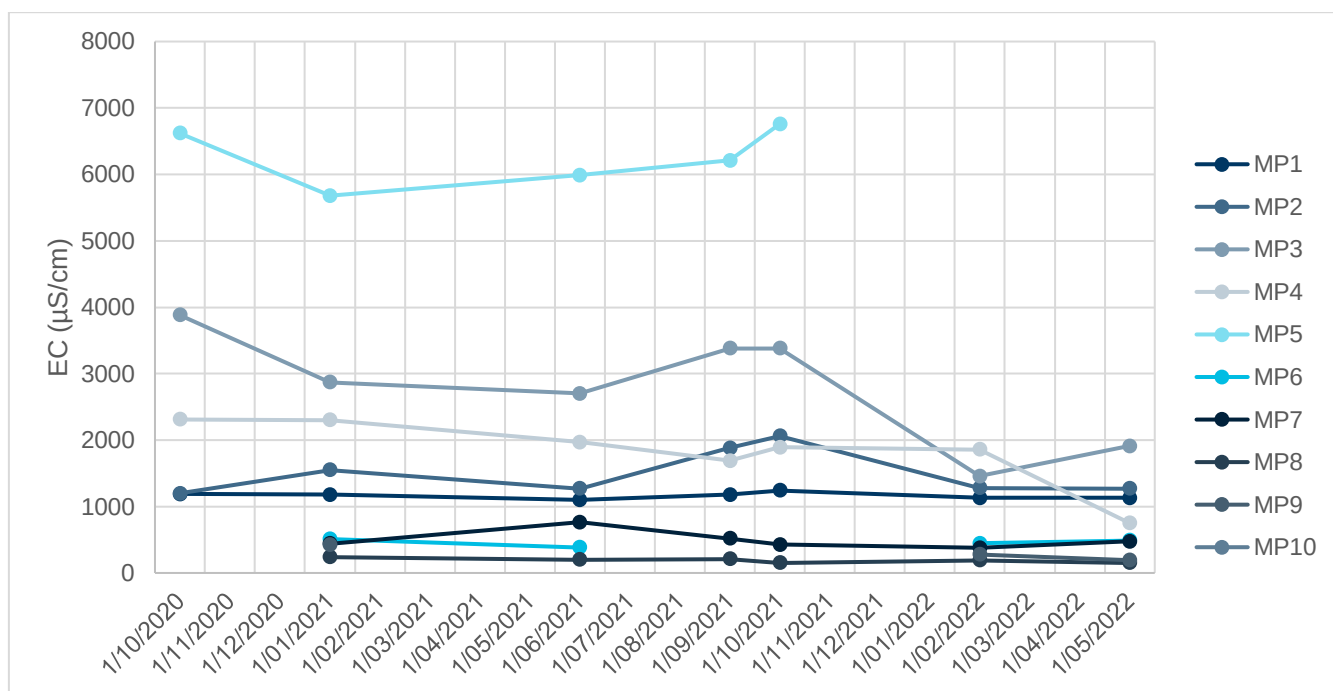
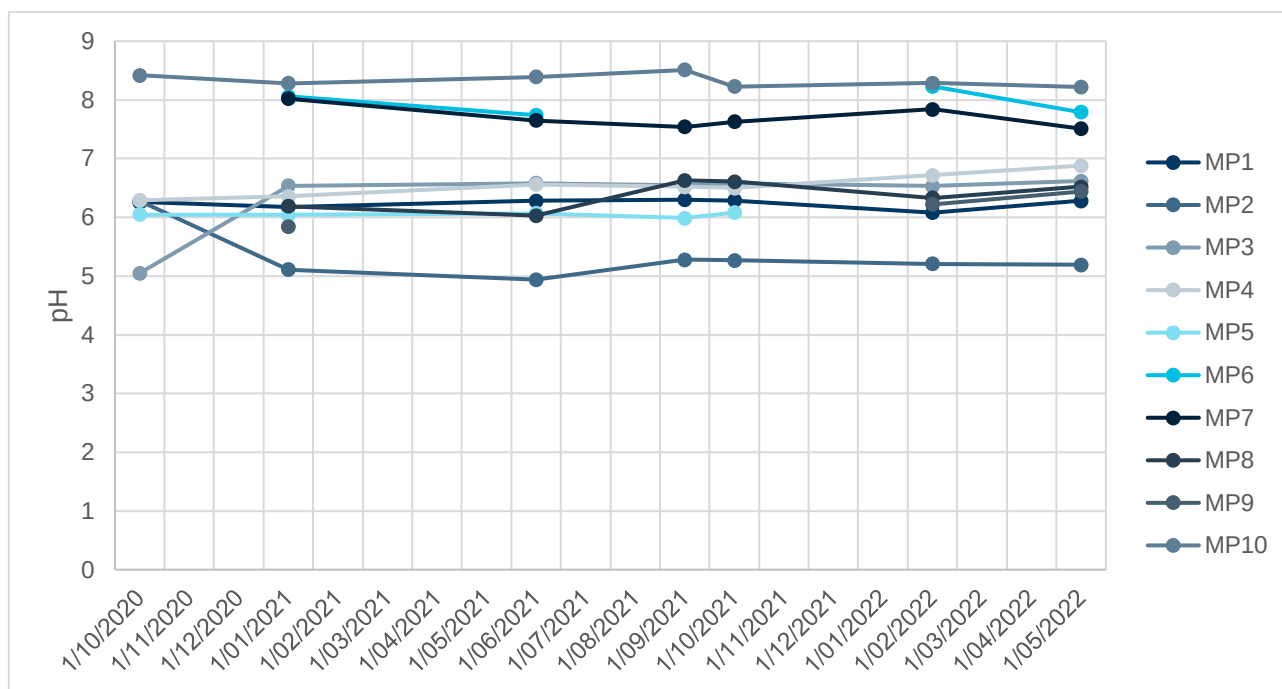
| Awaba Waste Management Facility         |       |      |                                        |             |  |  |  |      |  |  |  |  |       |  |  |  |     |  |  |  |  |      |  |  |  |  |
|-----------------------------------------|-------|------|----------------------------------------|-------------|--|--|--|------|--|--|--|--|-------|--|--|--|-----|--|--|--|--|------|--|--|--|--|
| Analyte                                 | Units | LOR  | ANZECC 95%<br>fresh water<br>guideline | Groundwater |  |  |  |      |  |  |  |  |       |  |  |  |     |  |  |  |  |      |  |  |  |  |
| Phenanthrene                            | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Anthracene                              | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Fluoranthene                            | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Pyrene                                  | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Benz(a)anthracene                       | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Chrysene                                | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Benzo(b)fluoranthene                    | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Benzo(k)fluoranthene                    | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Benzo(a)pyrene                          | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Indeno(1,2,3-cd)pyrene                  | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Dibenz(a,h)anthracene                   | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Benzo(g,h,i)perylene                    | µg/L  | 1    | 1                                      | <1.0        |  |  |  | 1    |  |  |  |  | <1.0  |  |  |  | 1   |  |  |  |  | <1.0 |  |  |  |  |
| Sum of polycyclic aromatic hydrocarbons | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Benzo(a)pyrene TEQ (zero)               | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Organophosphorus Pesticides (OP)        |       |      |                                        |             |  |  |  |      |  |  |  |  |       |  |  |  |     |  |  |  |  |      |  |  |  |  |
| Dichlorvos                              | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Demeton-S-methyl                        | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Monocrotophos                           | µg/L  | 2    | 2                                      | <2.0        |  |  |  | 2    |  |  |  |  | <2.0  |  |  |  | 2   |  |  |  |  | <2.0 |  |  |  |  |
| Dimethoate                              | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Diazinon                                | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Chlorpyrifos -methyl                    | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Parathion-methyl                        | µg/L  | 2    | 2                                      | <2.0        |  |  |  | 2    |  |  |  |  | <2.0  |  |  |  | 2   |  |  |  |  | <2.0 |  |  |  |  |
| Malathion                               | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Fenthion                                | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Chlorpyrifos                            | µg/L  | 0.5  | 0.01                                   | 0.5         |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Parathion                               | µg/L  | 2    | 0.004                                  | 2           |  |  |  | 2    |  |  |  |  | <2.0  |  |  |  | 2   |  |  |  |  | <2.0 |  |  |  |  |
| Phospho-ethyl                           | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Chlorfenvinphos                         | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Bromophos-ethyl                         | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Fenamiphos                              | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Prothios                                | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Ethion                                  | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Carbophenothion                         | µg/L  | 0.5  | 0.5                                    | <0.5        |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Azinphos Methyl                         | µg/L  | 0.5  | 0.02                                   | 0.5         |  |  |  | 0.5  |  |  |  |  | <0.5  |  |  |  | 0.5 |  |  |  |  | <0.5 |  |  |  |  |
| Hexavalent Chromium                     | mg/L  | 0.01 | 0.001                                  | 0.01        |  |  |  | 0.01 |  |  |  |  | <0.01 |  |  |  | 0.1 |  |  |  |  | <0.1 |  |  |  |  |
| Halogenated Aromatic Compounds          |       |      |                                        |             |  |  |  |      |  |  |  |  |       |  |  |  |     |  |  |  |  |      |  |  |  |  |
| Chlorobenzene                           | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Bromobenzene                            | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 2-Chlorotoluene                         | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 4-Chlorotoluene                         | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,3-Dichlorobenzene                     | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,4-Dichlorobenzene                     | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,2-Dichlorobenzene                     | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,2,4-Trichlorobenzene                  | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,2,3-Trichlorobenzene                  | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Trihalomethanes                         |       |      |                                        |             |  |  |  |      |  |  |  |  |       |  |  |  |     |  |  |  |  |      |  |  |  |  |
| Chloroform                              | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Bromodichloromethane                    | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Dibromochloromethane                    | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Bromoform                               | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Halogenated Aliphatic Compounds         |       |      |                                        |             |  |  |  |      |  |  |  |  |       |  |  |  |     |  |  |  |  |      |  |  |  |  |
| Dichlorodifluoromethane                 | µg/L  | 50   | 50                                     | <50         |  |  |  | 50   |  |  |  |  | <50   |  |  |  | 50  |  |  |  |  | <50  |  |  |  |  |
| Chloromethane                           | µg/L  | 50   | 50                                     | <50         |  |  |  | 50   |  |  |  |  | <50   |  |  |  | 50  |  |  |  |  | <50  |  |  |  |  |
| Vinyl chloride                          | µg/L  | 50   | 50                                     | <50         |  |  |  | 50   |  |  |  |  | <50   |  |  |  | 50  |  |  |  |  | <50  |  |  |  |  |
| Bromomethane                            | µg/L  | 50   | 50                                     | <50         |  |  |  | 50   |  |  |  |  | <50   |  |  |  | 50  |  |  |  |  | <50  |  |  |  |  |
| Chloroethane                            | µg/L  | 50   | 50                                     | <50         |  |  |  | 50   |  |  |  |  | <50   |  |  |  | 50  |  |  |  |  | <50  |  |  |  |  |
| Trichlorofluoromethane                  | µg/L  | 50   | 50                                     | <50         |  |  |  | 50   |  |  |  |  | <50   |  |  |  | 50  |  |  |  |  | <50  |  |  |  |  |
| 1,1-Dichloroethene                      | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Iodomethane                             | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| trans-1,2-Dichloroethene                | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,1-Dichloroethane                      | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| cis-1,2-Dichloroethane                  | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,1,1-Trichloroethane                   | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,1-Dichloropropylene                   | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Carbon Tetrachloride                    | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,2-Dichloroethane                      | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Trichloroethene                         | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Dibromomethane                          | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,1,2-Trichloroethane                   | µg/L  | 5    | 6500                                   | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,3-Dichloropropane                     | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| Tetrachloroethane                       | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| 1,1,1,2-Tetrachloroethane               | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  | <5   |  |  |  |  |
| trans-1,4-Dichloro-2-butene             | µg/L  | 5    | 5                                      | <5          |  |  |  | 5    |  |  |  |  | <5    |  |  |  | 5   |  |  |  |  |      |  |  |  |  |

| Surface water |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            | Leachate   |            |            |            |            |            |            |
|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| MP6           |            |            |            |            |            | MP7        |            |            |            |            |            | MP8        |            |            |            |            |            | MP9        |            |            |            |            |            | MP10       |            |            |            |            |            |            |            |            |            |            |
| 12/10/2020    | 22/03/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 22/03/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 20/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 | 12/10/2020 | 22/01/2021 | 30/06/2021 | 30/09/2021 | 12/10/2021 | 16/02/2022 | 27/05/2022 |
| Site dry      |            |            | Site dry   | Site dry   |            |            | Site Dry   |            |            |            |            |            |            | Site Dry   |            |            |            |            |            |            | Site Dry   |            | Site dry   | Site dry   | Site dry   |            |            |            |            |            |            |            |            |            |
|               | 8.06       | 7.74       |            |            | 8.23       | 7.79       |            | 8.02       | 7.65       | 7.54       | 7.63       | 7.84       | 7.51       |            | 6.19       | 6.03       | 6.63       | 6.61       | 6.33       | 6.52       |            | 5.84       |            |            |            | 6.22       | 6.44       | 8.42       | 8.28       | 8.39       | 8.51       | 8.23       | 8.29       | 8.22       |
|               | 510        | 382        |            |            | 447        | 487        |            | 439        | 765        | 519        | 426        | 379        | 473        |            | 238        | 198        | 211        | 150        | 192        | 153        |            | 425        |            |            |            | 277        | 192        |            |            |            | 44         | 106        | 53         | 22         |
|               | 60         | 24         |            |            | 7          | 19         |            | 224        | 22         | 6          | 70         | 31         | 211        |            | 12         | 94         | 30         | 29         | 60         | <5         |            | 5          |            |            |            | 10         | 6          | 82         | 55         | 33         |            |            |            |            |
|               | 320        |            |            |            |            |            |            | 402        |            |            | 254.00     |            |            |            |            |            |            | 134        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 1          | 1          |            |            | <1         | <1         |            | 1          | 1          | <1         | <1         | <1         | <1         |            | 1          | 1          | <1         | <1         | <1         | <1         |            | 1          |            |            |            | <1         | <1         | 1          | 1          | 1          | <1         | <1         | <1         | <1         |
|               | 1          | 1          |            |            | <1         | <1         |            | 1          | 1          | <1         | <1         | <1         | <1         |            | 1          | 1          | <1         | <1         | <1         | <1         |            | 1          |            |            |            | <1         | <1         | 1          | 1          | 1          | 161        | <1         | <1         | <1         |
|               | 193        | 118        |            |            | 121        | 135        |            | 144        | 198        | 119        | 103        | 119        | 145        |            | 23         | 23         | 24         | 39         | 30         | 14         |            | 17         |            |            |            | 22         | 13         | 4470       | 2960       | 4800       | 2840       | 2910       | 3460       | 3550       |
|               | 193        | 118        |            |            | 121        | 135        |            | 144        | 198        | 119        | 103        | 119        | 145        |            | 23         | 23         | 24         | 39         | 30         | 14         |            | 17         |            |            |            | 22         | 13         | 4470       | 2960       | 4800       | 3000       | 2910       | 3460       | 3550       |
|               | 31         | 18         |            |            | 28         | 20         |            | 19         | 30         | 34         | 26         | 15         | 13         |            | 10         | 10         | 13         | 14         | <1         | 8          |            | 9          |            |            | 12         | 12         | 10         | 22         | 1          | <10        | <10        | 19         | <100       |            |
|               | 29         | 39         |            |            | 74         | 48         |            | 36         | 96         | 68         | 53         | 26         | 40         |            | 57         | 42         | 38         | 22         | 34         | 32         |            | 123        |            |            | 63         | 41         | 2500       | 1970       | 189        | 1730       | 1520       | 1530       | 1260       |            |
|               | 36         | 17         |            |            | 19         | 23         |            | 20         | 35         | 29         | 18         | 26         | 30         |            | 4          | 3          | 6          | 7          | 4          | 3          |            | 6          |            |            | 4          | 3          | 110        | 73         | 68         | 78         | 51         | 107        | 82         |            |
|               | 14         | 10         |            |            | 13         | 14         |            | 11         | 17         | 12         | 8          | 11         | 13         |            | 5          | 4          | 4          | 4          | 4          | 4          |            | 10         |            |            | 6          | 4          | 105        | 69         | 69         | 63         | 46         | 79         | 58         |            |
|               | 33         | 37         |            |            | 54         | 42         |            | 38         | 76         | 49         | 34         | 29         | 34         |            | 32         | 26         | 20         | 13         | 22         | 19         |            | 55         |            |            | 35         | 25         | 1710       | 1190       | 1320       | 1030       | 779        | 1140       | 903        |            |
|               | 18         | 20         |            |            | 22         | 24         |            | 25         | 26         | 21         | 9          | 11         | 13         |            | 3          | 2          | 2          | 2          | 2          | 2          |            | 4          |            |            | 3          | 3          | 761        | 521        | 571        | 436        | 330        | 436        | 393        |            |
|               | 0.0013     | 0.0006     |            |            | 0.0374     | 0.102      |            | 0.0015     | 0.0715     | 0.0516     | 0.0009     | 0.126      | 0.393      |            | 0.128      | 0.0686     | 0.116      | 0.0373     | 0.178      | 0.068      |            | 0.054      |            |            |            | 0.176      | 0.031      | 0.464      | 0.372      | 0.388      | 0.408      | 0.266      | 0.592      | 0.476      |
|               | 0.088      | 0.172      |            |            | 2.20       | 2.97       |            | 0.223      | 0.112      | 0.056      | 0.039      | 0.55       | 3.46       |            | 0.876      | 0.397      | 0.192      | 0.203      | 4.8        | 1.46       |            | 0.073      |            |            |            | 1.14       | 1.67       | 9.18       | 6.92       | 7.82       | 7.42       | 8.39       | 7.46       | 7.58       |
|               | 0.2        | 0.2        |            |            | 0.2        | 0.2        |            | 0.2        | 0.2        | 0.2        | 0.2        | 0.3        | 0.2        |            | 0.1        | 0.1        | 0.2        | 0.1        | 0.3        | <0.1       |            | 0.1        |            |            |            | <0.1       | <0.1       | 0.8        | 0.6        | 0.6        | <0.1       | 0.5        | 0.5        | 0.4        |
|               | 3.83       | 0.04       |            |            | 0.02       | 0.08       |            | 1.12       | 3.43       | 0.47       | 0.35       | 1.21       | 2.45       |            | 0.04       | 0.04       | 0.06       | 0.03       | 0.02       | 0.02       |            | 0.02       |            |            |            | <0.01      | 0.01       | 1140       | 767        | 789        | 515        | 697        | 605        | 856        |
|               | 0.75       | 0.48       |            |            | <0.01      | 0.50       |            | 1.07       | 6.22       | 3.02       | 2.11       | 0.45       | 1.85       |            | 0.01       | 1.57       | 0.06       | 0.12       | 0.01       | 0.01       |            | 0.01       |            |            |            | 0.02       | <0.01      | 0.37       | 11.5       | 0.2        | <0.1       | 0.16       | <0.10      | <0.10      |
|               | 16         | 19         |            |            | 19         | 23         |            | 20         | 26         | 18         | 13         | 17         | 17         |            | 16         | 16         | 11         | 9          | 22         | 17         |            | 5          |            |            |            | 13         | 15         | 612        | 386        | 436        | 910        | 448        | 371        | 771        |
|               | 2          |            |            |            |            |            |            | 2          |            |            | 3          |            |            |            | --         |            |            | 5          |            |            |            |            |            |            |            |            | 33         | 139        | 23         | 56         | 104        | 53         | 97         |            |
|               | 0.05       | 0.05       |            |            | <0.05      | <0.05      |            | 0.05       | 0.05       | <0.05      | <0.05      | <0.05      | <0.05      |            | 0.05       | 0.05       | <0.05      | <0.05      | <0.05      | <0.05      |            | 0.05       |            |            |            | <0.05      | <0.05      | 0.05       | 0.05       | 0.05       | <0.05      | <0.05      | <0.05      | <0.05      |
|               | 0.02       |            |            |            |            |            |            | 0.04       |            |            | <0.01      |            |            |            |            |            |            | 0.05       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.003      |            |            |            |            |            |            | 0.004      |            |            | <0.001     |            |            |            |            |            |            | <0.001     |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.055      |            |            |            |            |            |            | 0.042      |            |            | 0.052      |            |            |            |            |            |            | 0.034      |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.0001     |            |            |            |            |            |            | 0.0001     |            |            | <0.0001    |            |            |            |            |            |            | <0.0001    |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.002      |            |            |            |            |            |            | 0.002      |            |            | <0.001     |            |            |            |            |            |            | <0.001     |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.001      |            |            |            |            |            |            | 0.001      |            |            | <0.001     |            |            |            |            |            |            | <0.001     |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.006      |            |            |            |            |            |            | 0.004      |            |            | 0.002      |            |            |            |            |            |            | 0.002      |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.001      |            |            |            |            |            |            | 0.001      |            |            | <0.001     |            |            |            |            |            |            | <0.001     |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.0001     |            |            |            |            |            |            | 0.0001     |            |            | <0.0001    |            |            |            |            |            |            | <0.001     |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.015      |            |            |            |            |            |            | 0.007      |            |            | <0.005     |            |            |            |            |            |            | 0.092      |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|               | 0.02       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |

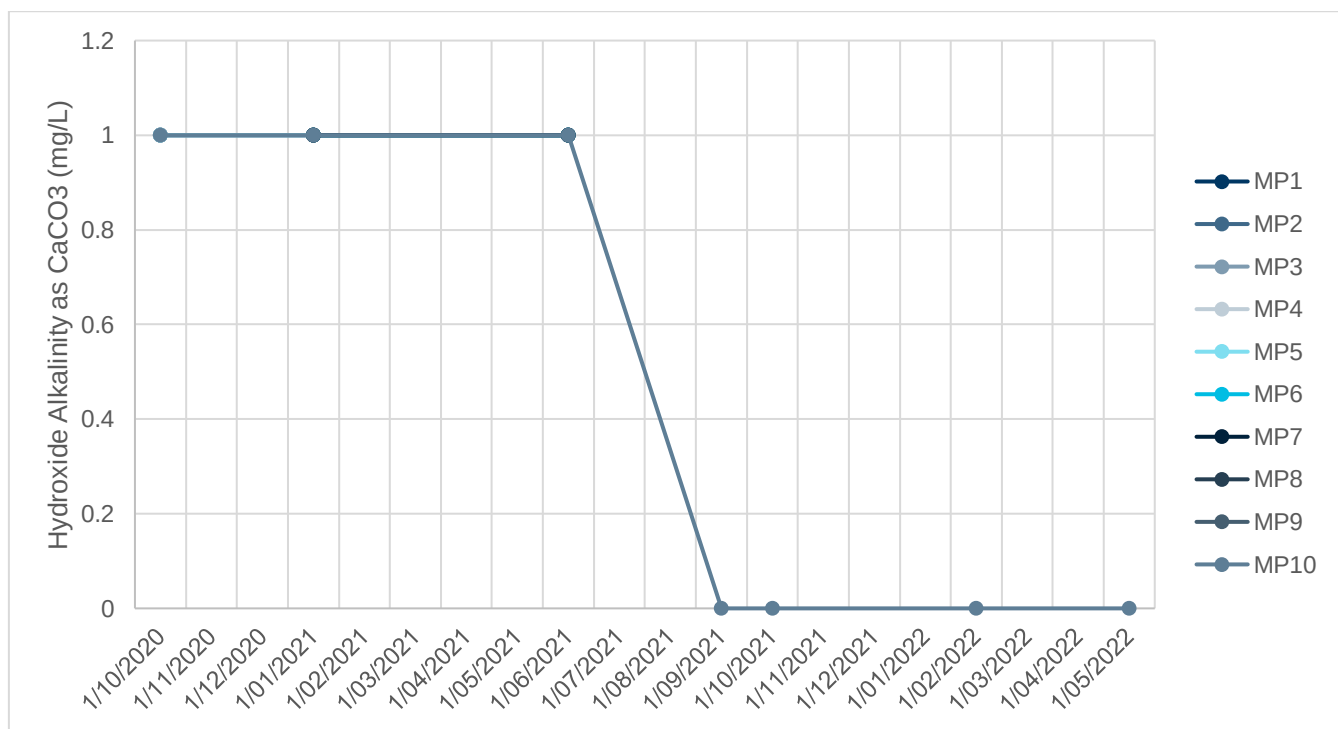
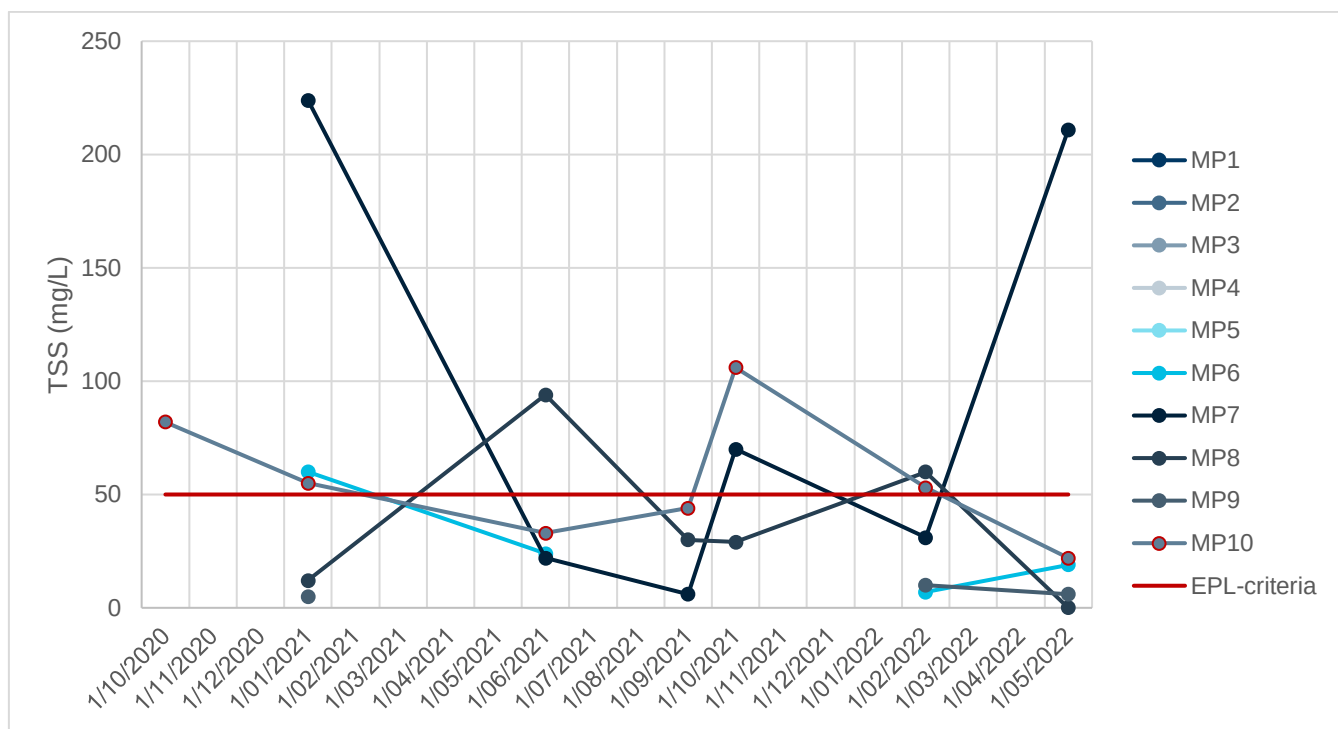


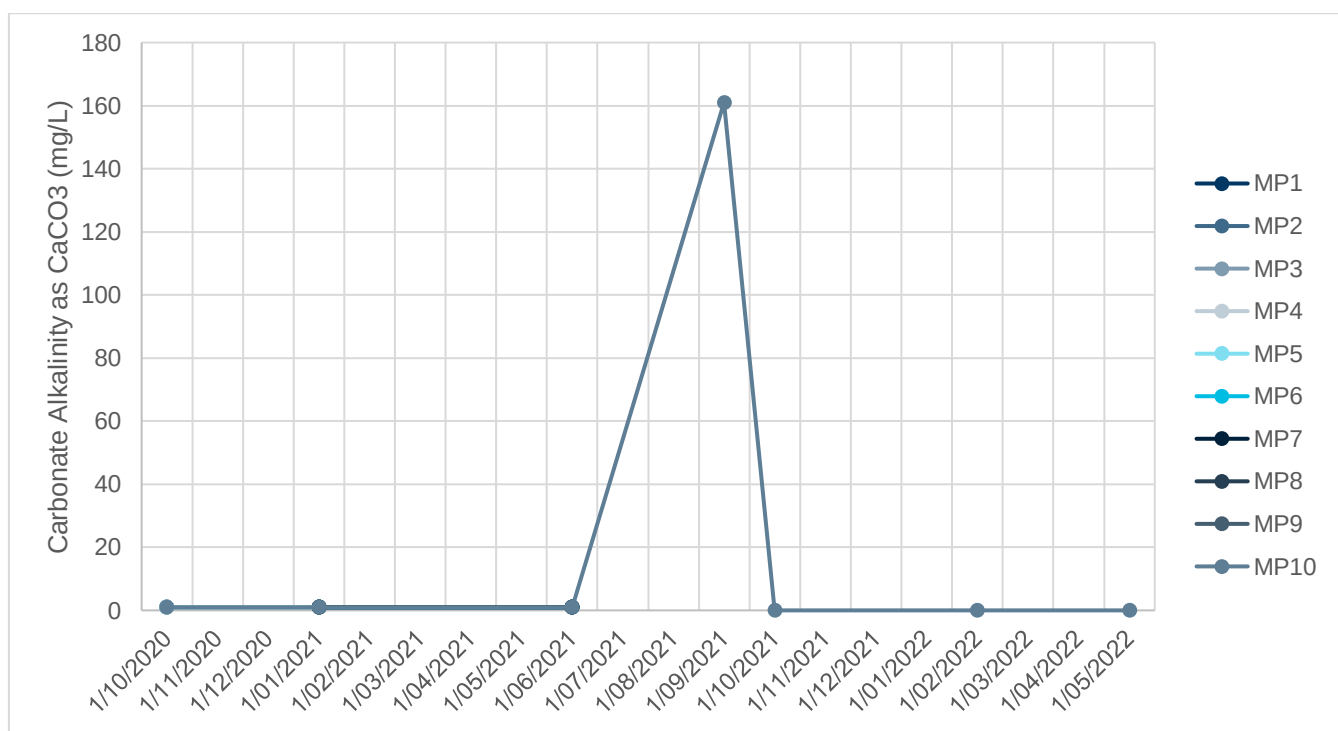
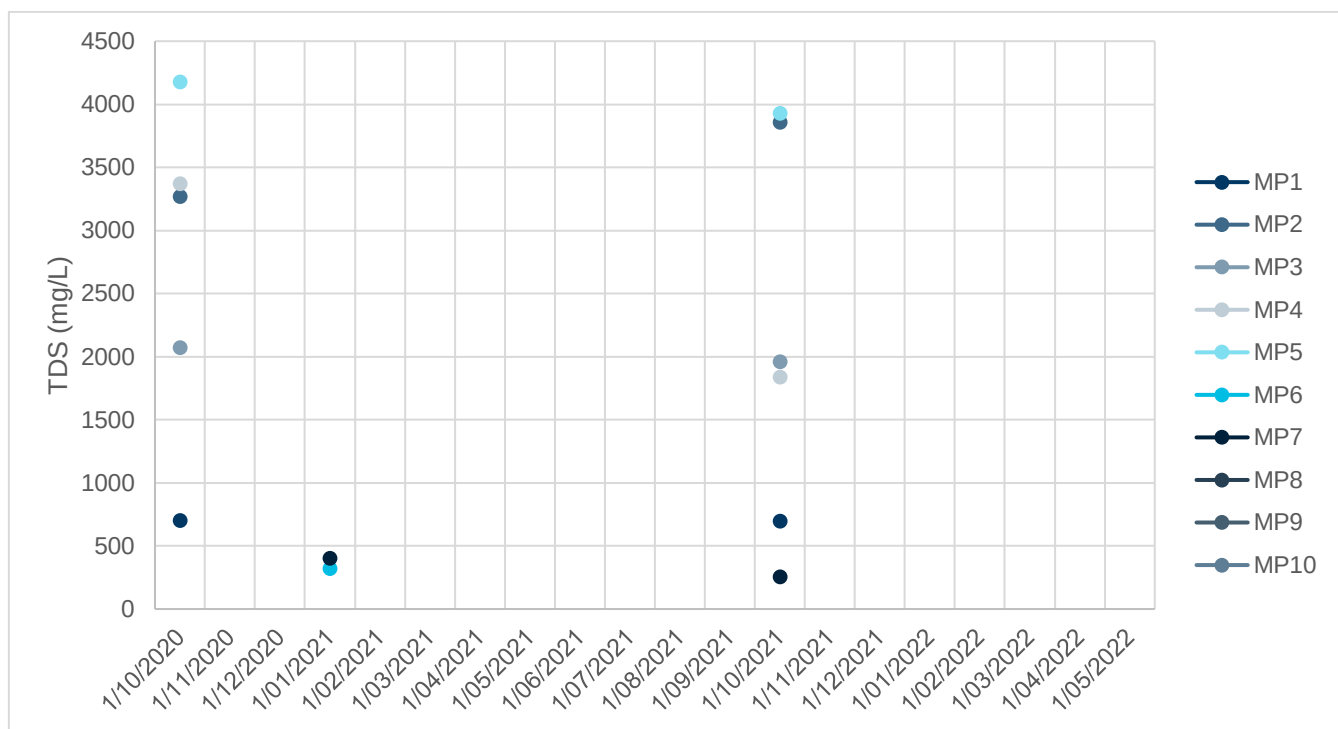
# **Appendix C**

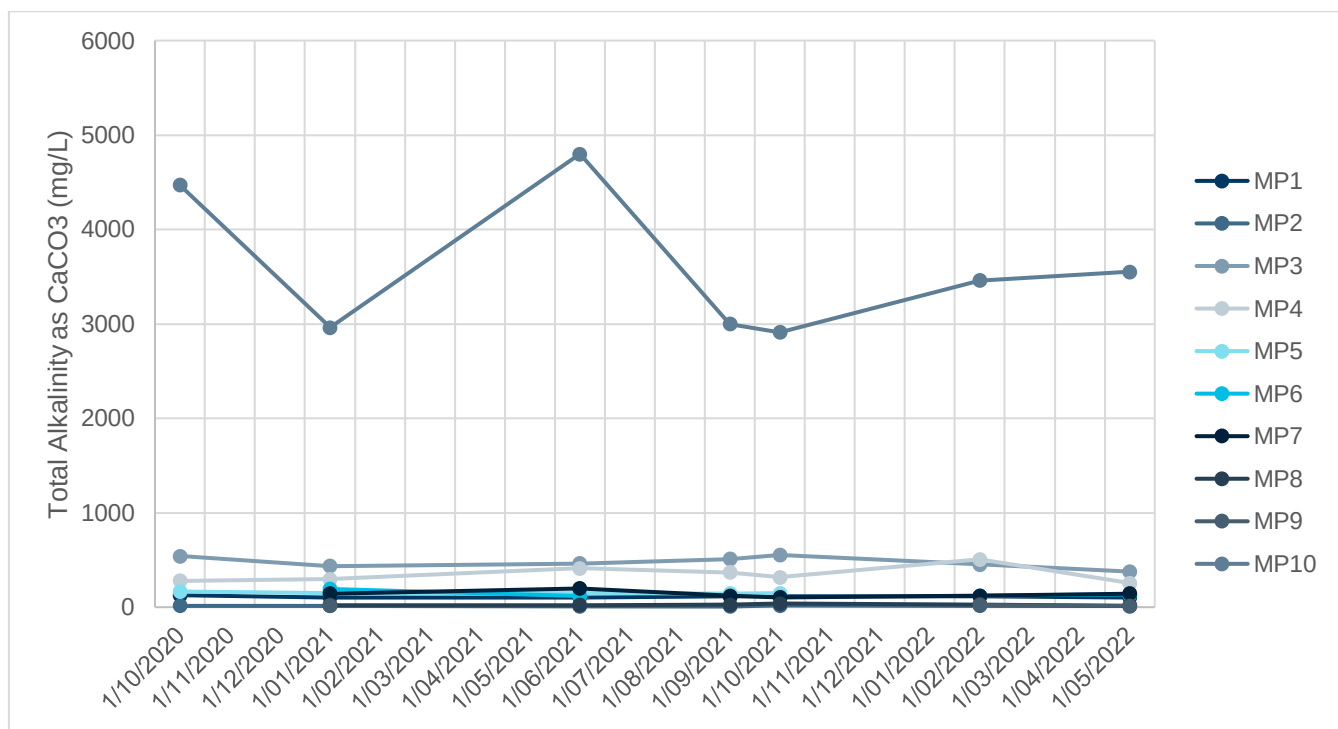
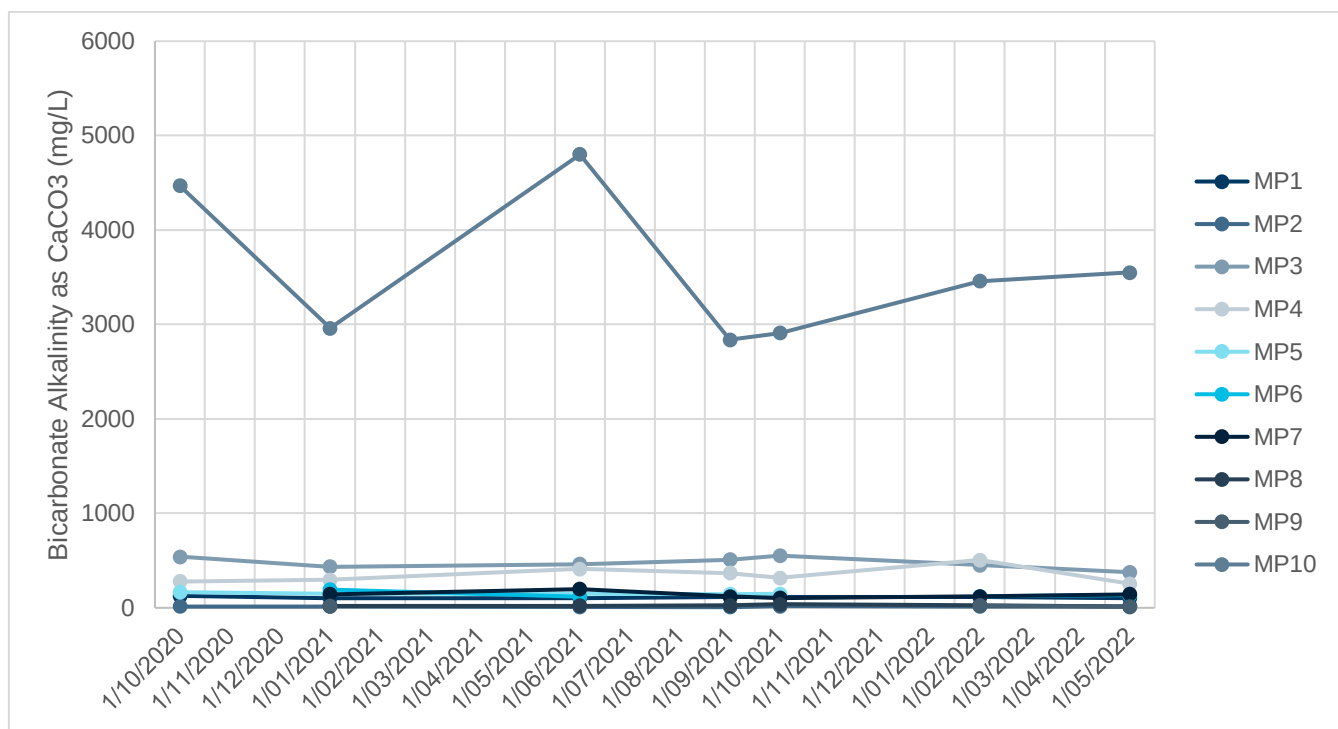
**Water quality monitoring charts**

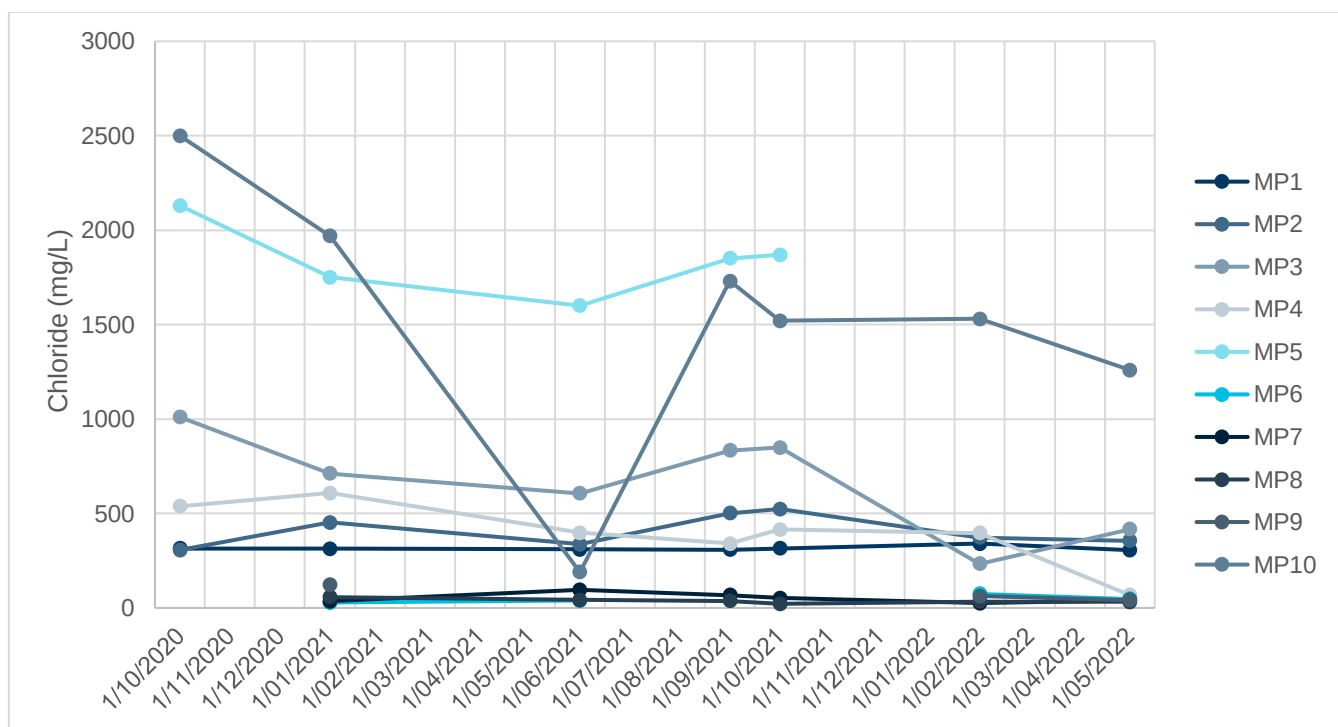
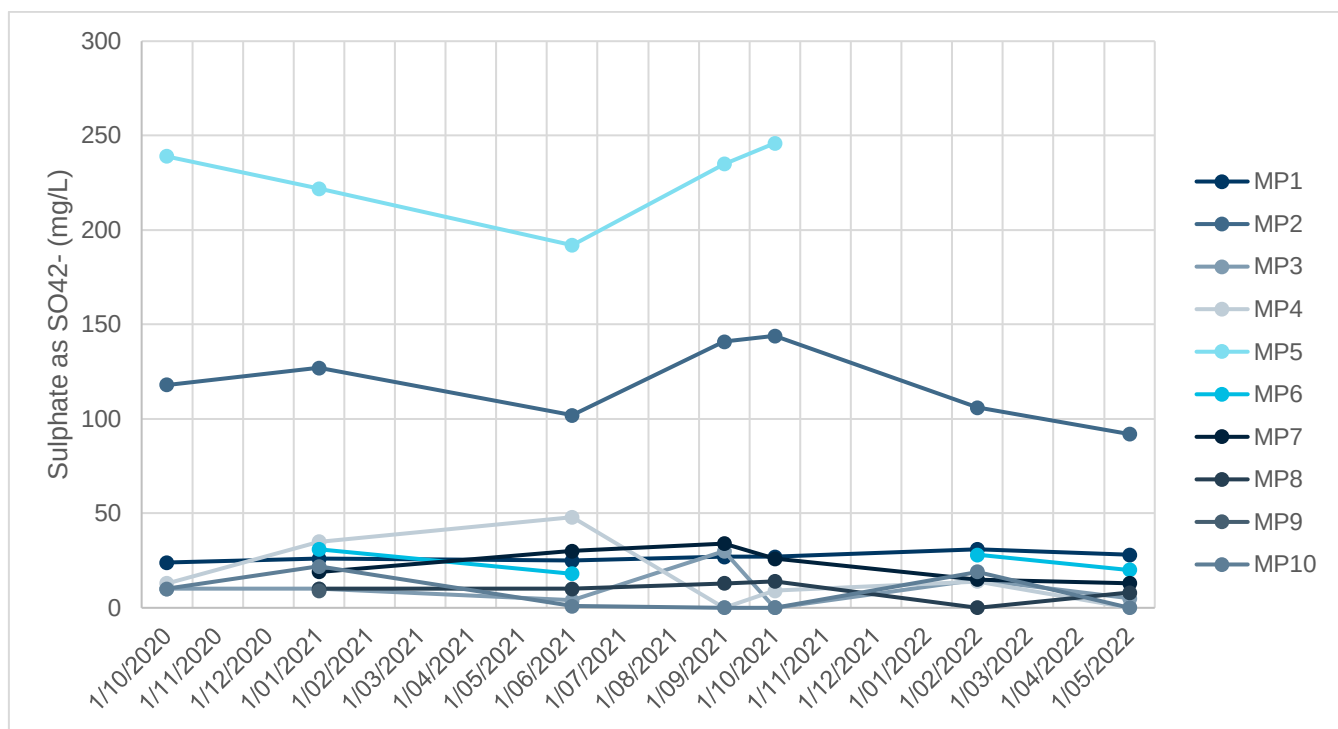


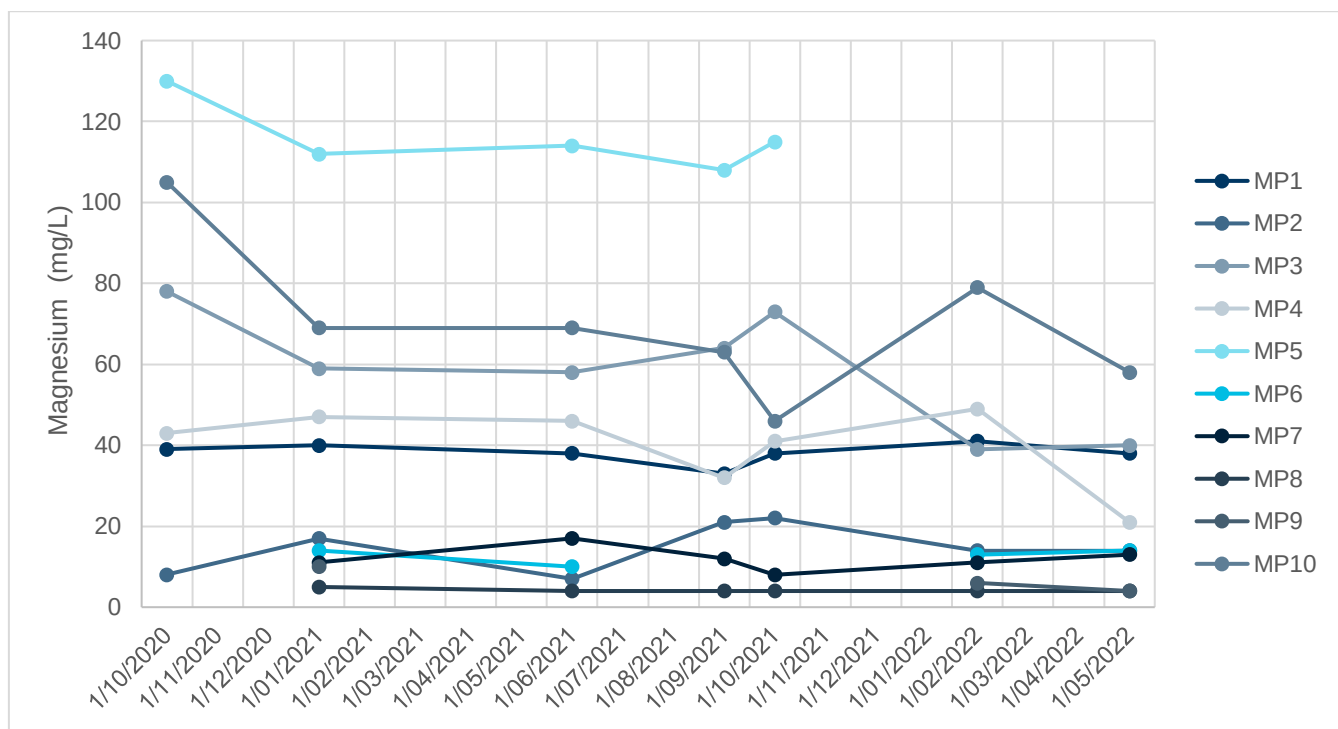
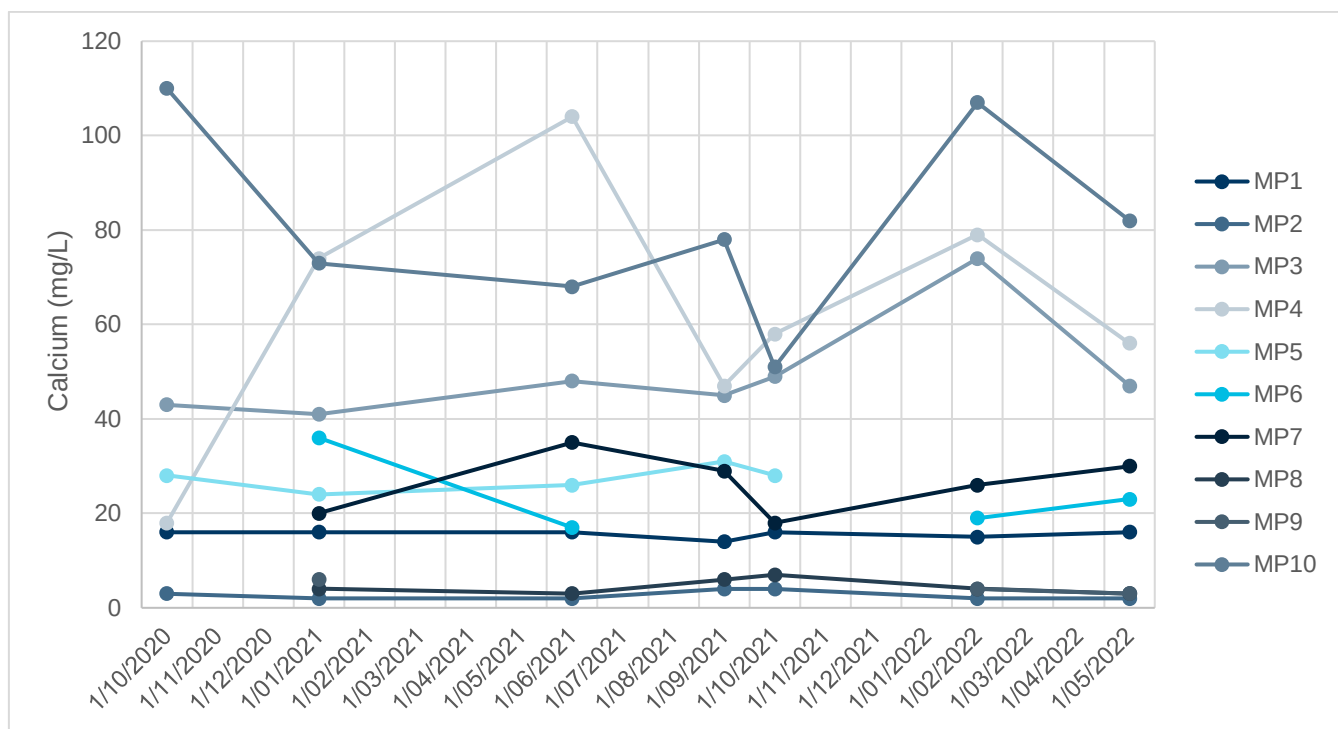


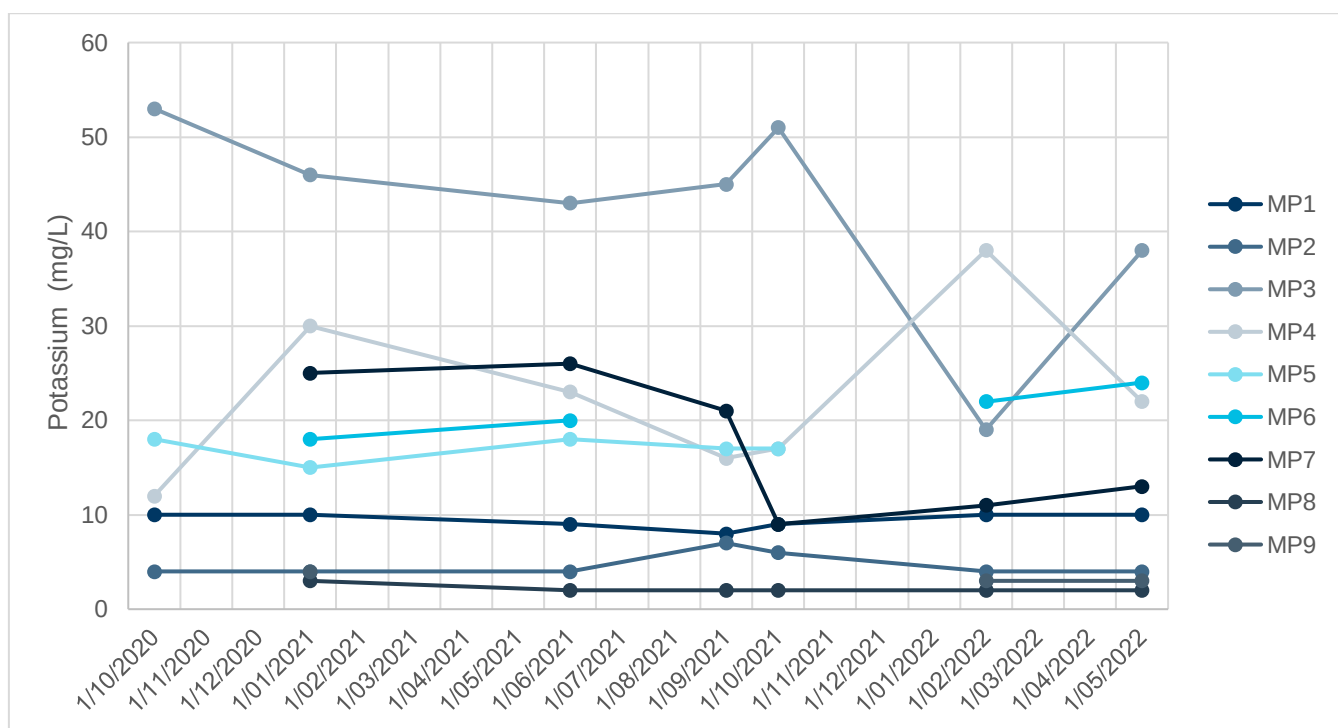
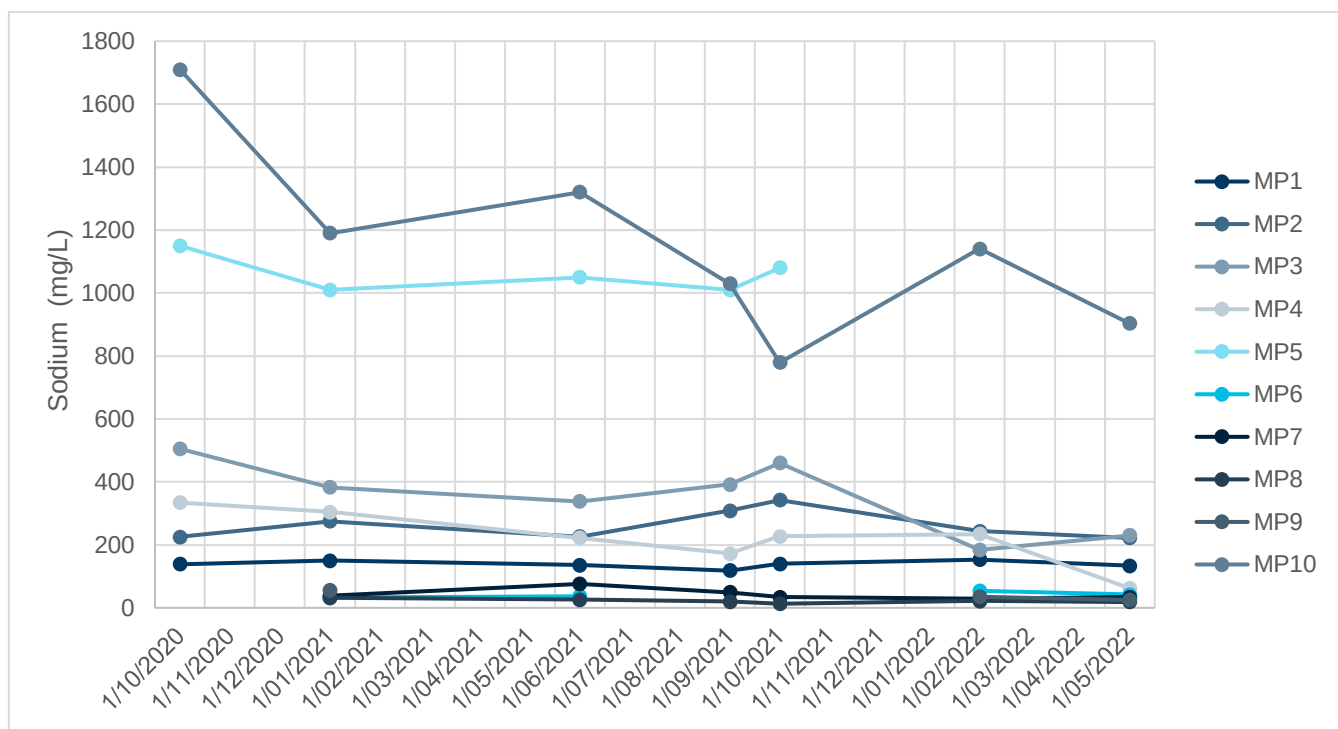


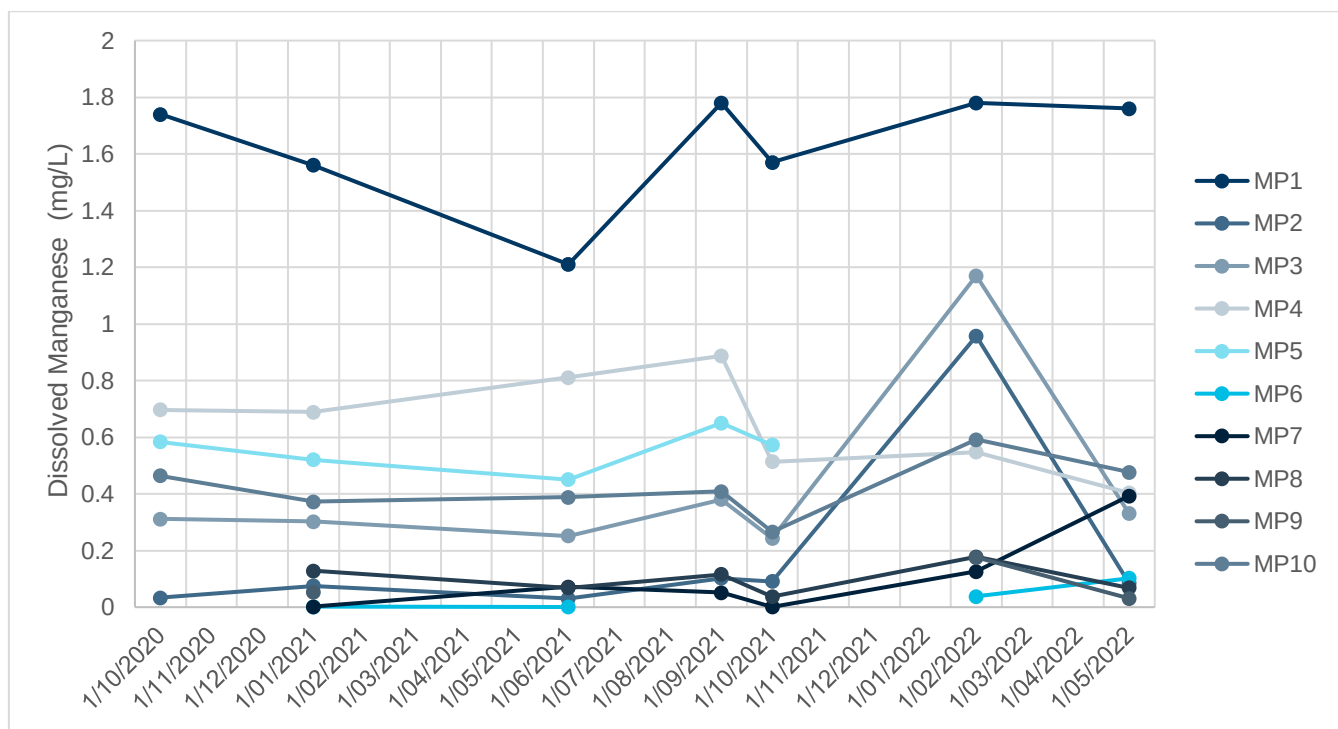
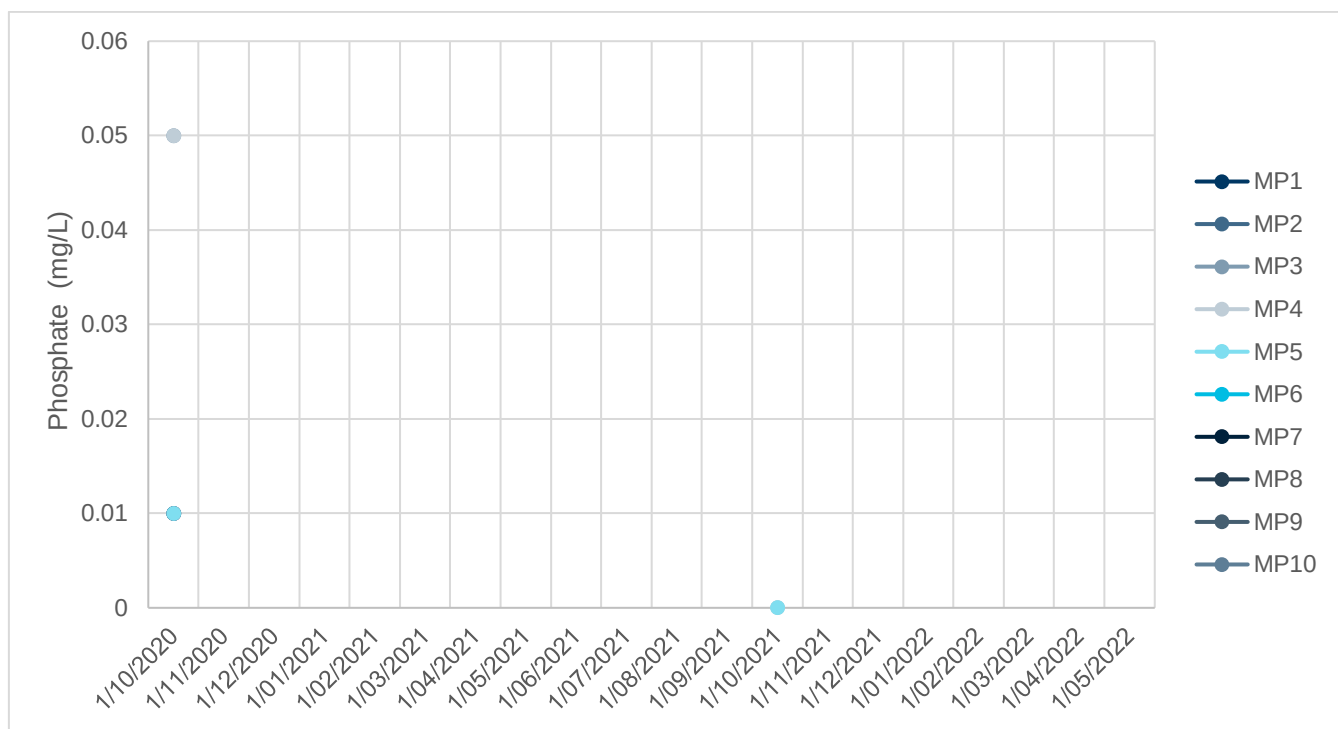


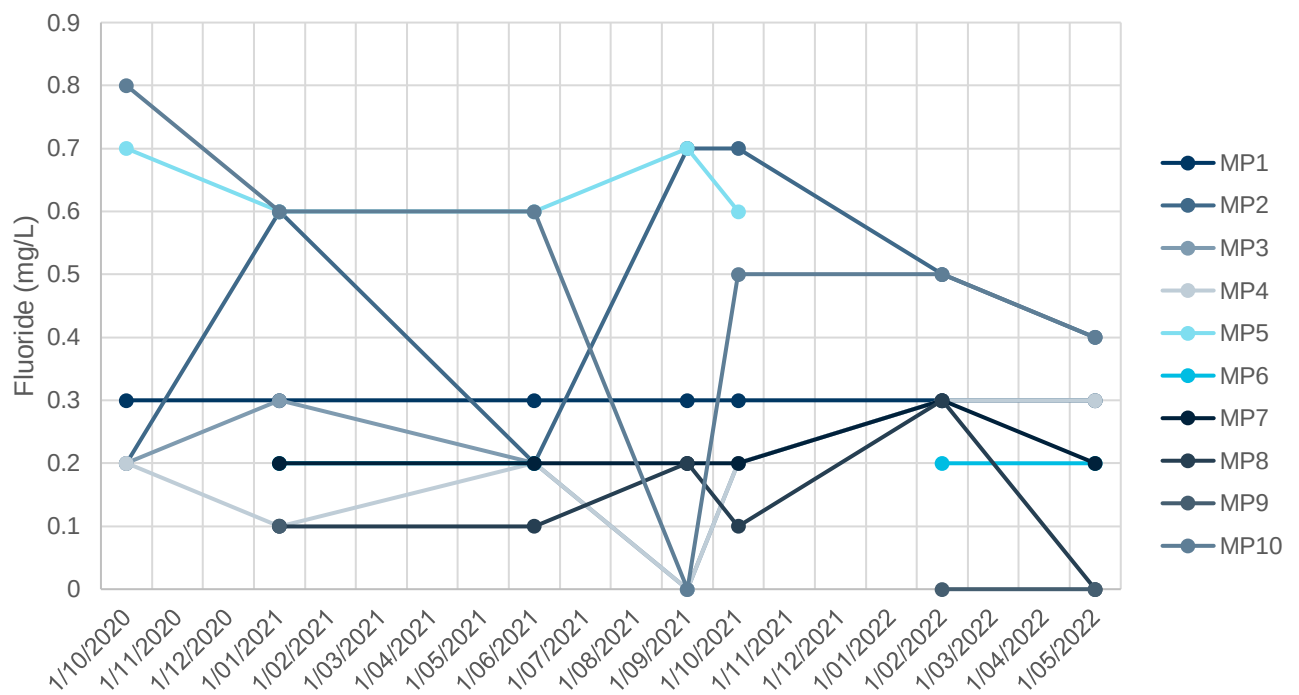
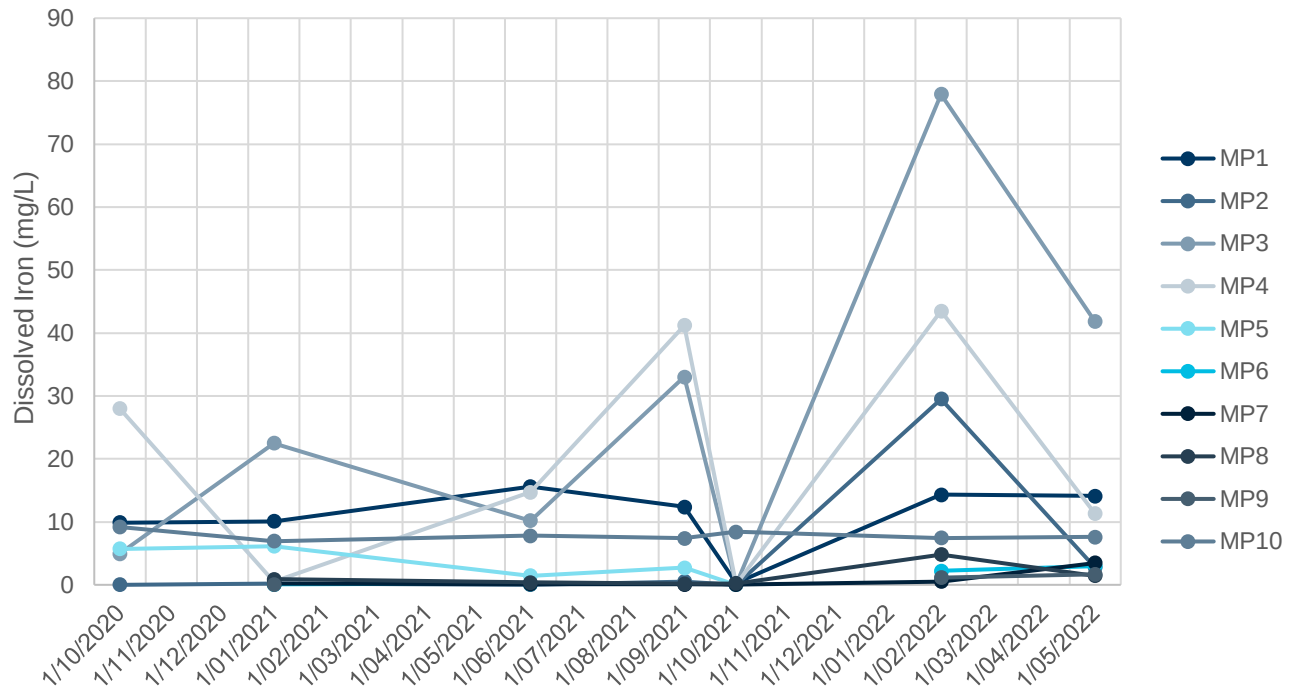




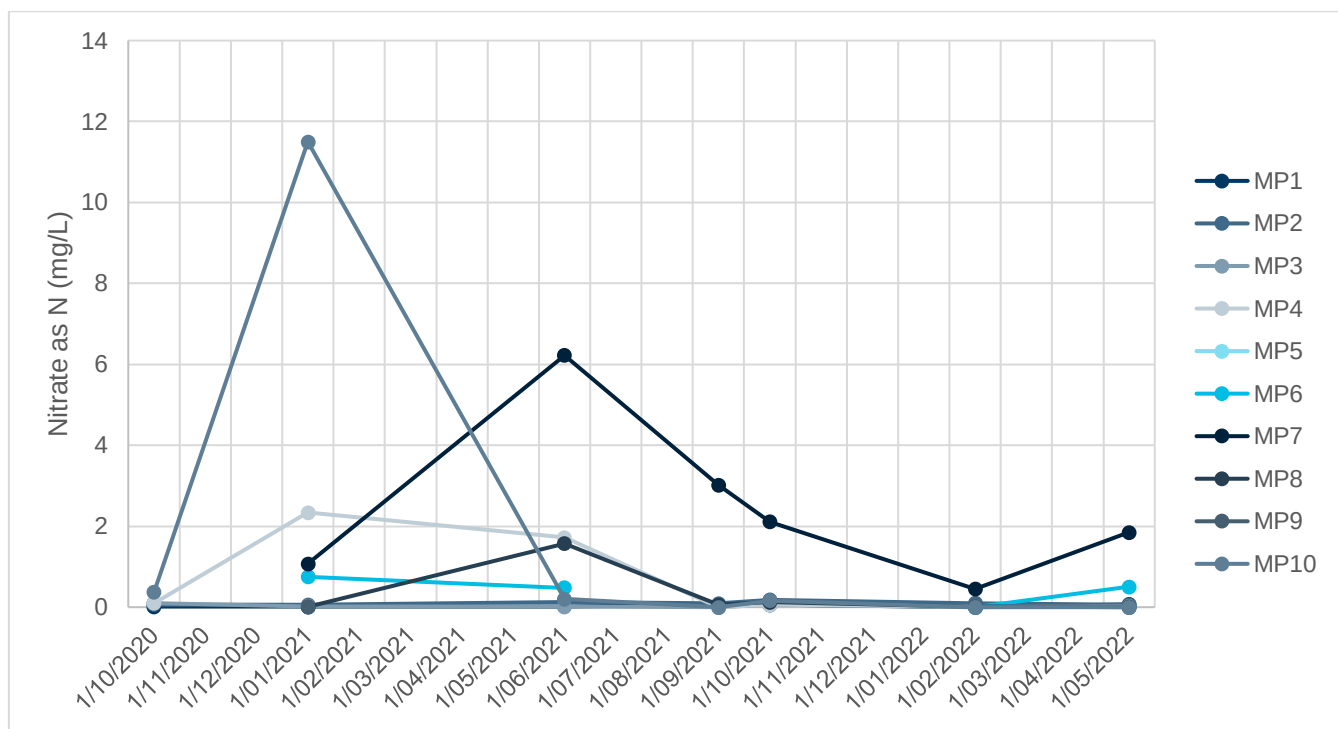
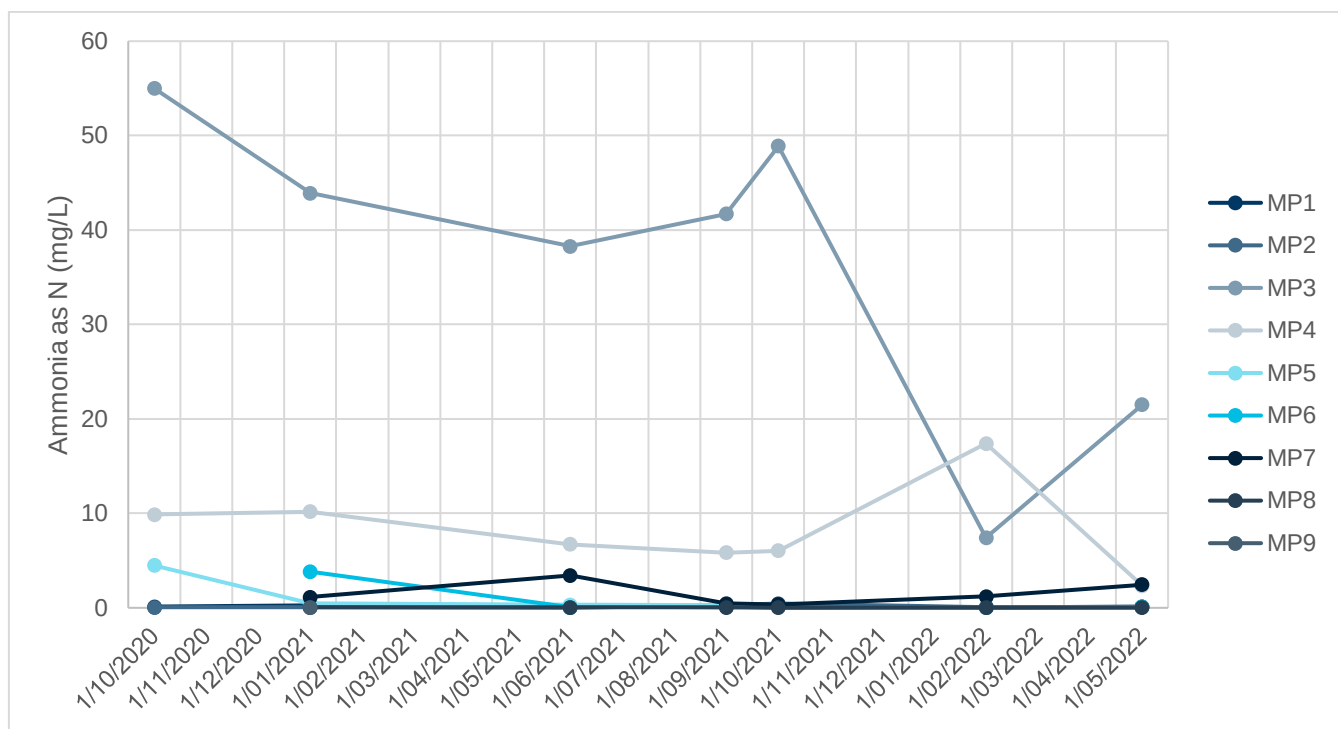


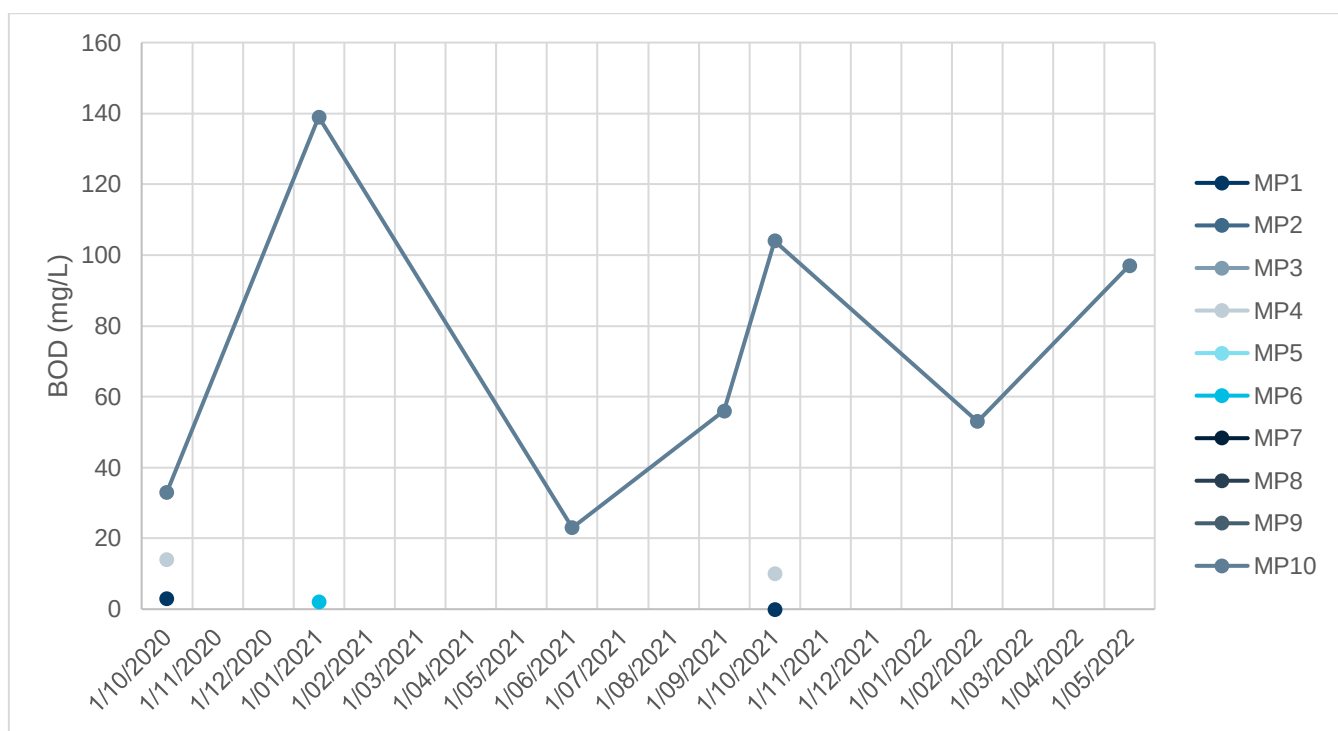
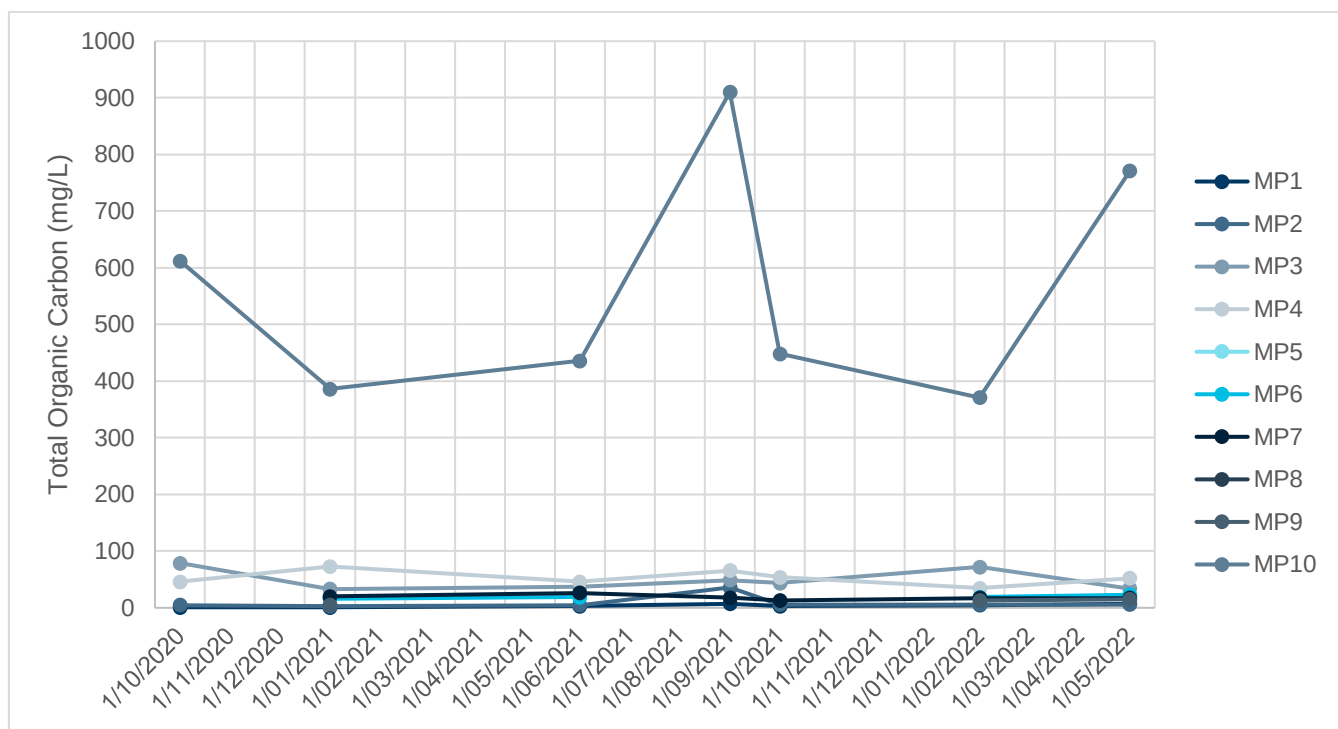


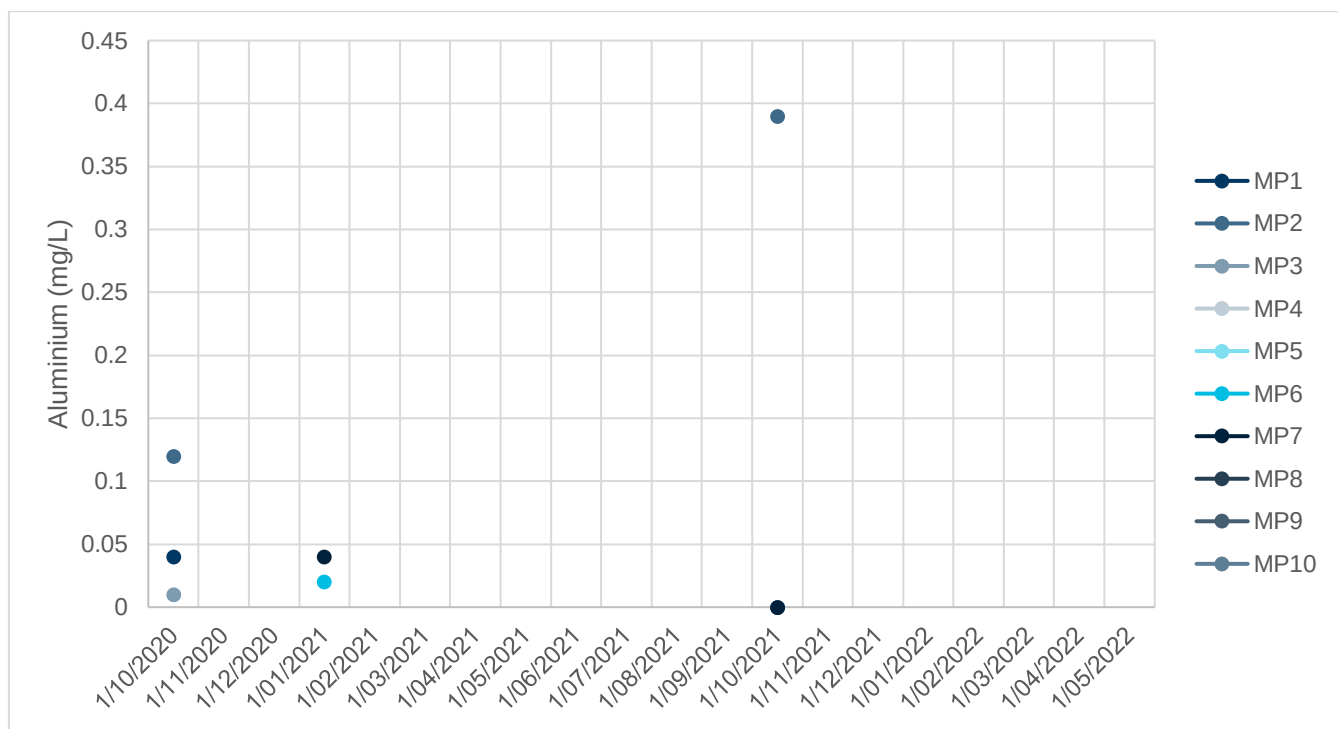
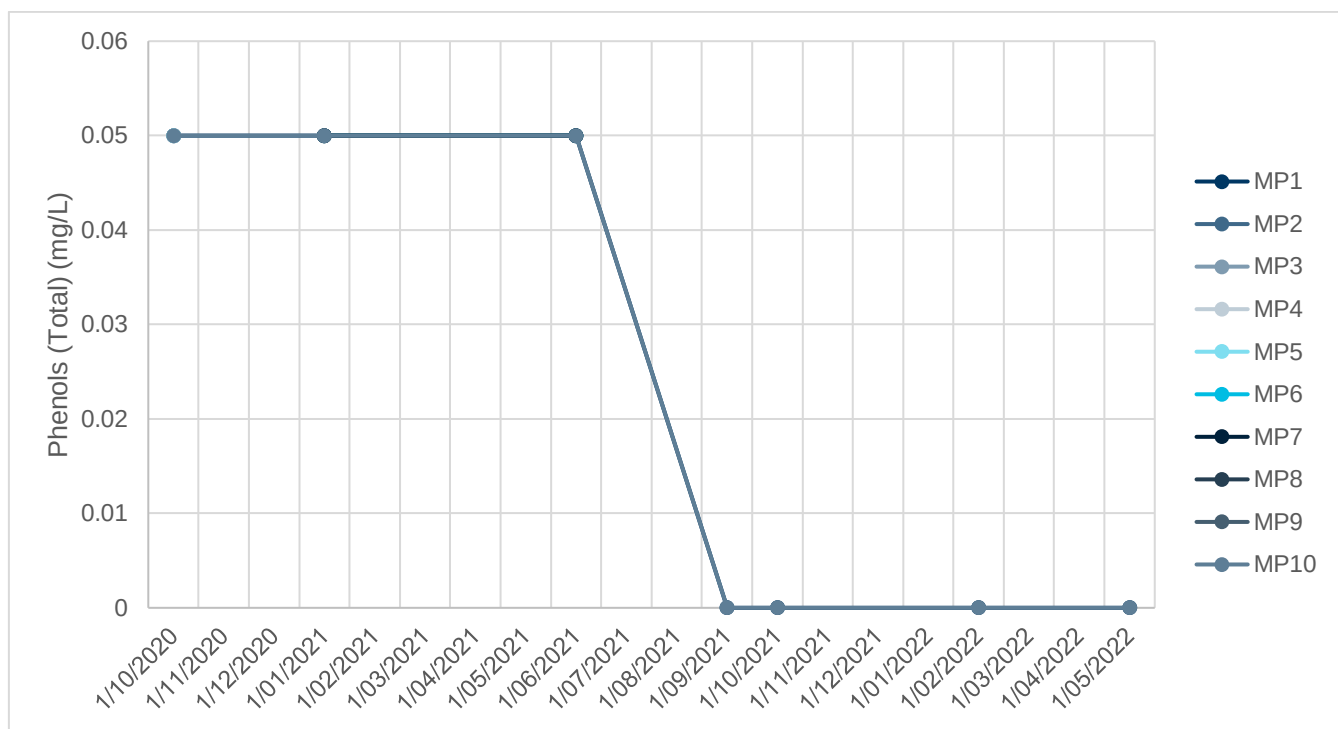


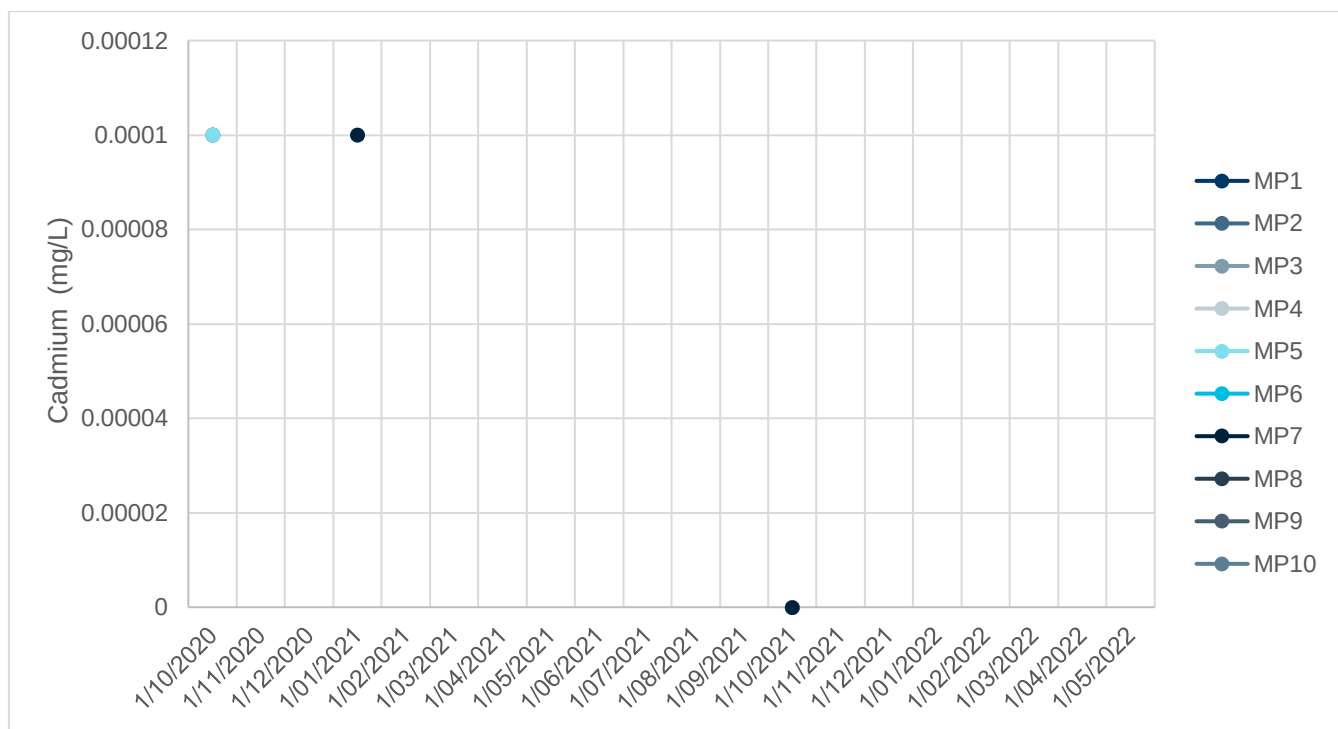
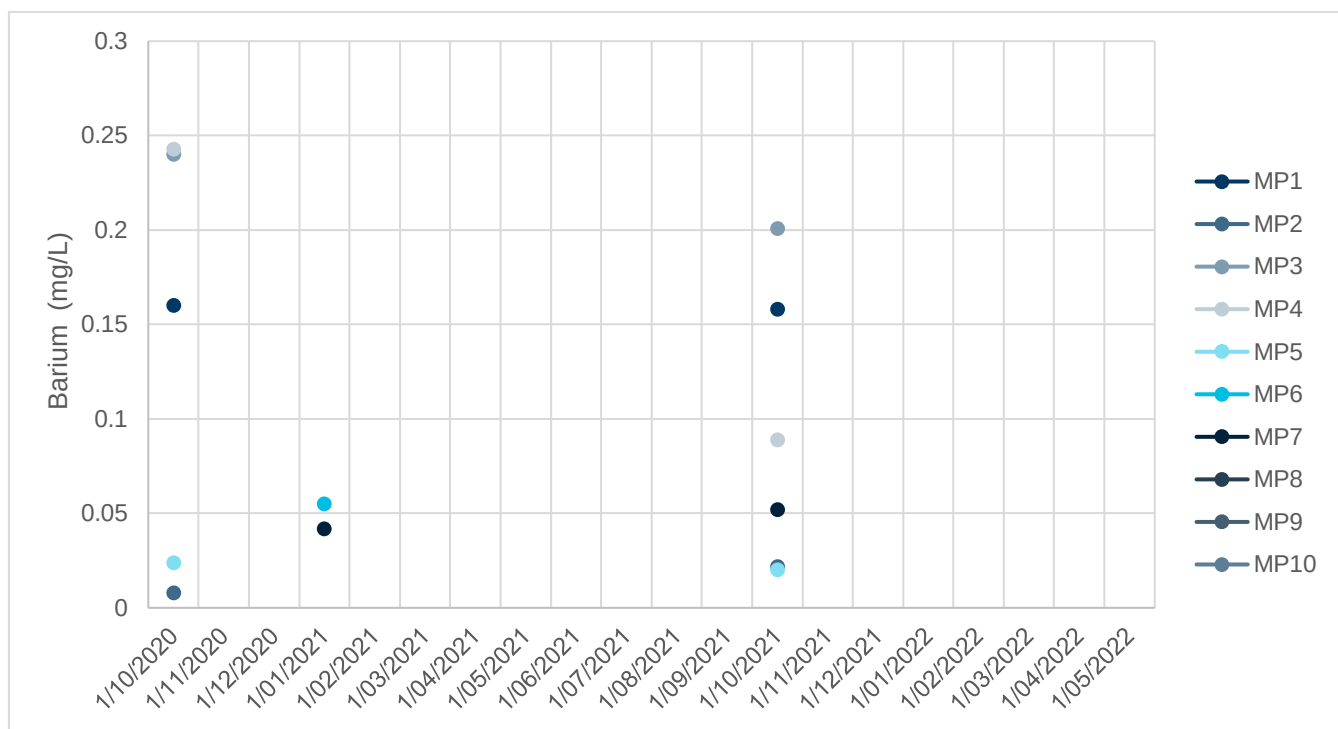


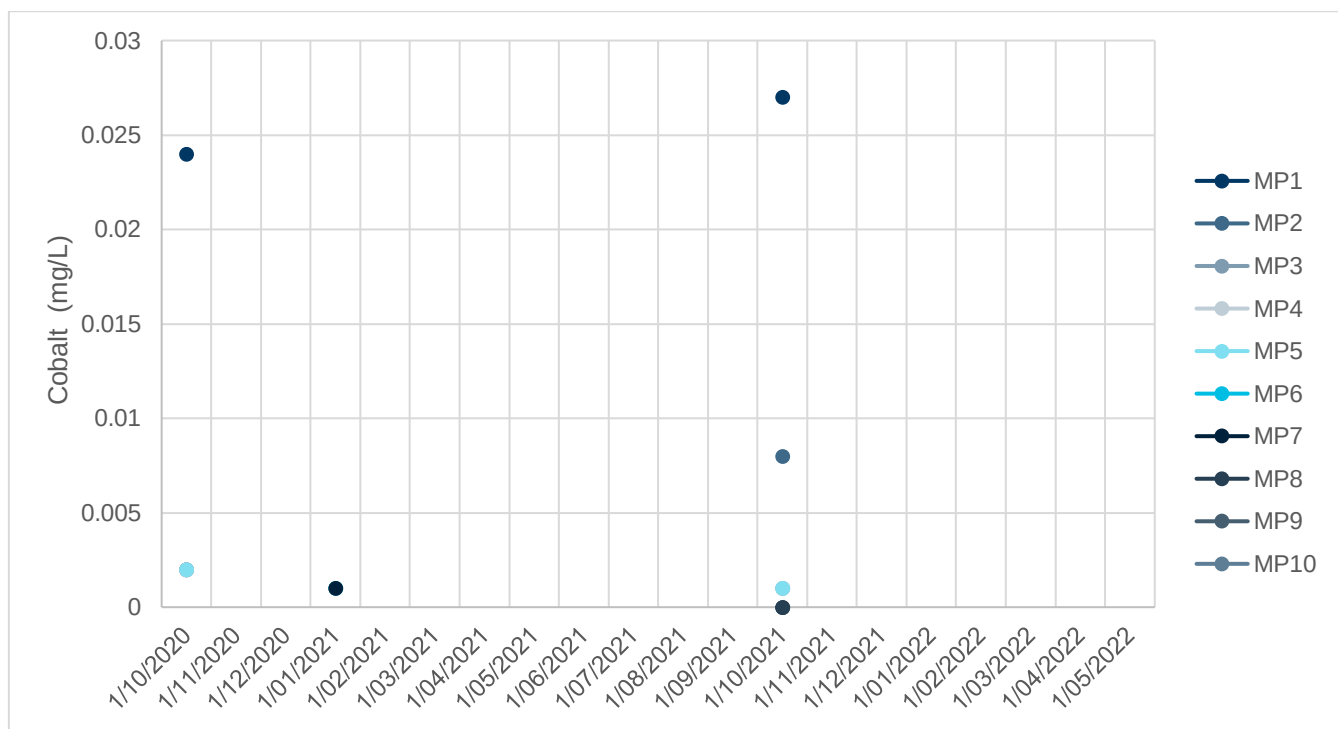
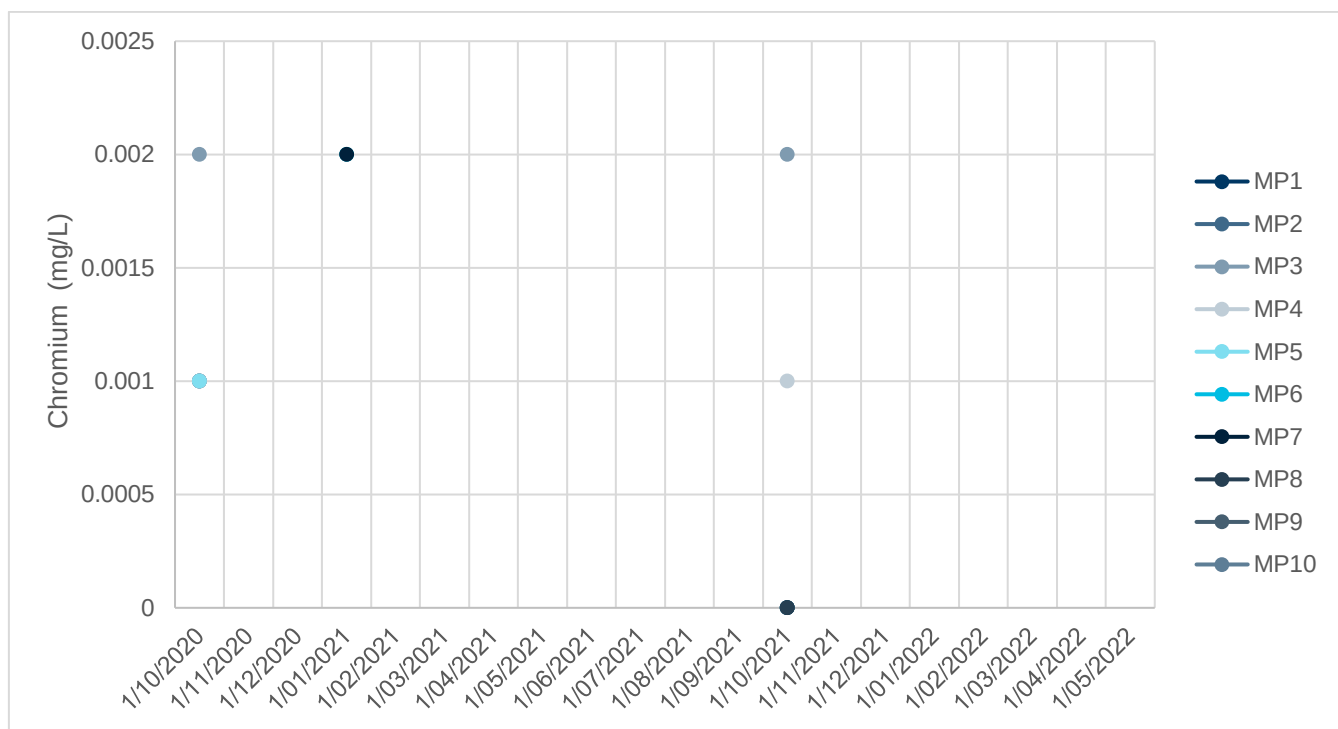


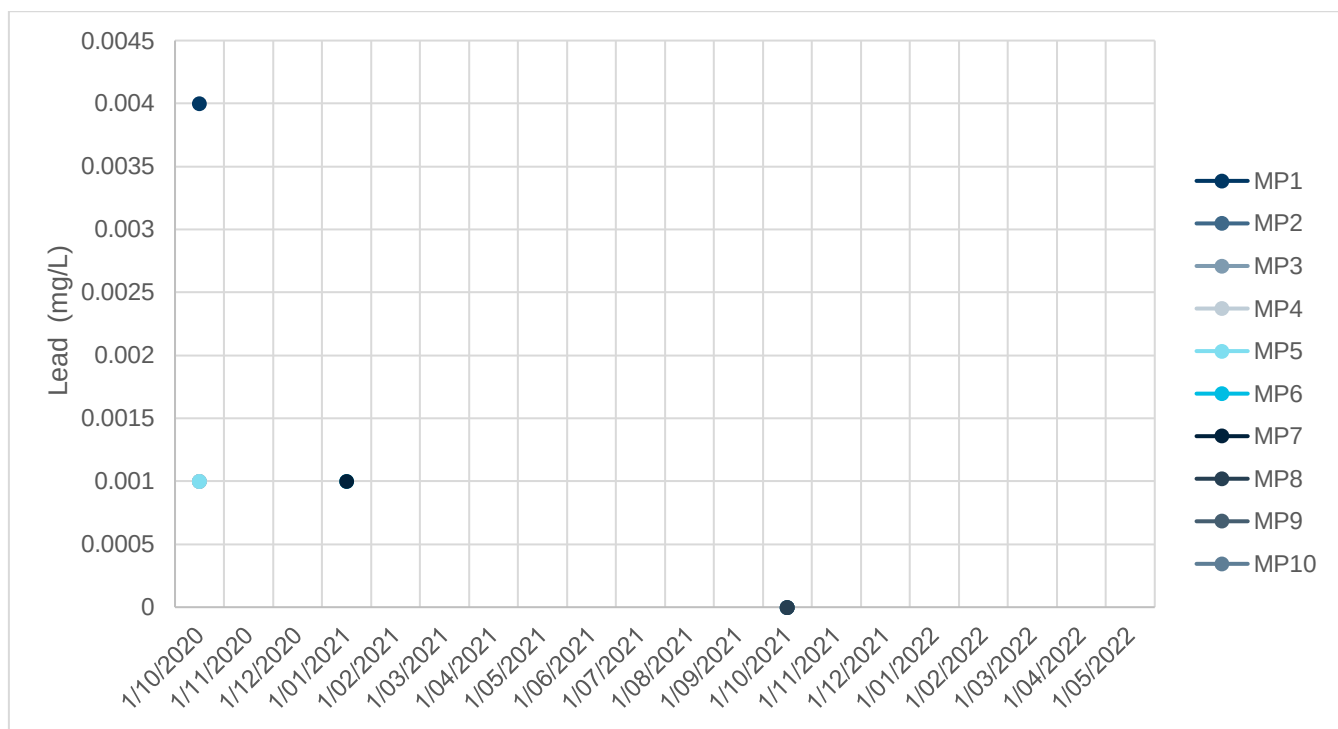
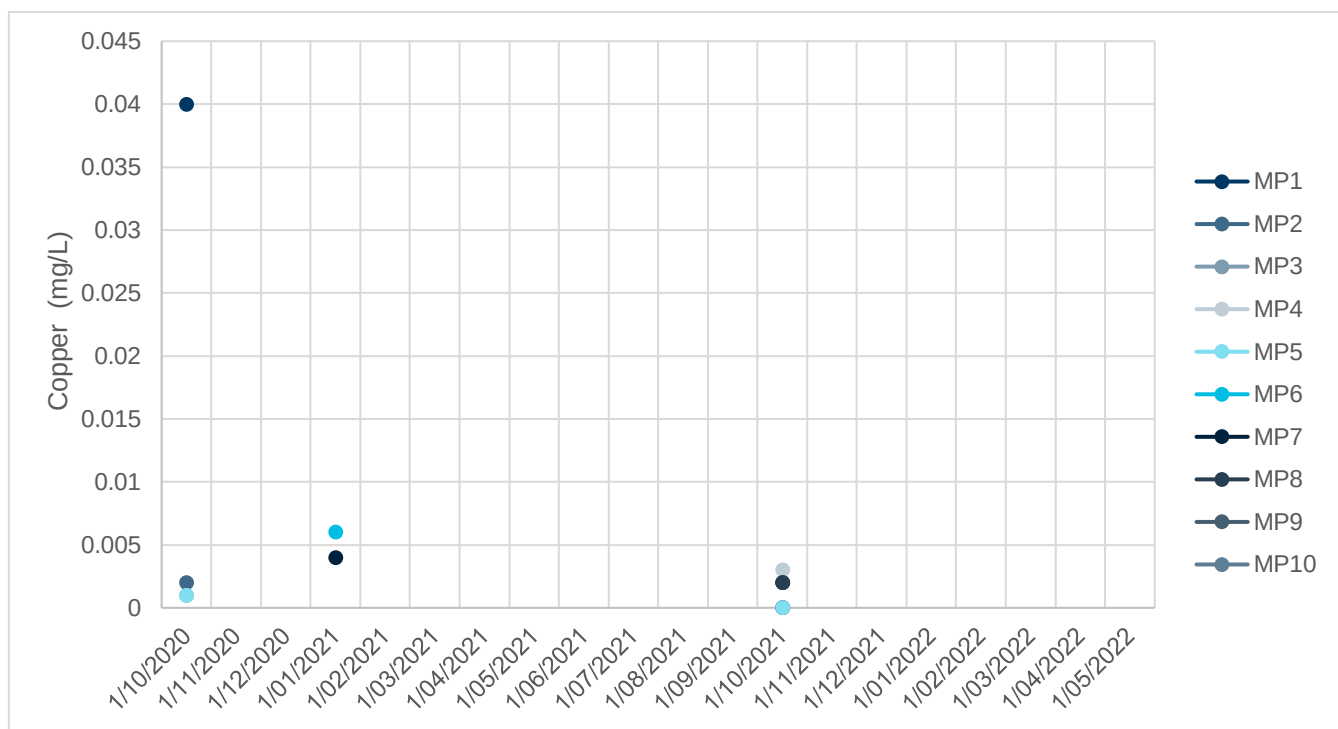


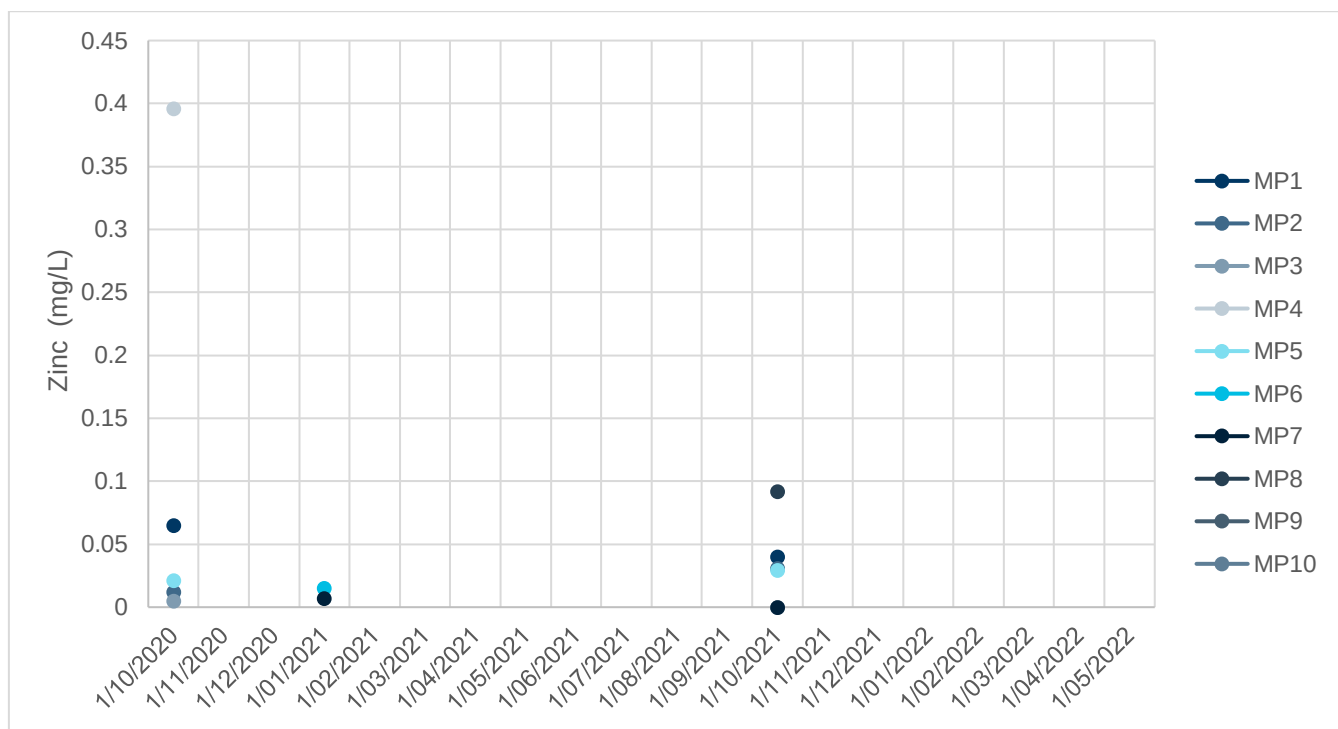
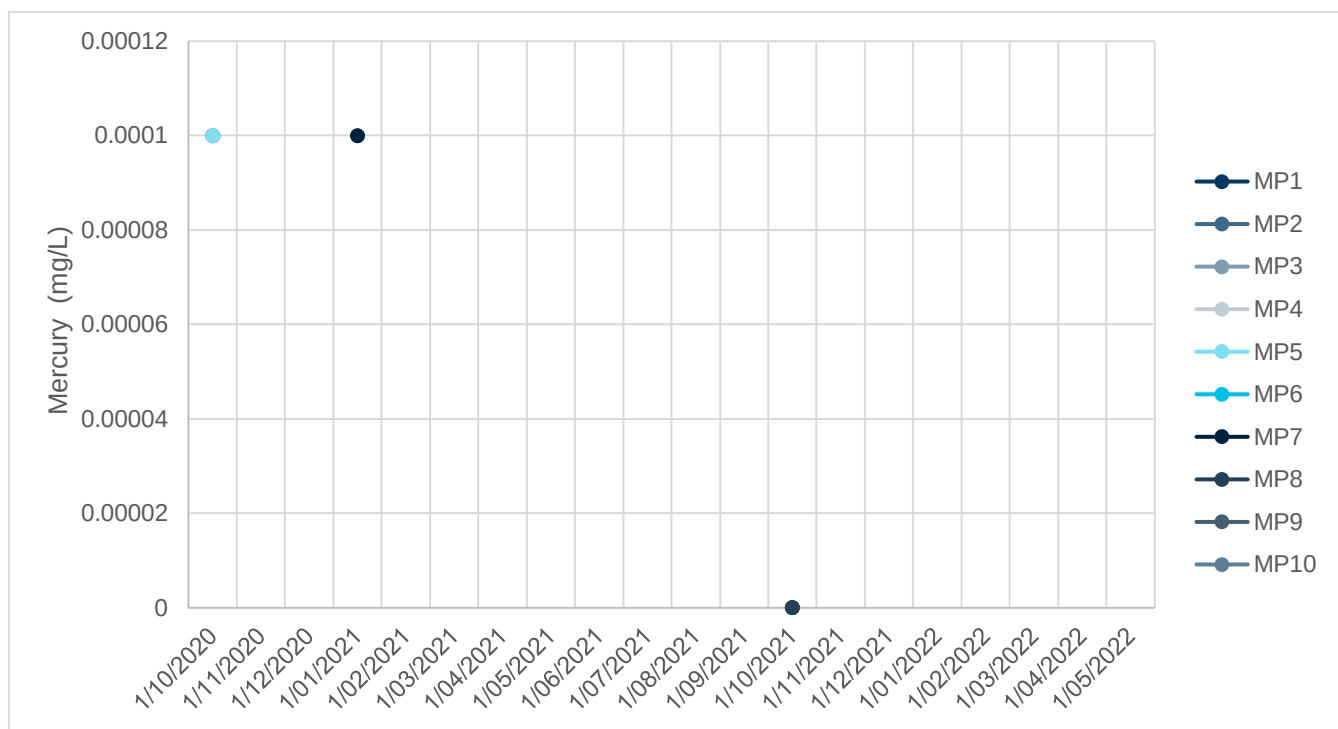


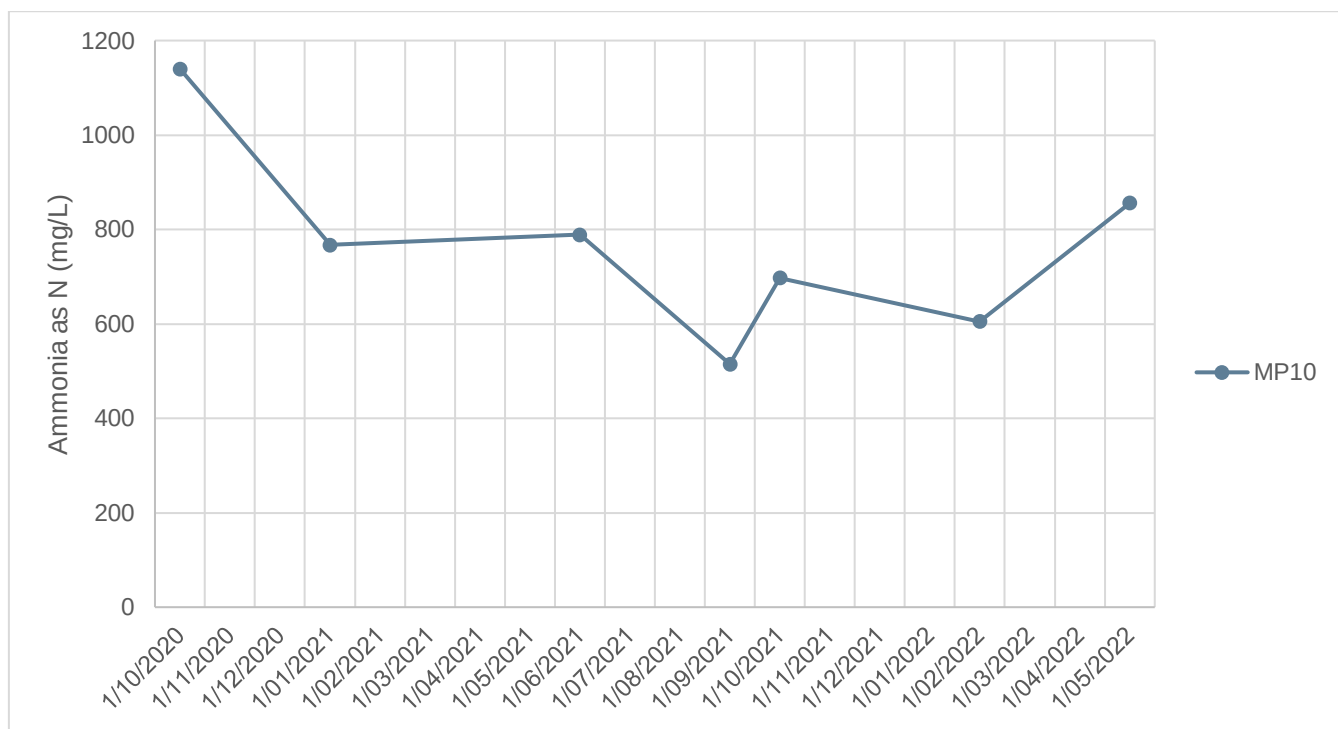
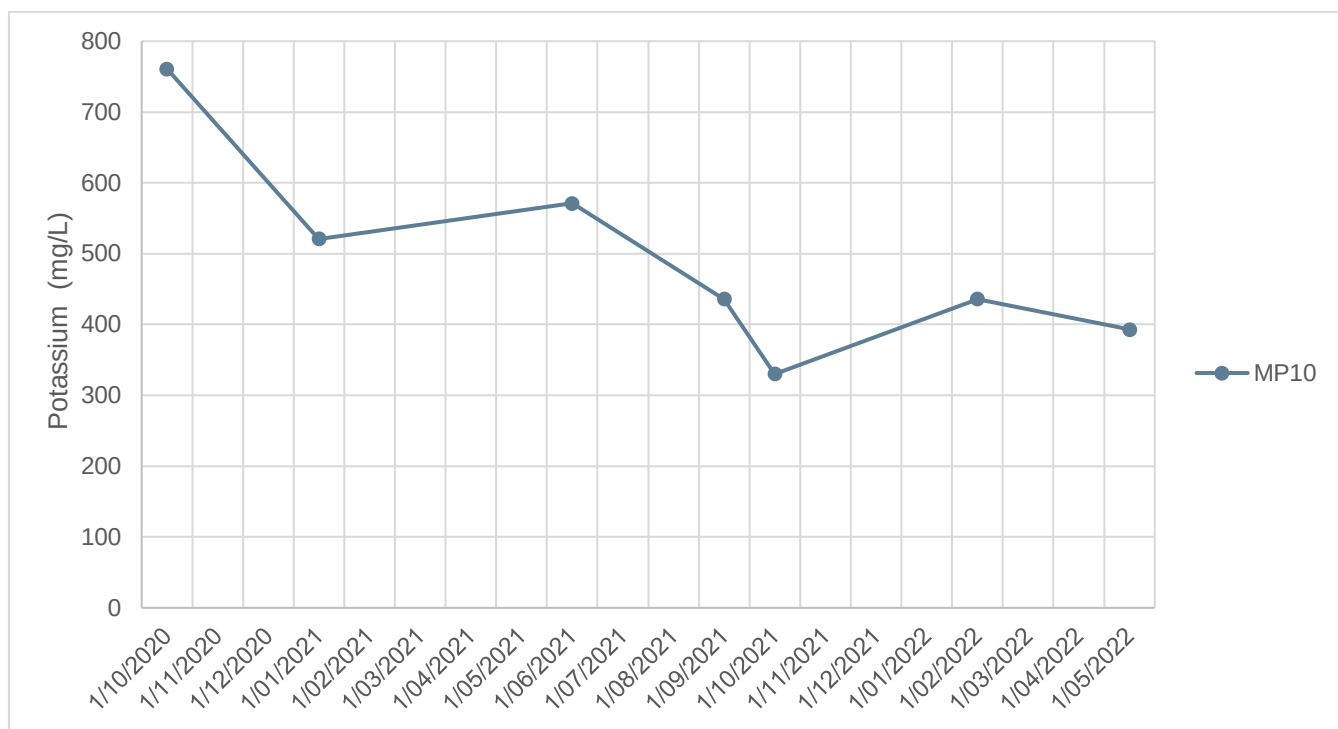




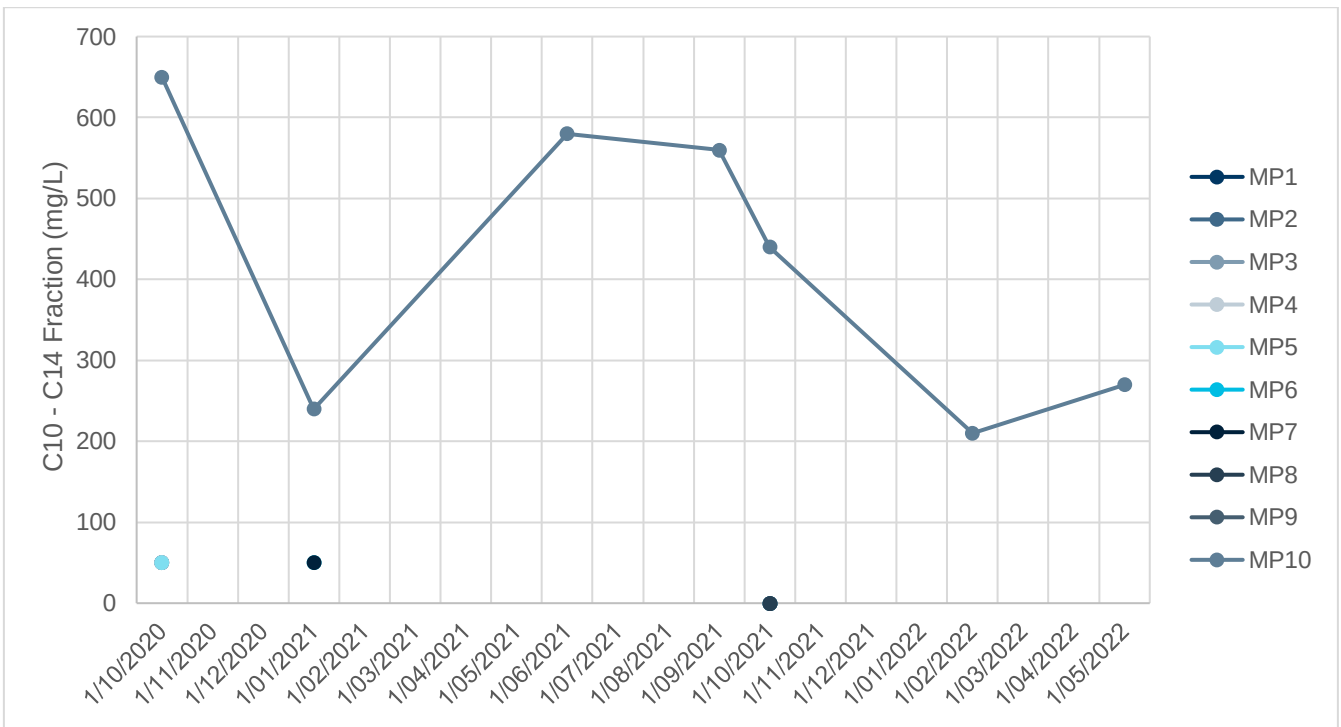
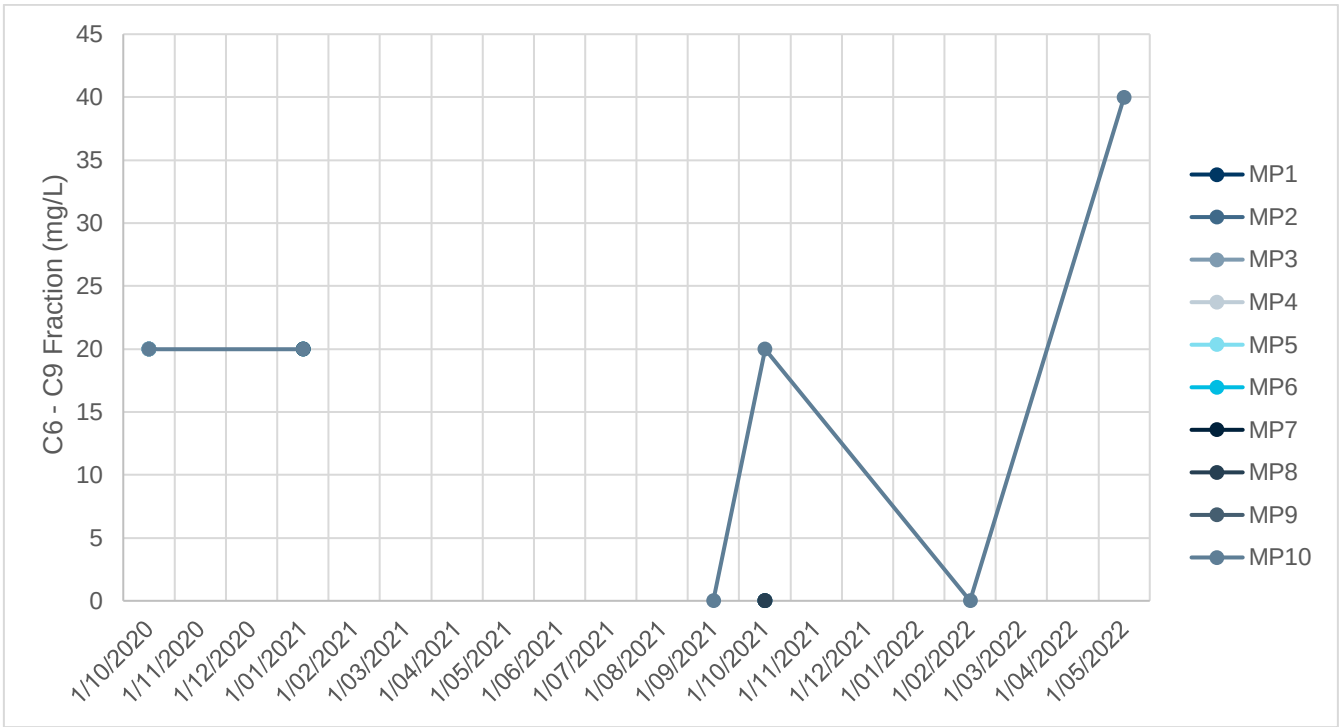


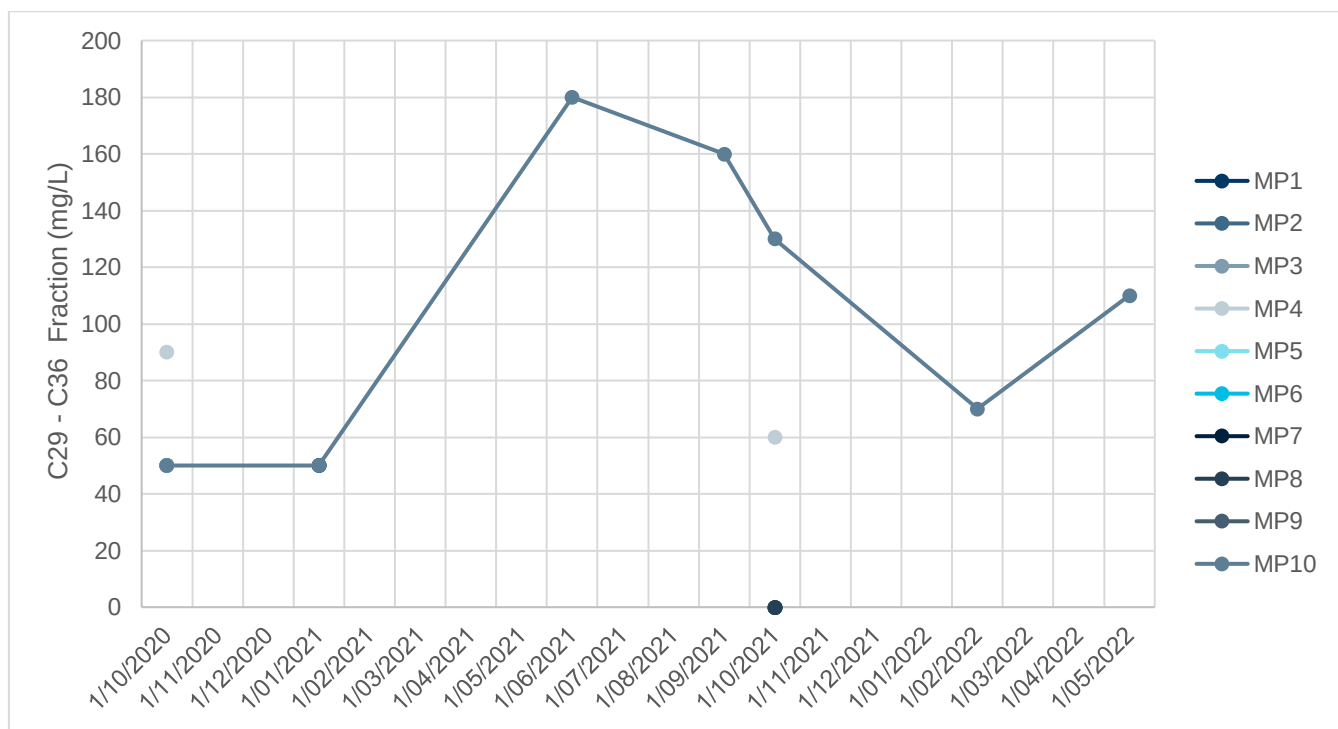
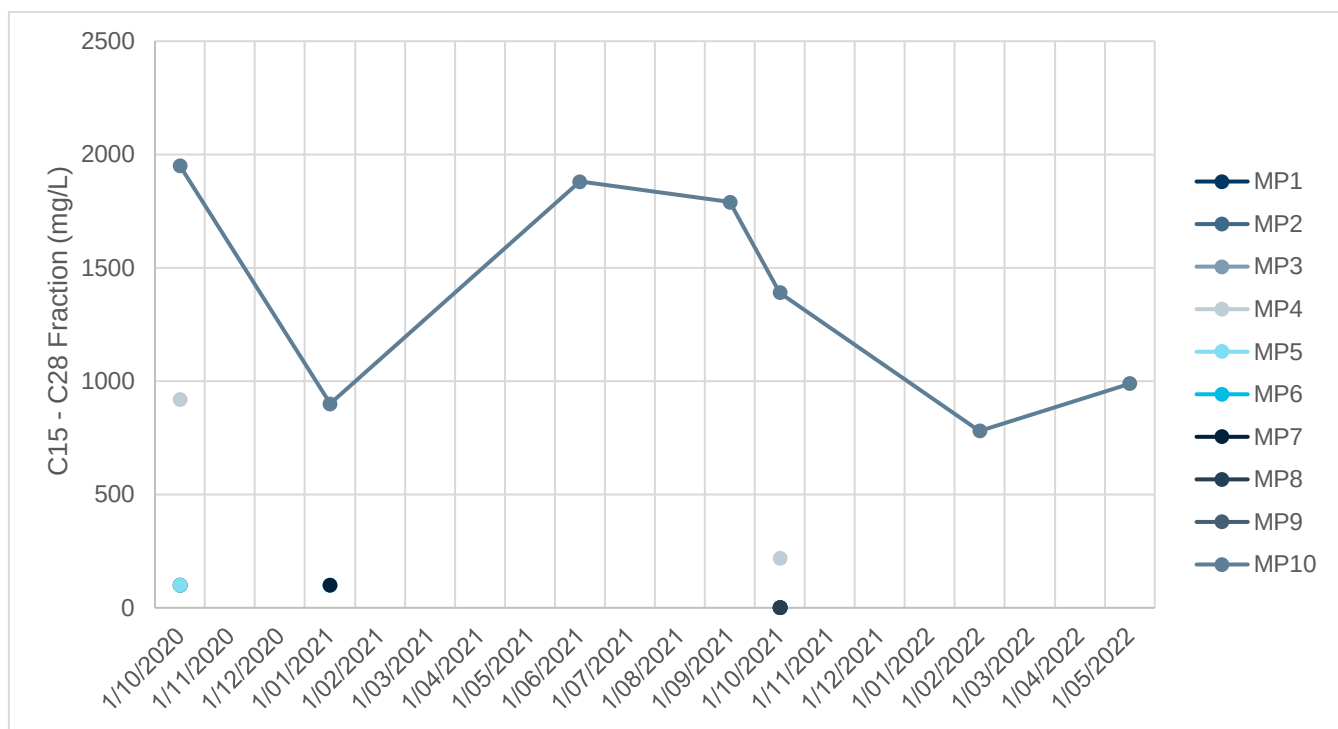


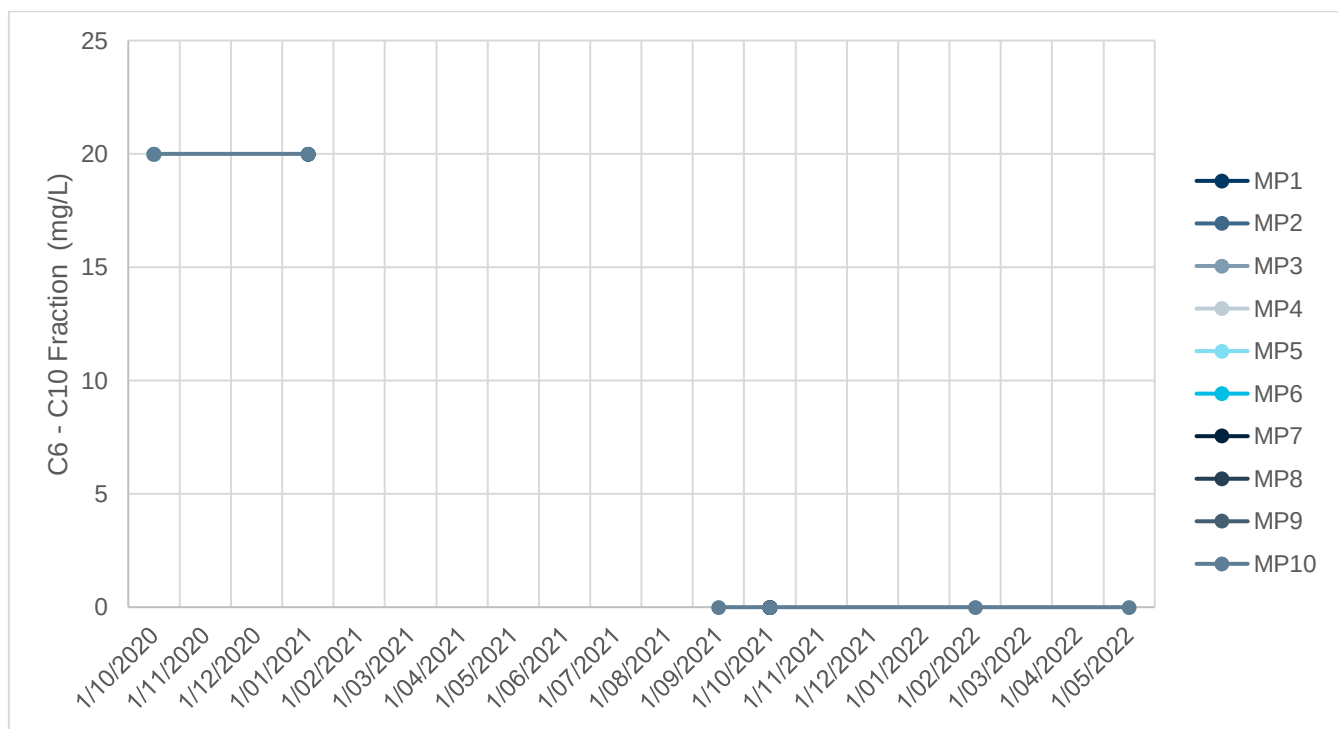
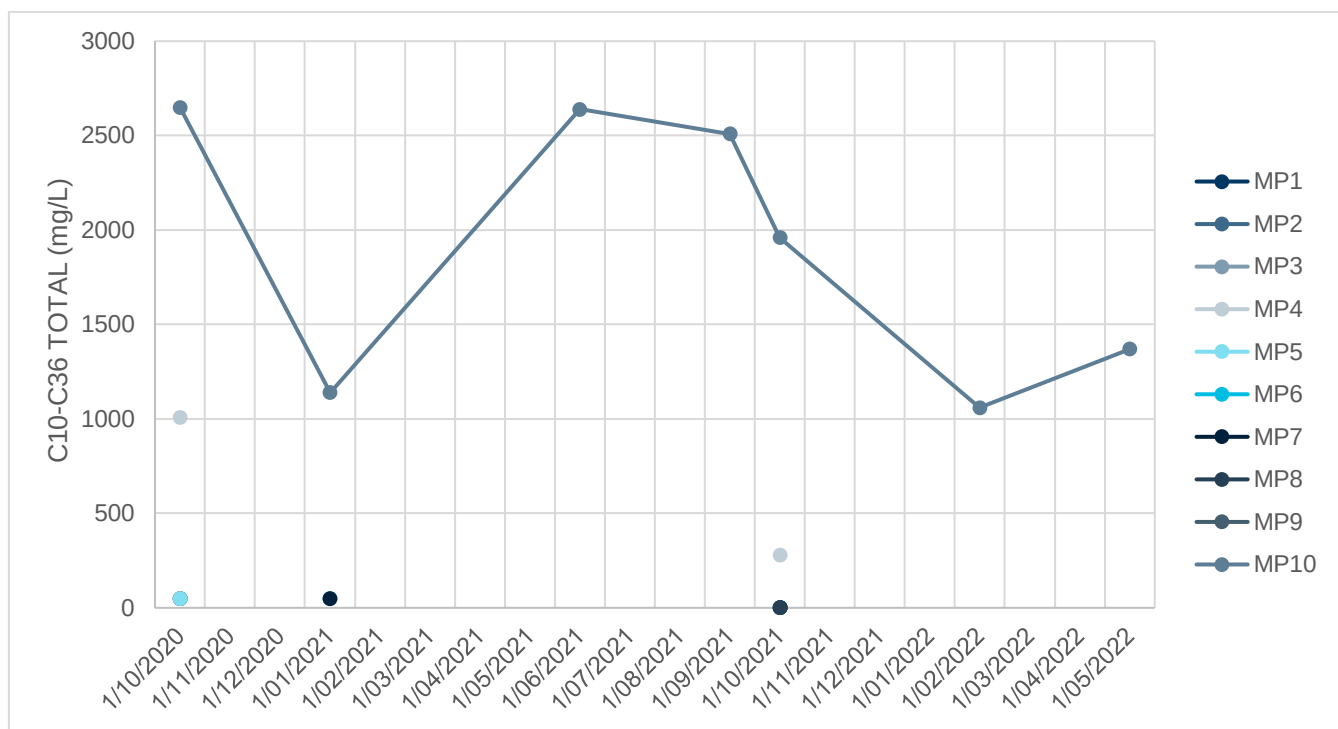


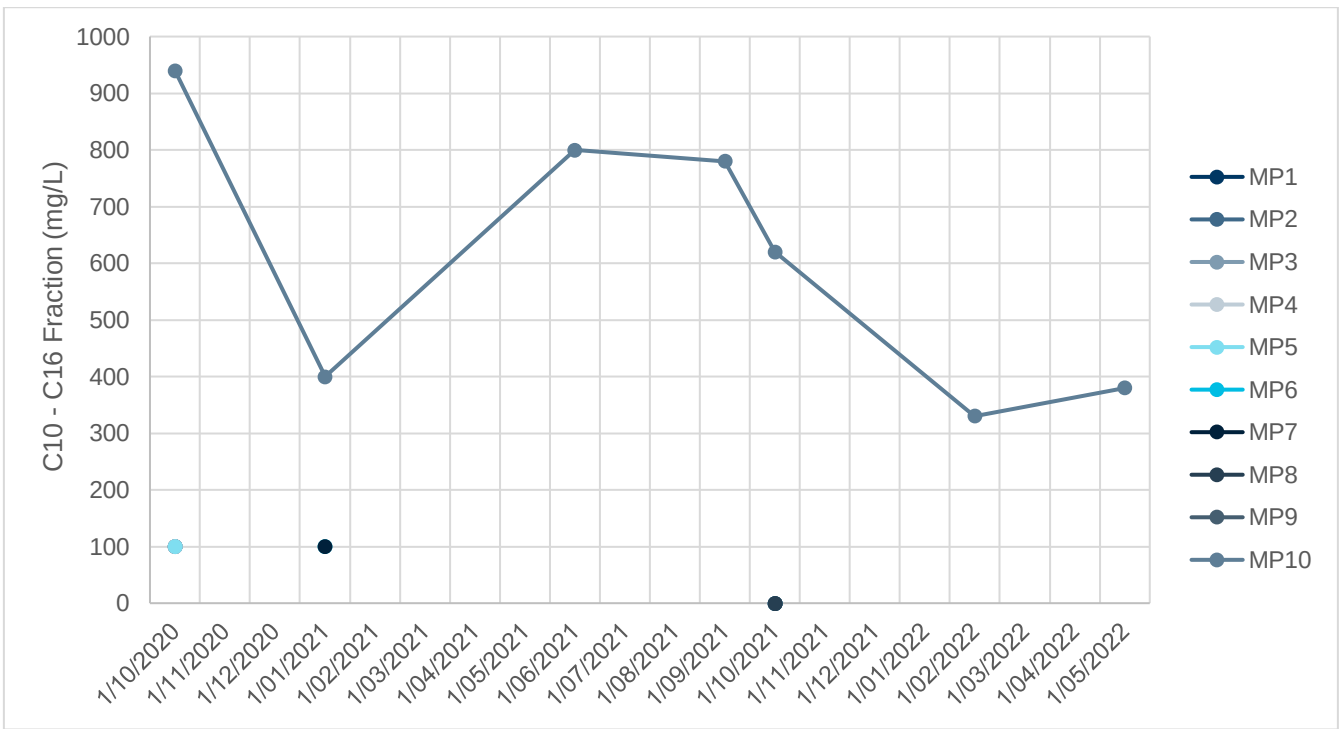
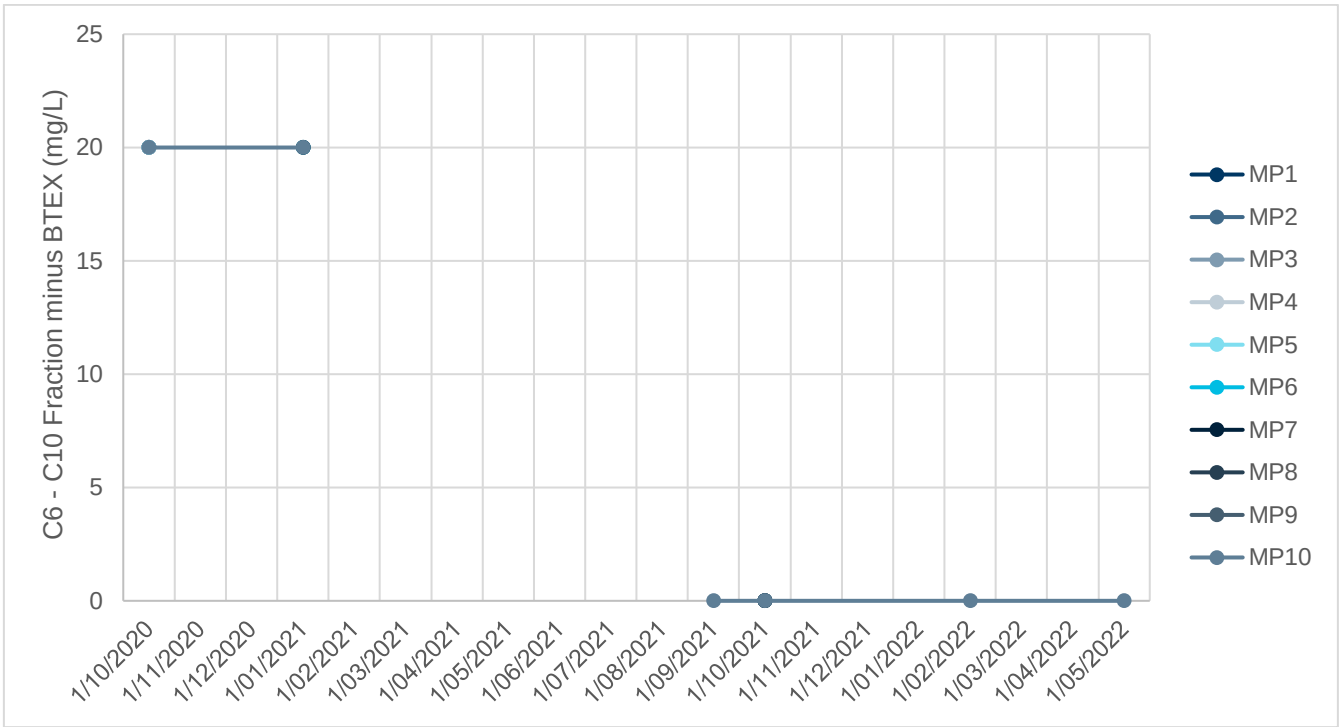


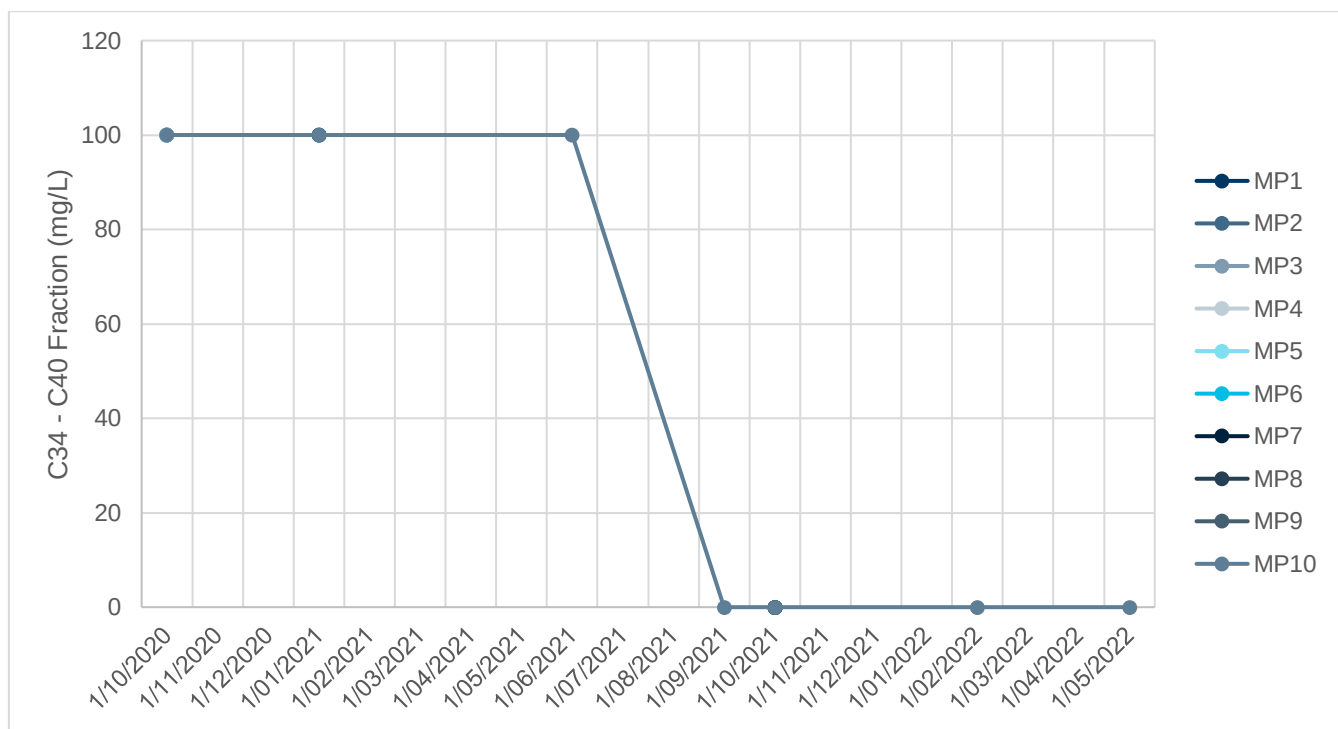
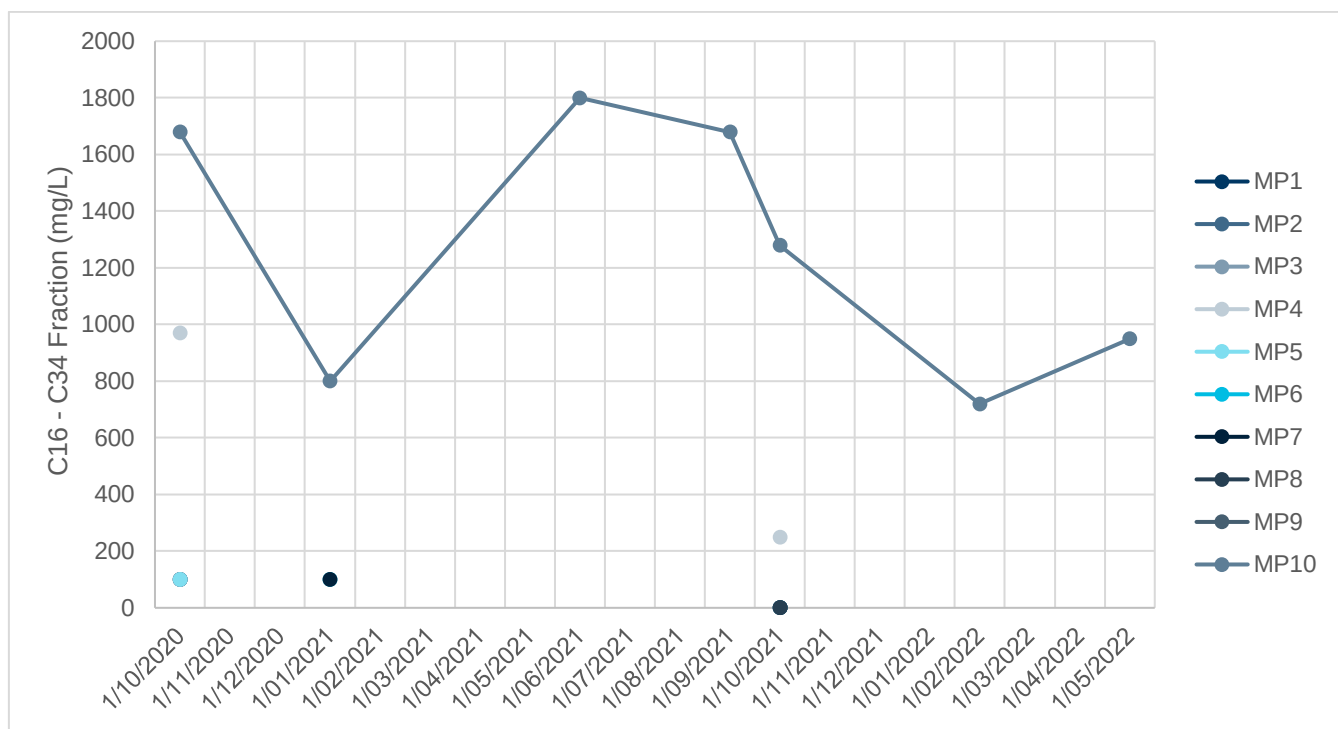


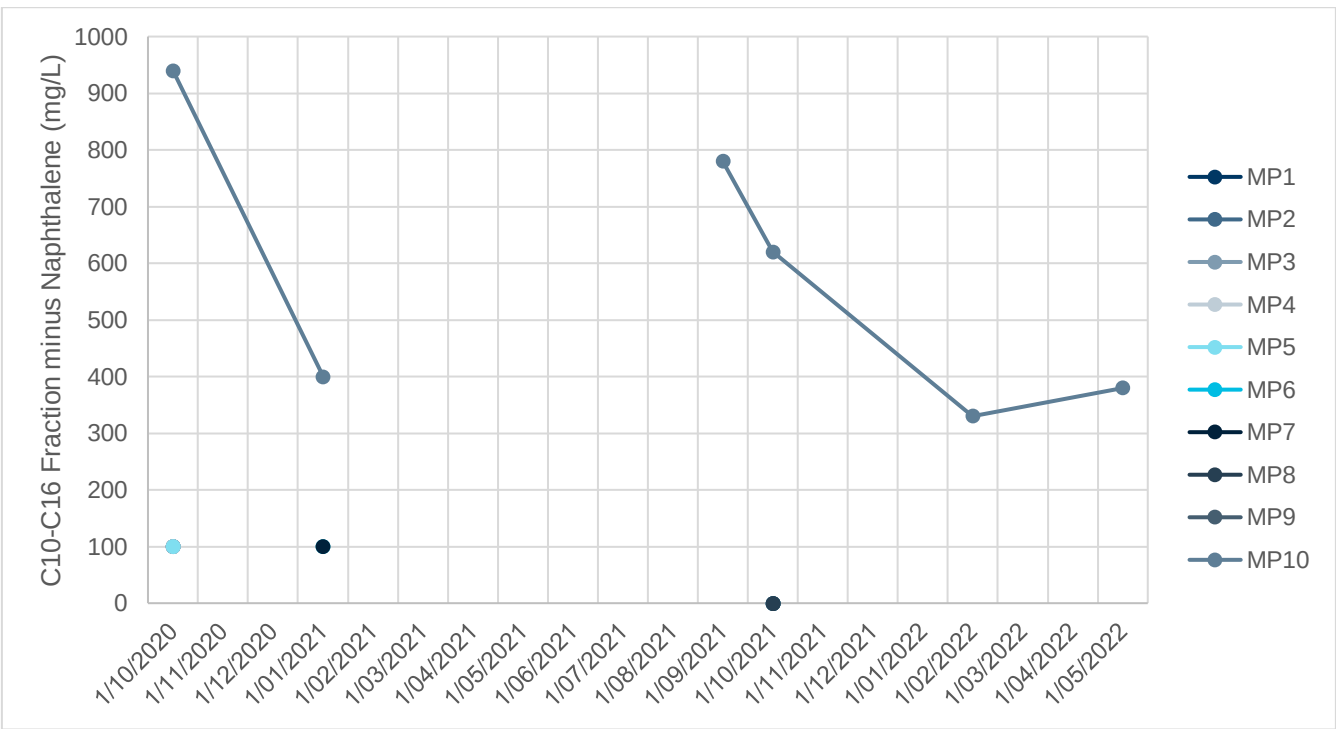
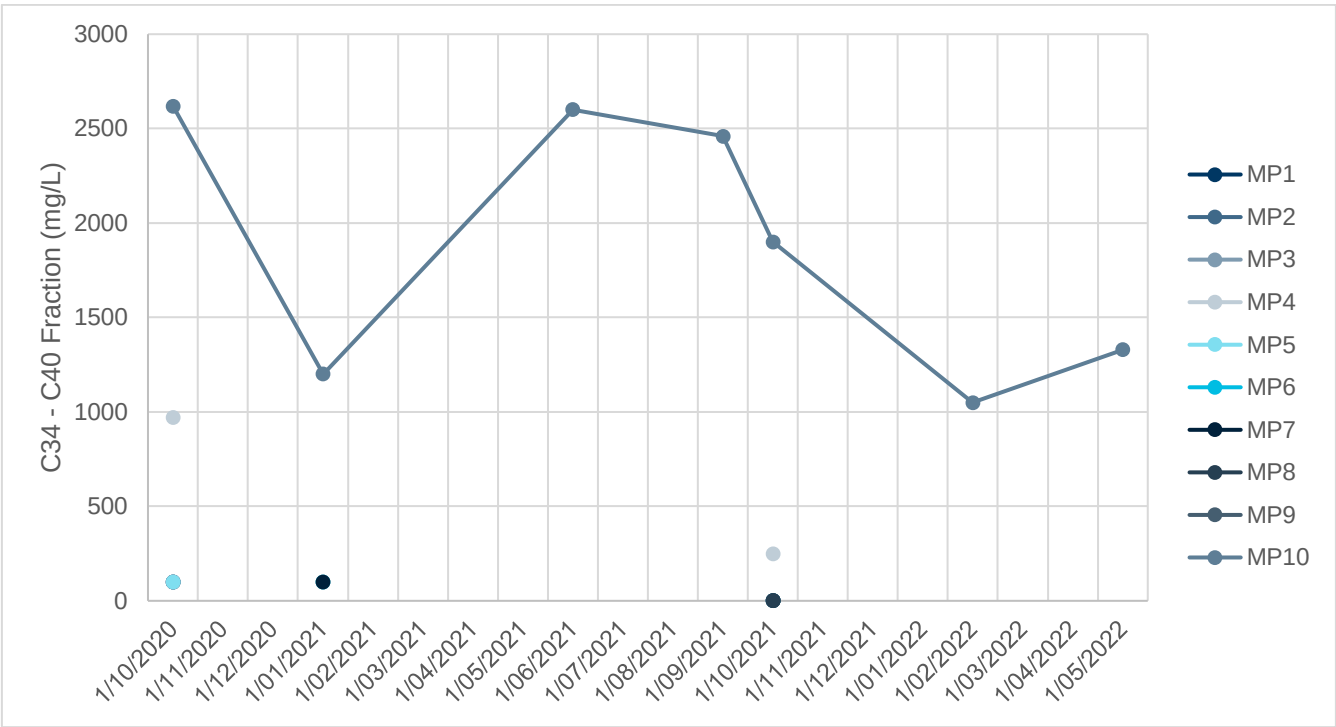














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