Annual Compliance Report - Year 1 (EPBC 2018/8166)

Harvest Estate, Byron Bay (EPBC 2018/8166)

Prepared for Villa World Byron Pty Ltd

By Planit Consulting Pty Ltd

(v.1) - November 2023

Job No: J7148

Company Details

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Document Control

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Approval Details

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Signature	

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1 Introduction and Background

Villa World Byron P/L has engaged Planit Consulting to prepare an Annual Compliance Report for the Harvest Estate located within the West Byron Urban Release Area, Byron Bay (refer to **Figure 1**).

Harvest Estate is an approved 149 allotment residential subdivision which also comprises of the creation of 7 green infrastructure lots, together with associated works including vegetation removal, earthworks, landscaping, creation of public reserves, roads, environmental management and protection and stormwater works.

Harvest Estate was referred under the *Environment Protection and Biodiversity Conservation Act* and determined to be a 'controlled action' under the provisions of sections 18/18A (listed threatened species and communities) of the Act (EPBC 2018/8166). The assessment process determined by the then Department of Environment and Energy (DoEE) was that the project would be assessed by referral information.

On 6th July 2018 the Harvest Estate residential development was granted approval under sections 130(1) and 133 of the EPBCA subject to conditions.

The purpose of this document is to demonstrate that there has been compliance with the conditions of the EPBC approval for the Project (EPBC 2018/8166) and to satisfy Condition 8 of that approval, which states:

> *The approval holder must prepare a compliance report for each 12-month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must:*
>
> *a. publish each compliance report on the website within 60 business days following the relevant 12-month period,*
>
> *b. notify the department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of publication, and*
>
> *c. keep all compliance reports publicly available on the website until this approval expires.*

Figure 1: Harvest Estate Aerial Photograph (Nearmap 2023)

1.1 Terms, Definitions and Acronyms

The following terms are used within this report:

ACR: means Annual Compliance Report

Annual Compliance Report Guidelines/ACR Guidelines: means DCCEEW (2023) *Annual Compliance Report Guidelines*. Commonwealth of Australia.

Approval/EPBC Act Approval: means EPBC 2018/8166 approval for the Harvest Estate.

Approval holder: means the person to whom the approval is granted, or any person acting on their behalf, or to whom approval is transferred under section 145B of the EPBC Act. For this offset under EPBC 2018/8166 the approval holder is Villa World Byron Pty Ltd.

BSC: Byron Shire Council.

Contractor/sub-contractor: means a party or company appointed by the proponent that performs works on site, and includes all employees of the Contractor and its sub-contractors, e.g. machinery operators, bush regenerators, spotter catchers etc.

Commence / commenced / commencement of construction: means any physical works associated with the action, excluding fences and signage.

Construction: means the clearing of land and creation of residential allotments, roadways and infrastructure services (sewerage, electricity, water, stormwater) associated with the action. This does not include preparatory works.

Date of commencement: 29th August 2023

Department/DoEE/DCCEEW: the Australian Government Department administering the EPBC Act.

Development or action: To develop the Harvest Estate staged master planned residential community within the West Byron Urban Release Area in Byron Bay, NSW..

EPBC Act: the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Existing Habitat: means the areas represented in Attachment B of the EPBC Act Approval by the zones enclosed within the blue solid lines labelled 'PROTECTED FROG HABITAT ZONES'.

Habitat creation areas: means the areas represented in Attachment B of the EPBC Act Approval by the black hatched shaded polygons labelled 'HABITAT CREATION AREAS FOR ACID FROGS'.

Harvest Estate: the development or action being a residential estate and all associated ancillary works necessary for establishment.

NES: means National Environmental Significance.

Project Area: means the location of the action, represented by the area enclosed within the red lines labelled 'SUBJECT LAND' in Attachment B of the EPBC Act Approval.

Proponent: the approval holder.

Rehabilitation Plan: means the document: Australian Wetlands Consultancy (2021) *Acid Frog Management Plan, 'Harvest Estate ', West Byron Urban Release Area, Ewingsdale Road, Byron Bay*, prepared for Tower Holdings Pty Ltd, dated 18 October 2021, or a version revised in accordance with this approval.

Wallum Sedge Frog: means the EPBC Act listed threatened species *Litoria olongburenses*, also known as the Olongburra Frog.

Year 1: The period from 29th August 2022 to 29th August 2023.

2 EPBC Approval Details & Descriptions of Activities

2.1 Project Background

The Project was referred to the then Department of Environment and Energy (DoEE) for assessment on 25th February 2018. The referred Project incorporated a staged master planned residential community, involving 282 lots and a development footprint of approximately 27.8 ha (refer to **Figure 2**).

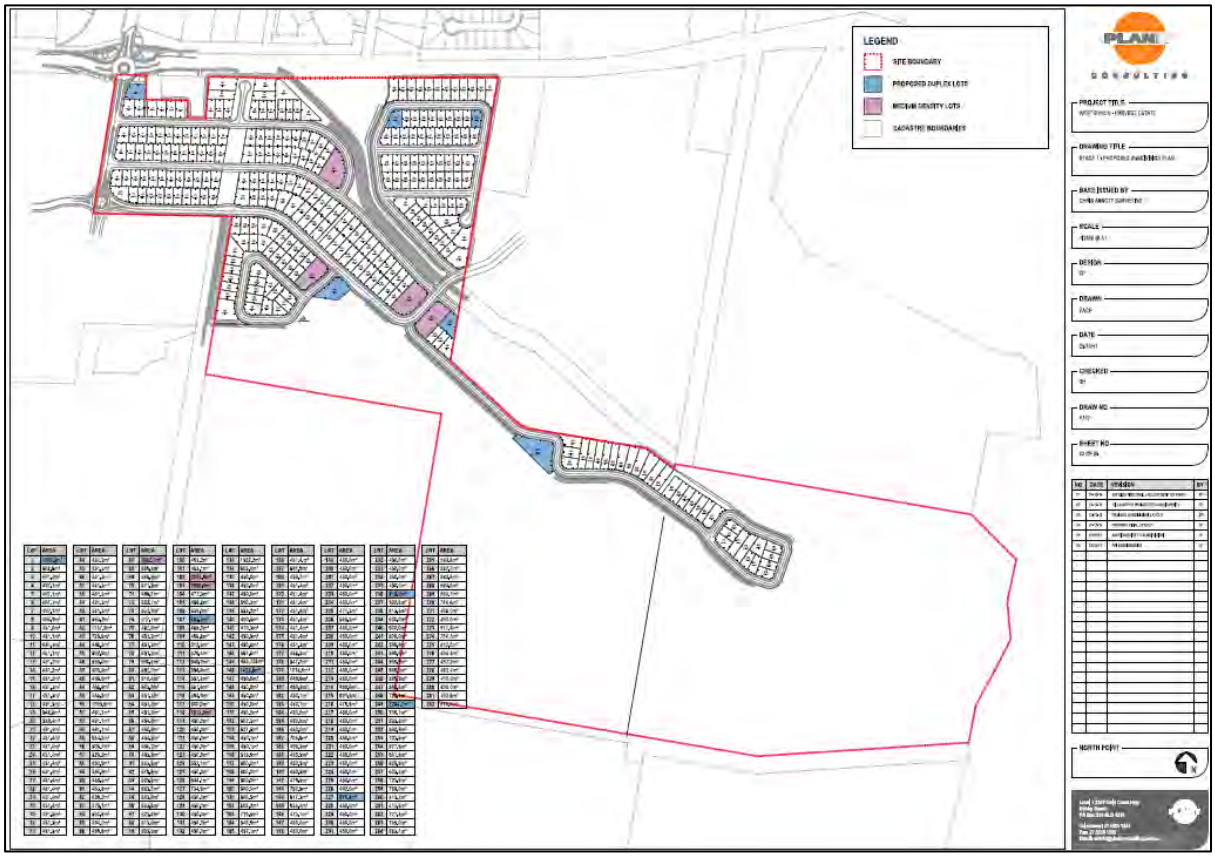


Figure 2: Original Harvest Estate Subdivision Plan (Provided with EPBC 2018/8166)

On the 29th March 2018, the Department advised that the Project would be a controlled action and would require assessment and approval under the EPBC Act before it could proceed. The relevant controlling provisions being listed threatened species and community (sections 18 & 18A). Following assessment, the Project was approved by the Department subject to conditions dated 6th July 2018.

During this time, the development application was in the process of being reviewed and determined by Byron Shire Council. The development was officially refused by Council on 8th April 2019 due to a variety of factors. This refusal occurred post the original EPBC Act determination.

The development was then modified and significantly reduced its development footprint and yield. The proposal was reduced from 282 lots and a development footprint of ~27.8 ha, to 149 lots and a development footprint of ~16 ha (refer to **Figure 3**).

Approval was eventually granted by the Land and Environment Court of NSW by way of a Section 34 Agreement on 8th December 2020 (Villa World Byron Pty Ltd v Byron Shire Council - LEC No. 2019/00310612) for the delivery of the Harvest Estate.

A summary of the Harvest Estate development details is provided below:

Table 1: Approved Harvest Estate Development Details

Approval Information	
Applicant	Villa World Byron Pty Ltd
Address	342 Ewingsdale Road, 22A and 22B Melaleuca Drive, Byron Bay
Development Consent Description	Staged subdivision of 9 lots into 149 residential lots (comprised of 145 smaller residential lots and 4 large lifestyle lots) and the creation of 7 green infrastructure lots, together with associated works including vegetation removal, earthworks, landscaping, creation of public reserves, roads, environmental management and protection and stormwater works at 342 Ewingsdale Road, 22A and 22B Melaleuca Drive, Byron Bay
Local Government Approval Reference	Development Consent 10.2017.201.1 (Villa World Byron Pty Ltd v Byron Shire Council - LEC No. 2019/00310612)
Modification Consent Description	Development Consent 10.2017.201.1 S4.56 Modification to amend staging and timeframes Determination Date 4th November 2021
EPBC Act Approval Reference	EPBC 2018/8166

Harvest Estate will be developed in accordance with the subdivision approval as depicted above.

Additionally, the development shall also be conducted in accordance with EPBC 2018/8166 Villa World Byron P/L dated 8 November 2022 which requires the approval holder to conduct a variety of activities in accordance with the conditions stipulated within the approval and this document.

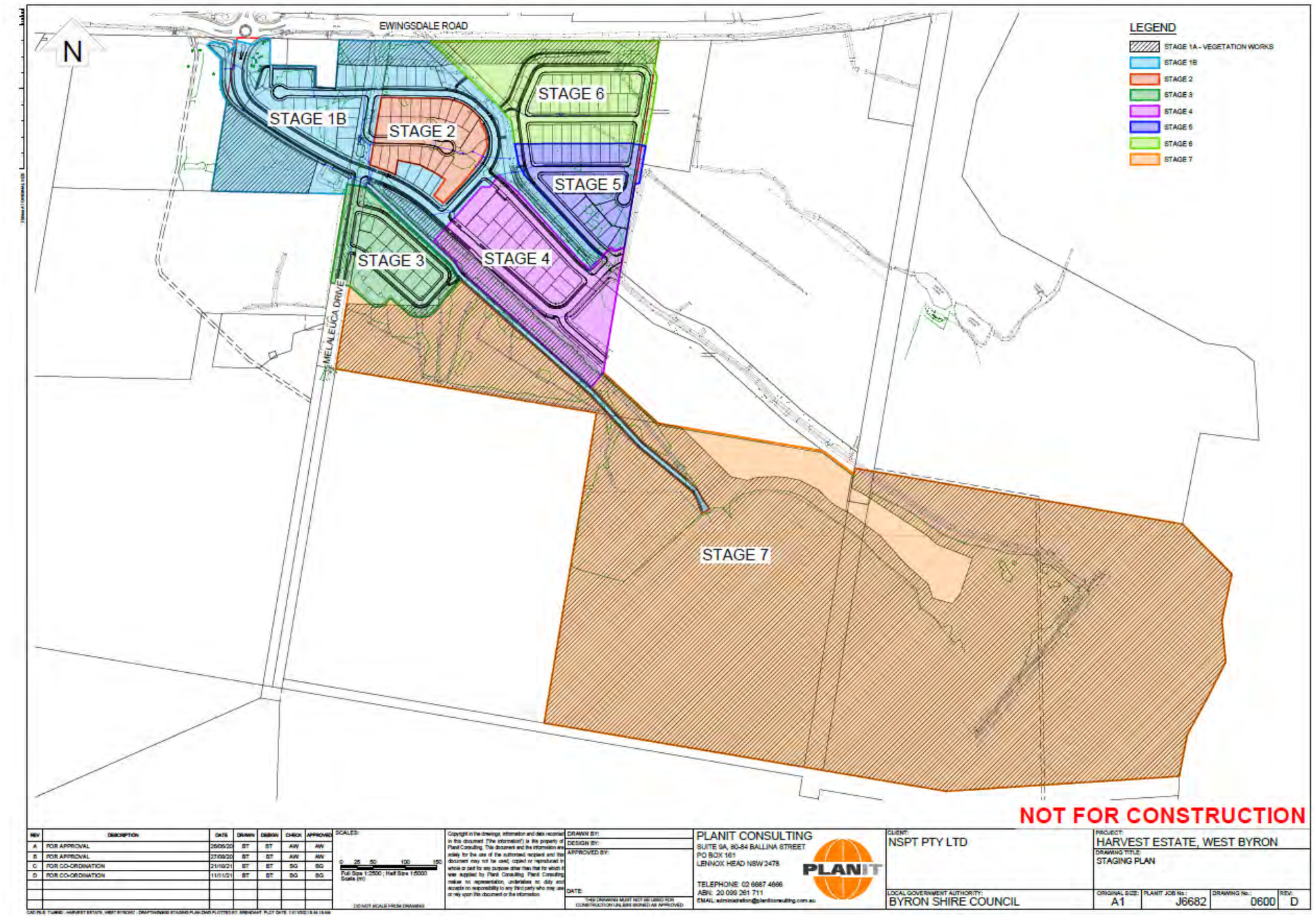


Figure 3: Current Approved Harvest Estate Layout

2.2 Description of Activities Prior to and Within Year 1 and Key Dates

The following key dates are provided with regard to development activities relevant to Year 1 of project monitoring:

- Variation to EPBC Act approval – 8 November 2022
- Notification of commencement of construction to DCCEEW – 29 August 2022
- First Annual Compliance Report due date – 22 November 2023

Subsequent to the commencement of the action the following activities have occurred during the 2022/2023 reporting period (within Year 1):

- Clearing of vegetation has occurred from the first portions of the Harvest Estate from within numbered stages 1B and 2 in accordance with the Development Consent (10.2017.201.1).
- Installation of sediment and erosion control devices;
- Construction activities (i.e. earthworks) associated with stages 1B and 2;
- Civil infrastructure (i.e. construction of roads, building pads, stormwater infrastructure, electricity, sewerage etc.) associated with stages 1B and 2;
- Landscaping associated with stages 1B and 2;
- Rehabilitation/Restoration Works within retained Rehabilitation Zones;
- Continuous monitoring and maintenance; and
- Whilst not occurring within the Year 1 period, the created frog breeding habitat areas were constructed over a four-week period in September-October 2023 within Rehabilitation Zones 2 and 3. Transplantation of native species has occurred which covers approximately 20% of the area. The created habitat infill planting is ready for implementation from the contractor as soon as site and ground conditions are favourable (currently flooded from recent heavy rains).

The following images are relevant to the Year 1 site activity:

Rehabilitation Zone 1: Baseline Survey

Rehabilitation Zone 1: End Year 1

Rehabilitation Zone 3: Baseline Survey

Rehabilitation Zone 3: End Year 1

Retained Frog Habitat Zone: Baseline Survey

Retained Frog Habitat Zone: End Year 1

Created Frog Habitat Area [Infill Plantings Yet to Occur]

Created Frog Habitat Area [Infill Plantings Yet to Occur]

Vegetation Protection Fencing, Signage and Silt Fencing Installed at the Interface Between Retained Frog Habitat Zone and Construction Area

Tree Protection Fencing and Signages Installed Externally to the Retained Frog Habitat Zone

Koala Recorded within Zone 6 During Annual Spring/Summer Survey Efforts

Treated Camphor Laurel within Retained Frog Habitat Area

Striped Rocket Frog Recorded by the Spotter Catcher During Pre-clearing Inspection

Green Tree Snake Captured and Released into the Environmental Protected Area by the Spotter Catcher During Clearing Works

Frog Fencing Installed Between Frog Habitat Zones

Nestboxes Installed within Rehabilitation Zone 6

3 EPBC 2018/8166 Approval Condition Compliance

This section addresses the status and compliance of the action against the conditions imposed within the EPBC Act Approval 2015/8166 for the first reporting period between 29th August 2022 and 29th August 2023. Details on the status of compliance have been tabulated for conditions under EPBC Act Approval 2018/8166 as follows:

- **Table 2** – EPBC Act Approval 2018/8166 Conditions – Compliance Assessment Table

For each column below, the approval condition or management measure is provided with a note on its status of compliance, a general comment and related source of evidence as relevant. The DCCEEW have prepared guidance (Annual Compliance Report Guidelines, 2023) related to the preparation of compliance audits, including generic expressions that are used to identify the status of each item (DCCEEW, 2023 Section 3.7):

The following designations must be used to record findings in compliance reports:

Compliant
'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.

Non-compliant
A designation of 'non-compliant' must be given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.

Not applicable
A designation of 'not applicable' must be given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition that applies to an activity that has not yet commenced.

Table 2: EPBC 2018/8166 Approval Conditions Compliance Table

Condition No.	Approval Condition	Condition Currently Triggered?	Compliance?	Comments and Supporting Documentation
1	To avoid impacts to the Wallum Sedge Frog, the person taking the action must retain all existing habitat within the project area.	Yes.	Compliant.	The frog habitat zones have been retained and protected during the Year 1 reporting period. The frog habitat zones have been regularly monitored and maintained during the Year 1 period.
2	Revoked as a part of the variation dated 8 November 2022.	Not applicable.	Not applicable.	Not applicable.
3	Revoked as a part of the variation dated 8 November 2022.	Not applicable.	Not applicable.	Not applicable.
4	Revoked as a part of the variation dated 8 November 2022.	Not applicable.	Not applicable.	Not applicable.
5	The person taking the action must implement the Rehabilitation Plan for the life of this approval. In accordance with the Appendix A of the Rehabilitation Plan, the person taking the action must, by 30 June 2028, establish at least: a. 0.64 ha of Wallum Sedge Frog breeding habitat in the habitat creation areas, and b. 4.77 ha of Wallum Sedge Frog movement/foraging habitat in the habitat creation areas. The habitat creation areas must be maintained and monitored to achieve the performance criteria specified in section 5.4 of the Rehabilitation Plan for, at least, the life of the approval.	Not applicable.	Not applicable.	Whilst not occurring within Year 1, the created frog breeding habitat areas were constructed over a four-week period in September-October 2023 within rehabilitation zones 2 and 3. Transplantation of native species has occurred which covers approximately 20% of the area. The ponds will be infilled with native wetland species in the coming months. The created habitat infill planting is ready for implementation from the contractor as soon as site and ground conditions are favourable (currently flooded from recent heavy rains). Once completed, these areas will be maintained and monitored as per the Rehabilitation Plan. The 4.77 ha of Wallum Sedge Frog movement/foraging habitat in the habitat creation areas have been subject to restoration/rehabilitation works and is regularly maintained and monitored. As summary of the Year 1 monitoring efforts are provided within **Appendices 2** and **3**.
6	Within 20 business days after the commencement of the action, the person taking the action must advise the Department in writing of the actual date of commencement.	Yes.	Compliant.	The Project commenced on 29 August 2022. The Department was notified regarding the commencement date and confirmed commencement by way of return correspondence dated 16 September 2022.
7	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.	Yes.	Compliant.	The approval holder records and holds all relevant information for this EPBC Act approval which can be made available upon request.
8	The approval holder must prepare a compliance report for each 12-month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must: a. publish each compliance report on the website within 60 business days following the relevant 12-month period, b. notify the department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of publication, and c. keep all compliance reports publicly available on the website until this approval expires.	Yes.	Compliant.	The Project commenced on 29 August 2022. As such, the compliance report must be prepared and published by 22 November 2023. This report has been prepared to satisfy this condition and will be published on Planit Consulting's website (https://www.planitconsulting.com.au/portfolio/harvestestate/) prior to 22 November 2023.

Condition No.	Approval Condition	Condition Currently Triggered?	Compliance?	Comments and Supporting Documentation
9	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish all plans and agreements referred to in these conditions of approval on their website. Each plan and agreement must be published on the website within 1 month of being approved by the Minister or being submitted under condition 11. Plans and agreements must remain published for the life of the approval. Plans and agreements must continue to be published unless otherwise agreed to by the Minister in writing.	Yes.	Compliant.	The EPBC Act Approval and approved Rehabilitation Plan is published on Planit Consulting's website (https://www.planitconsulting.com.au/portfolio/harvestestate/). The Plans and agreements will remain published for the life of the approval unless otherwise agreed to by the Minister in writing.
10	If, at any time after five (5) years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.	Not applicable.	Not applicable	The Project substantially commenced on 29 August 2022 which is within 5 years of the date of the approval.
11	The person taking the action may choose to revise the Rehabilitation Plan approved by the Minister without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. If the person taking the action makes this choice they must: a. Notify the Department in writing that the approved plan has been revised and provide the Department with an electronic copy of the revised plan. b. Implement the revised plan from the date that the plan is submitted to the Department. For the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan would not be likely to have a new or increased impact.	Not applicable.	Not applicable	The Rehabilitation Plan has not been revised since the variation approval by the Department on 8 November 2022.
12	The person taking the action may revoke their choice under condition 11 at any time by notice to the Department. If the person taking the action revokes the choice to implement a revised plan without approval under section 143A of the EPBC Act, the plan approved by the Minister must be implemented.	Not applicable	Not applicable	Not applicable.
13	If the Minister gives a notice to the person taking the action that the Minister is satisfied that the taking of the action in accordance with the revised plan would be likely to have a new or increased impact, then: a. Condition 11 does not apply, or ceases to apply, in relation to the revised plan; and b. The person taking the action must implement the plan approved by the Minister. To avoid any doubt, this condition does not affect any operation of conditions 11 and 12 in the period before the day the notice is given.	Not applicable	Not applicable	No notice was provided by the Minister under this condition during the reporting period.

Condition No.	Approval Condition	Condition Currently Triggered?	Compliance?	Comments and Supporting Documentation
	At the time of giving the notice the Minister may also notify that for a specified period of time that condition 11 does not apply for one or more specified plans required under the approval.			
14	Conditions 11, 12, and 13 are not intended to limit the operation of section 143A of the EPBC Act which allows the person taking the action to submit a revised plan to the Minister for approval.	Not applicable	Not applicable.	The Rehabilitation Plan has not been revised since the variation approval by the Department on 8 November 2022.
15	The approval holder must notify the Department electronically, within 2 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan. The approval holder must specify in the notification: a. any condition or commitment made in a plan which has been or may have been breached. b. a short description of the incident and/or potential non-compliance and/or actual non-compliance. c. the location (including co-ordinates), date, and time of the incident and/or potential non-compliance and/or actual non-compliance. Note: If the exact information cannot be provided, the approval holder must provide the best information available.	Yes.	Compliant.	There have been no notifiable incidents or non-compliance during the reporting period. The Project is therefore complaint with this condition.
16	The approval holder must provide to the Department in writing, within 12 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance, the details of that incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan. The approval holder must specify: a. any corrective action or investigation which the approval holder has already taken b. the potential impacts of the incident and/or non-compliance and/or non-compliance c. the method and timing of any corrective action that will be undertaken by the approval holder.	Yes.	Compliant.	There have been no notifiable incidents or non-compliance during the reporting period. The Project is therefore complaint with this condition.

3.1 Correcting Non-compliance

No incidences of non-compliance have been identified in Year 1.

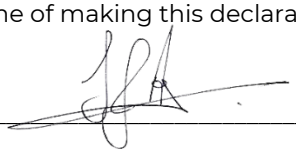
4 New Environmental Risks

Hydrology at the site has undergone a noticeable shift in 2023. The most prominent aspect being the absence of standing water in some retained habitats. Although external to the Year 1 period, between 27th-30th October 2023, 88mm of rainfall fell at the site. This rainfall failed to result in standing water or pooling at the site, and therefore it appears that climatic factors are playing only a background role in the drying out of habitat. No evidence of pooling water was found in the subsequent weeks also ruling out a groundwater lag. A potential cause lies in altered groundwater hydrology following the excavation of the central drain running parallel to Melaleuca Drive and the retained habitat in Lot 227. This should be investigated before initiating any rectifying civil works. The applicant, Australian Wetlands Consulting (Rehabilitation Plan author) and Byron Shire Council are currently working together for a prompt and viable solution that will allow recharge to this section during significant rain events.

No other new environmental risks have been identified in Year 1.

5 Declaration of Accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed 

Full Name (please print) Terrence Agnew

Position (please print) Director

Organisation (please print including ABN/CAN if applicable) Villa World Byron Pty Ltd

Date 17/11/23

Appendix A – EPBC Act Approval (EPBC 2018/8166)

VARIATION OF CONDITIONS ATTACHED TO APPROVAL

Harvest Estate, West Byron Urban Release Area, Ewingsdale Road, Byron Bay, NSW (EPBC 2018/8166)

This decision to vary conditions of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

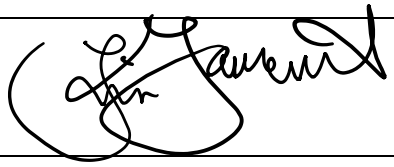
Approved action

Approval holder	**Name:** Villa World Byron Pty Ltd **ACN:** 612 247 195
Approved action	To develop the Harvest Estate staged master planned residential community within the West Byron Urban Release Area in Byron Bay, NSW [See EPBC Act referral 2018/8166]

Variation

Variation of conditions attached to approval	The variation is: Delete conditions 1, 5 and 8 attached to the approval and substitute with the conditions 1, 5 and 8 specified in the table below Delete definitions of **Existing habitat**, **Minister**, **Rehabilitation Plan** and **Wallum Sedge Frog** attached to the approval and substitute with the definitions of **Existing habitat**, **Minister**, **Rehabilitation Plan** and **Wallum Sedge Frog** specified in the table below Delete Attachment B attached to the approval and substitute with the Attachment B specified in the table below Add new conditions 15 and 16 specified in the table below Add new definitions of **Business day**, **Clear, cleared or clearing**, **Compliance reports**, **EPBC Act**, **Habitat creation areas**, **Impact**, **Incident**, **Project area**, **Plan** and **Website** specified in the table below Revoke conditions 2, 3 and 4 Revoke the definitions of **BioBanking Statement** and **Statement of assessment of reasonable equivalence of biodiversity credits** Revoke Attachment A and Attachment C.
Date of effect	This variation has effect on the date this instrument is signed

Person authorised to make decision

Name and position	Kim Farrant Branch Head Environment Assessments (Vic, Tas) and Post Approvals Branch
Signature	
Date of decision	8 November 2022

Date of decision	Conditions attached to approval
As varied on the date this instrument was signed	1. To avoid impacts to the **Wallum Sedge Frog**, the person taking the action must retain all **existing habitat** within the **project area**.
As varied on the date this instrument was signed	2. **REVOKED**
As varied on the date this instrument was signed	3. **REVOKED**
As varied on the date this instrument was signed	4. **REVOKED**
As varied on the date this instrument was signed	5. The person taking the action must implement the **Rehabilitation Plan** for the life of this approval. In accordance with the Appendix A of the **Rehabilitation Plan**, the person taking the action must, by 30 June 2028, establish at least: a. 0.64 ha of **Wallum Sedge Frog** breeding habitat in the **habitat creation areas**, and b. 4.77 ha of **Wallum Sedge Frog** movement/foraging habitat in the **habitat creation areas**. The **habitat creation areas** must be maintained and monitored to achieve the performance criteria specified in section 5.4 of the **Rehabilitation Plan** for, at least, the life of the approval.
Original dated 6/7/2018	6. Within 20 business days after the **commencement** of the action, the person taking the action must advise the **Department** in writing of the actual date of **commencement**.
Original dated 6/7/2018	7. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.
Annual compliance reporting	
As varied on the date this instrument was signed	8. The approval holder must prepare a **compliance report** for each 12-month period following the date of **commencement** of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

Date of decision	Conditions attached to approval
	a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12-month period, b. notify the **department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within 5 **business days** of publication, and c. keep all **compliance reports** publicly available on the **website** until this approval expires. **Note**: **Compliance reports** may be published on the **Department**'s website.
Original dated 6/7/2018	9. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish all plans and agreements referred to in these conditions of approval on their website. Each plan and agreement must be published on the website within 1 month of being approved by the **Minister** or being submitted under condition 11. Plans and agreements must remain published for the life of the approval. Plans and agreements must continue to be published unless otherwise agreed to by the **Minister** in writing.
Original dated 6/7/2018	10. If, at any time after five (5) years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the **Minister**.
Revision of plan	
Original dated 6/7/2018	11. The person taking the action may choose to revise the **Rehabilitation Plan** approved by the **Minister** without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a **new or increased impact**. If the person taking the action makes this choice they must: a. Notify the **Department** in writing that the approved plan has been revised and provide the **Department** with an electronic copy of the revised plan. b. Implement the revised plan from the date that the plan is submitted to the **Department**. For the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan would not be likely to have a **new or increased impact**.
Original dated 6/7/2018	12. The person taking the action may revoke their choice under condition 11 at any time by notice to the **Department**. If the person taking the action revokes the choice to implement a revised plan without approval under

Date of decision	Conditions attached to approval
	section 143A of the **EPBC Act**, the plan approved by the **Minister** must be implemented.
Original dated 6/7/2018	13. If the **Minister** gives a notice to the person taking the action that the **Minister** is satisfied that the taking of the action in accordance with the revised plan would be likely to have a **new or increased impact**, then: a. Condition 11 does not apply, or ceases to apply, in relation to the revised plan; and b. The person taking the action must implement the plan approved by the **Minister**. To avoid any doubt, this condition does not affect any operation of conditions 11 and 12 in the period before the day the notice is given. At the time of giving the notice the **Minister** may also notify that for a specified period of time that condition 11 does not apply for one or more specified plans required under the approval.
Original dated 6/7/2018	14. Conditions 11, 12, and 13 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the person taking the action to submit a revised plan to the **Minister** for approval.
Reporting non-compliance	
As varied on the date this instrument was signed	15. The approval holder must notify the **Department** electronically, within 2 **business days** of becoming aware of any **incident** and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a **plan**. The approval holder must specify in the notification: a. any condition or commitment made in a **plan** which has been or may have been breached. b. a short description of the **incident** and/or potential non-compliance and/or actual non-compliance. c. the location (including co-ordinates), date, and time of the **incident** and/or potential non-compliance and/or actual non-compliance. **Note**: If the exact information cannot be provided, the approval holder must provide the best information available.
As varied on the date this instrument was signed	16. The approval holder must provide to the **Department** in writing, within 12 **business days** of becoming aware of any **incident** and/or potential non-compliance and/or actual non-compliance, the details of that **incident** and/or potential non-compliance and/or actual non-compliance with the

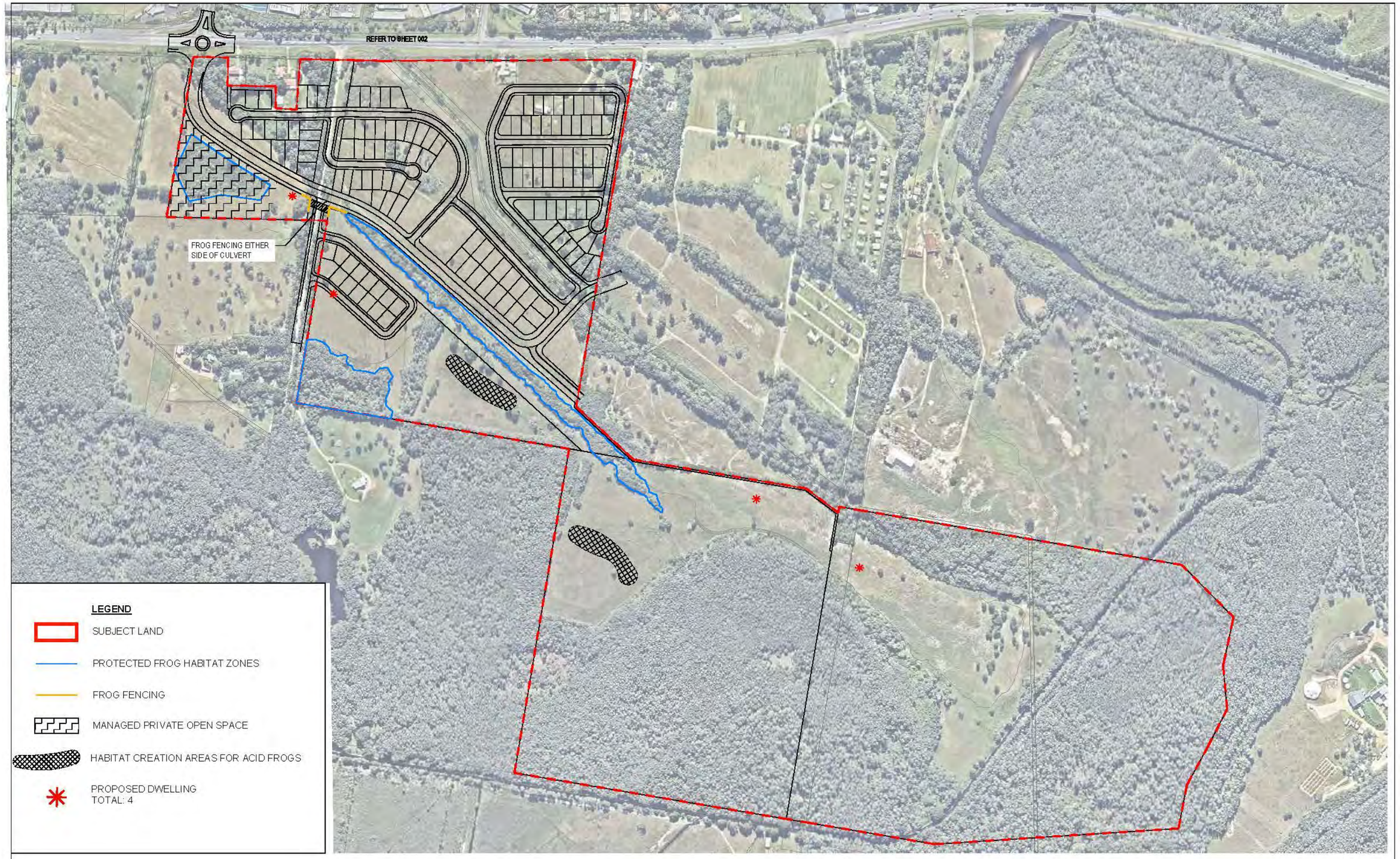
Date of decision	Conditions attached to approval
	conditions or commitments made in a **plan**. The approval holder must specify: a. any corrective action or investigation which the approval holder has already taken b. the potential impacts of the **incident** and/or non-compliance and/or non-compliance c. the method and timing of any corrective action that will be undertaken by the approval holder.

Date of decision	Definitions attached to approval
As varied on the date this instrument was signed	**BioBanking Statement** - **REVOKED**
As varied on the date this instrument was signed	**Business day** means a day that is not a Saturday, a Sunday or a public holiday in the state of New South Wales.
As varied on the date this instrument was signed	**Clear**, **cleared** or **clearing** means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting, or burning of vegetation.
Original dated 6/7/2018	**Commencement** means any physical works associated with the action, excluding fences and signage.
As varied on the date this instrument was signed	**Compliance reports** means written reports: i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans** ii. consistent with the **Department**'s *Annual Compliance Report Guidelines* (2014) iii. include a **shapefile** of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12-month period iv. annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12-month period.
Original dated 6/7/2018	**Department** means the Australian Government Department or any other agency administering the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) from time to time.
As varied on the date this instrument was signed	**EPBC Act** means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
As varied on the date this instrument was signed	**Existing habitat** means the areas represented in Attachment B by the zones enclosed within the blue solid lines labelled 'PROTECTED FROG HABITAT ZONES'.
As varied on the date this instrument was signed	**Habitat creation areas** means the areas represented in Attachment B by the black hatched shaded polygons labelled 'HABITAT CREATION AREAS FOR ACID FROGS'.

Date of decision	Definitions attached to approval
As varied on the date this instrument was signed	**Impact** means to cause any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.
As varied on the date this instrument was signed	**Incident** means any event which has the potential to, or does, impact on **Wallum Sedge Frog**.
As varied on the date this instrument was signed	**Minister** means the Minister administering the **EPBC Act** and includes a delegate of the Minister.
Original dated 6/7/2018	**New or increased impact** means a new or increased impact on any matter protected by the controlling provisions for the action, when compared to the plan that has been approved by the Minister.
As varied on the date this instrument was signed	**Project area** means the location of the action, represented by the area enclosed within the red lines labelled 'SUBJECT LAND' in Attachment B.
As varied on the date this instrument was signed	**Plan** means any action management plan or strategy that the approval holder is required by these conditions to implement.
As varied on the date this instrument was signed	**Rehabilitation Plan** means the document: Australian Wetlands Consultancy (2021) *Acid Frog Management Plan, 'Harvest Estate ', West Byron Urban Release Area, Ewingsdale Road, Byron Bay*, prepared for Tower Holdings Pty Ltd, dated 18 October 2021, or a version revised in accordance with this approval.
As varied on the date this instrument was signed	**Statement of assessment of reasonable equivalence of biodiversity credits** - **REVOKED**
As varied on the date this instrument was signed	**Wallum Sedge Frog** means the **EPBC Act** listed threatened species *Litoria olongburensis*, also known as the Olongburra Frog.
As varied on the date this instrument was signed	**Website** means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Date of decision	Annexures
As varied on the date this instrument was signed	**Annexure A – REVOKED**
As varied on the date this instrument was signed	**Annexure B – Habitat Creation Areas for Acid Frogs**
As varied on the date this instrument was signed	**Annexure C – REVOKED**

Attachment B: Habitat Creation Areas for Acid Frogs



SHEET 02

PROJECT: THREATENED SPECIES MANAGEMENT PLAN

DRAWING TITLE: HABITAT CREATION AREAS FOR ACID FROGS

01	LANDSCAPE MANAGEMENT PLAN FOR INFORMATION	13.05.20	AH	AH	JA
02	LANDSCAPE OPW FOR INFORMATION	18.08.20	AH	AH	LT

JOB NO: J5644 DWG NO: J5644_02

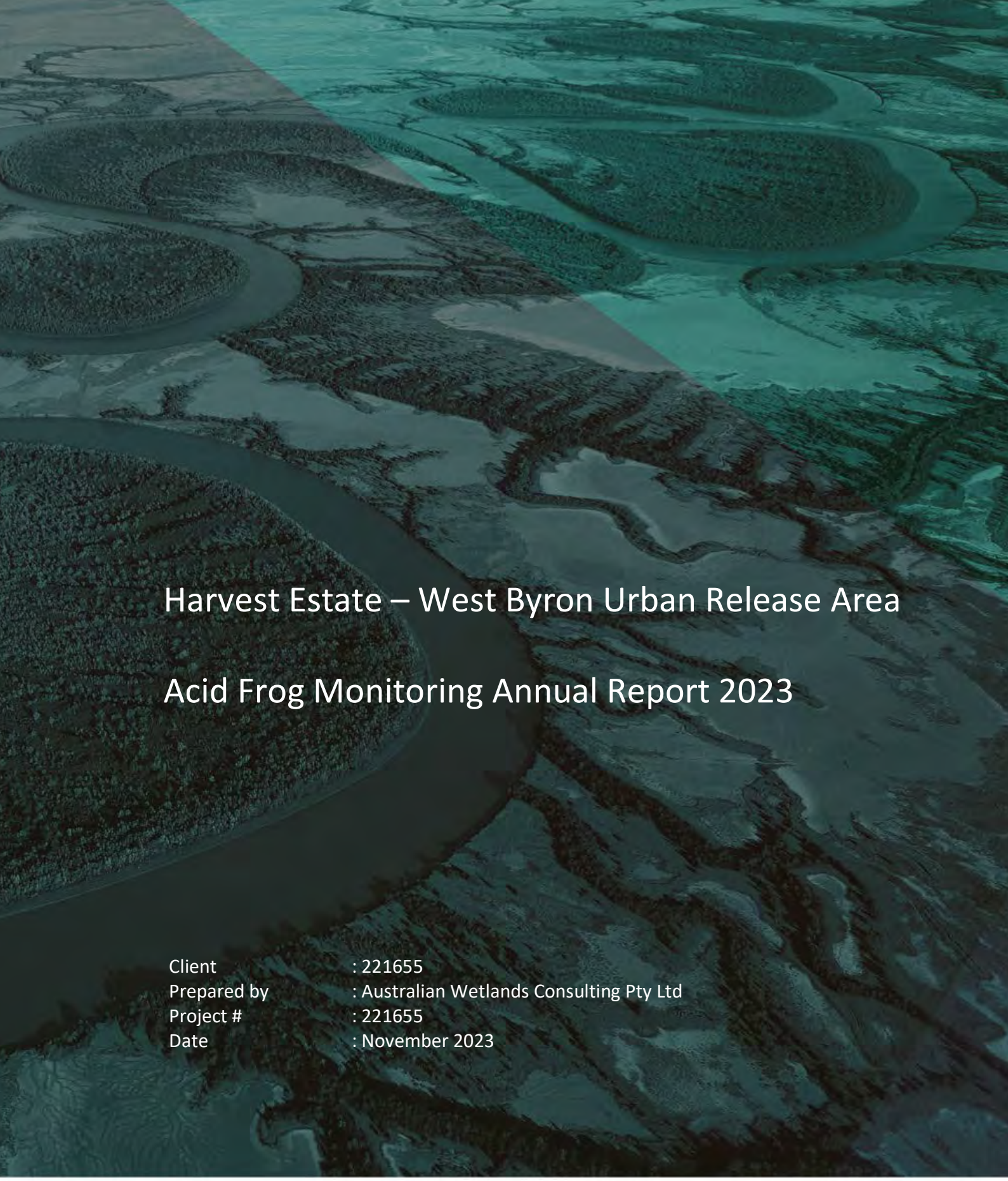
SCALE: 1:2500 @ A1

CLIENT: Tower Holdings Pty Ltd

Australian Institute of Landscape Architects

PLANIT
Level 1 2247 Gold Coast Hwy
PO Box 206
Nobby Beach QLD 4218
Telephone: 07 5526 1500
ABN: 20 011 261 711
Email: admin@planitconsulting.com.au

Appendix B – Acid Frog Monitoring Annual Report 2023



Harvest Estate – West Byron Urban Release Area

Acid Frog Monitoring Annual Report 2023

Client	: 221655
Prepared by	: Australian Wetlands Consulting Pty Ltd
Project #	: 221655
Date	: November 2023

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Harvest Estate – West Byron Urban Release Area

Acid Frog Monitoring Annual Report 2023

Project control

Project name:	Harvest Estate – West Byron Urban Release Area Acid Frog Monitoring Annual Report 2023
Job number:	221655
Client:	Planit Consulting Pty Ltd
Contact:	Giuseppe Fallara
Prepared by:	Australian Wetlands Consulting Pty Ltd

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Date:	Revision:	Prepared by:	Reviewed by:	Distributed to:
November 2023	A	Gareth Davies	Renae Baker	Giuseppe Fallara

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Executive Summary

This annual report has been completed following Acid Frog monitoring events undertaken in March, July and October 2023 targeting Wallum Sedge Frog (*Litoria olongburensis*) and Wallum Froglet (*Crinia tinnula*). Weekly water quality monitoring results and observations also inform the report on the state of Acid Frog populations at the Harvest Estate.

This report occurred entirely within the construction period which ended as the October monitoring was completed. While civil works have been completed, planting of the two created habitat basins is still to occur.

Triannual monitoring results determined:

- No Wallum Sedge Frogs were identified on site
- Twenty eight Wallum Froglets were identified on site at three locations
- Incidental observations of seven native frog species were noted throughout the monitoring period across all monitoring locations
- Cane Toad presence was noted across the site including within standing water of created habitat basins
- Retained habitat has shown a shift toward dryness with no standing water observed since March 2023, including immediately after significant rainfall events (>25mm/day)
- Retained habitat is shifting toward a vegetation community dominated by woody vegetation at the expense of sedgeland
- Weed presence remains <10% cover in habitat areas
- No Mosquito Fish (*Gambusia holbrooki*) were recorded
- Water quality (where existent) was within determined ranges for Acid Frogs

Recommendations and corrective actions going forward include:

- Investigation of changed groundwater regime focusing on the suspected role of the central drain in the drying out of adjacent retained habitat
    - Implement civil works to increase the probability of ephemeral water in retained habitat as per the key performance indicator (KPI) Wetland Hydroperiod (refer Table 4.4)
- Intensive surveying following Spring/Summer rain event including use of song-meters or pitfall trapping to conduct a more thorough search for Wallum Sedge Frog
- Thinning of woody vegetation (following Byron Shire Council (BSC) approval) to restore suitable sedgeland habitat
- Completion of wetland plantings in created habitat basins
- Ongoing weed control work

1 Introduction and Background

This annual report has been prepared to summarise monitoring results from Acid Frog monitoring undertaken at the Harvest Estate, West Byron Urban Release Area in accordance with the monitoring requirements set out in the Acid Frog Management Plan (AFMP) (AWC, 2021). Acid Frogs are known for their tolerance (and preference) for mildly acidic ground and water conditions and are found along Australia's eastern seaboard. Whilst their geographic range is largely unchanged since pre-European times, their area of occupancy has been significantly reduced due to land clearing, development and other anthropogenic impacts (Meyer *et al*., 2006). The scope of the AFMP is to address State and Commonwealth listed Acid Frogs that are known to occur on the proposed development site, specifically:

- Wallum Sedge Frog (*Litoria olongburensis*)
  - Listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
  - Listed as Vulnerable under the NSW *Biodiversity Conservation Act 2016* (BC Act)
- Wallum Froglet (*Crinia tinnula*)
  - Listed as Vulnerable under the BC Act.

The aim of the AFMP is to provide a mitigation strategy to ensure the conservation of these frog species and provide key monitoring and management actions to ensure the long-term survival of the species' across the subject site. Section 5 of the AFMP sets out monitoring requirements for the two species of Acid Frogs. A 20-year monitoring period has been established, from the pre-construction stage to the operational phase of the development. Monitoring of target frog species is required to be undertaken at eight permanent monitoring locations three times per year, at roughly four month intervals, by the appointed ecologist.

In order to determine whether mitigation strategies are successful, key performance criteria have been developed. These are outlined in Section 4.2 of this report; discussion of progress towards these indicators is outlined in Section 5 of this report, with recommendations following in Section 6.

1.1 Subject Site

Harvest Estate, part of the West Byron Urban Release Area, is located along Ewingsdale Rd, approximately 3km west of Byron Bay. The site is approximately 27.8ha in area, comprising a large residential subdivision on formerly rural lands. Eight permanent monitoring locations have been established at the site, to provide an indication of Acid Frog presence and population abundance at the site (refer to Figure 1.1).

Source:	Imagery: Nearmaps Layout: Harvest Estate AF Habitat and Monitiring Locations: AWC
Disclaimer:	Care was taken in the creation of this map. AWC should be consulted as to the suitability of the information shown here in prior to the commencement of any works based on the information provided. AWC cannot accept any responsibility for errors, omissions or positional accuracy. There are no warranties expressed or implied as to the suitability of this map for a particular purpose. However, notification of any errors will be appreciated.
Date	18-6-21

0 75 150 225 300 m

A3 Scale 1:4,000
Coordinate System: MGA 56 Projection: Transverse Mercator

Legend

AF Habitat

- Impacted
- Retained
- Created
- Created breeding habitat
- AF monitoring sites
- Layout

Figure 1.1 Site overview

2 Acid Frog Habitat

Both Wallum Froglet and Wallum Sedge Frog are found in wallum habitats, which are characterised by acidic conditions and ephemeral wetlands. The Wallum Sedge Frog is likely to be found in undisturbed wallum heath or sedgeland environments and is not generally known to inhabit disturbed environments. Their lifecycle is adapted to the acidic pH (2.5 to 5.5) of these wetlands. In undisturbed wallum habitat, Wallum Froglet occurs sympatric with other 'acid' frog species including the Wallum Sedge Frog and Wallum Rocket Frog (*Litoria freycineti*). In disturbed habitat, Wallum Froglet may be found in low-lying areas with sparse grass and sedge cover, including fire breaks and access tracks through wallum heath.

For breeding habitat, the Wallum Sedge Frog shows a clear preference for ephemeral (seasonally inundated) perched swamps with emergent sedges, with upright species such as *Baumea* and *Schoenus* preferred by adult frogs for perching.

Like other Acid Frog species, the Wallum Froglet is highly acid tolerant, breeding in waters as acidic as pH 3.2 (Hines and Meyer 2011; Meyer 2004). The Wallum Froglet is known to breed in shallow surface water along cleared tracks as well as borrow pits and drainage ditches (Hines and Meyer 2011). Non-breeding habitat usage is poorly documented in the Wallum Froglet, however, adult animals have been recorded some distance (many tens of metres) from breeding habitat in nearby Banksia woodland and/or open eucalypt forest (Meyer *et al*. 2006). Nonbreeding animals have also been located amidst damp leaf litter and down crayfish burrows (Hines and Meyer 2011).

2.1 Management on site

To ensure the long-term viability of the population of Wallum Sedge Frog and Wallum Froglet, the core elements of the AFMP's proposed mitigation strategy are:

- Retain existing habitat
    - A total of 3.0ha of habitat occurs at the site, with 2.95ha being retained following development. Habitat lost (0.05ha) is located adjacent a primary road
- Create new habitat
    - An additional 4.77 hectares of movement/foraging habitat will be created through vegetation management
    - An additional 0.64 hectares of breeding habitat (ponds) will be created
- Provide a fauna underpass connecting the two mapped habitat polygons, including installation of sections of frog fencing to facilitate effective movement
- Direct stormwater discharge away from habitat areas, resulting in no direct stormwater entering habitat during or after construction
- Implement management measures including sediment and erosion control, water quality monitoring, weed management, frog fencing and frog friendly fauna crossings
- Ensure that habitat being recreated, rehabilitated and conserved is protected and managed in perpetuity
- The design and implementation of rehabilitation and habitat re-creation will be informed by additional soil and groundwater assessment
- Maintaining and/or creating an ephemeral acidic wetland will be key to negating the threats of Cane

Toad and Mosquito Fish (*Gambusia holbrooki*) on existing Acid Frog populations at the site:
    - Ephemeral wetlands will disrupt the potential populations of the Mosquito Fish
    - Acidic waters (pH <5.2) are unfavourable to Cane Toad and Cane Toad breeding
- Ensure there are no artificial waterbodies created incidentally during development (defined as ponds/wetlands that have permanent water) in order to minimise the habitat suitable to Cane Toad and/or Mosquito Fish
- All water sensitive urban design (WSUD) devices are ephemeral, meaning they will dry out between rainfall events and thus not be habitable by either Cane Toads or Mosquito Fish
- Prevention of regular external catchment surface flows from entering frog habitat will ensure external transport of Cane Toad tadpoles and/or Mosquito Fish will not occur

3 Methods

To determine the success of the AFMP management and mitigation strategies, monitoring was undertaken to:

- Document the persistence of Wallum Sedge Frog and Wallum Froglet within retained areas of known habitat and created habitat
- Determine whether Acid Frogs are utilising areas of created habitat
- Determine that suitable pH occurs within all areas of retained and created habitat
- Record water depth and quality
- Determine the presence/influence of Cane Toads
- Determine the presence of weed species

Document the persistence of Mosquito Fish and the impact they are having on the Wallum Sedge Frog and Wallum Froglet populations and habitat

Monitoring of retained habitat areas was conducted three times during 2023 (March, July and October). Each monitoring event occurred over two nights for a total of 2.5 person hours and was comprised of:

- Nocturnal survey and counting of Wallum Sedge Frog and Wallum Froglet individuals at six locations across the two retained habitat areas
    - Two locations at the created habitat ponds were surveyed in October only due to the lag in construction
- Call playback to elicit response
- Water quality sampling if standing water was present
- Recording of incidental amphibian and Mosquito Fish at the site
- Recording weather conditions (temperature, relative humidity, rainfall)

Monitoring of created habitat areas commenced in the October monitoring period following completed excavations and, in part, translocation of macrophyte vegetation.

4 Results

Results from the three monitoring events are shown in Tables 4.1 - 4.3 and compared with rainfall in Figure 4.1.

Wallum Sedge Frog was not recorded at any of the monitoring locations, nor incidentally at the site. The last record at the site dates back to December 2022.

Wallum Froglet was recorded during all monitoring events in the retained habitat at AF-01. No individuals were recorded in retained habitat at Lot 227 (AF-02, 03, 03a, 04). A clear downward trend in abundance of Wallum Froglet has occurred throughout 2023, with a high in March (21 records) compared to three and four records in July and October respectively. This correlates with decreasing rainfall throughout the year.

Incidental records of other amphibian species also fell in July, with only one non-target species, the Common Eastern Froglet (*Crinia signifera*), recorded at the site. This result is consistent with a seasonal decrease in calling, a trend noted in previous winter surveys.

Rainfall during the July-October period also declined markedly, with just two large rainfall events occurring since June (>20mm/day) and monthly rainfall totals 65% below the historic average. Monthly rainfall data is provided in Appendix B.

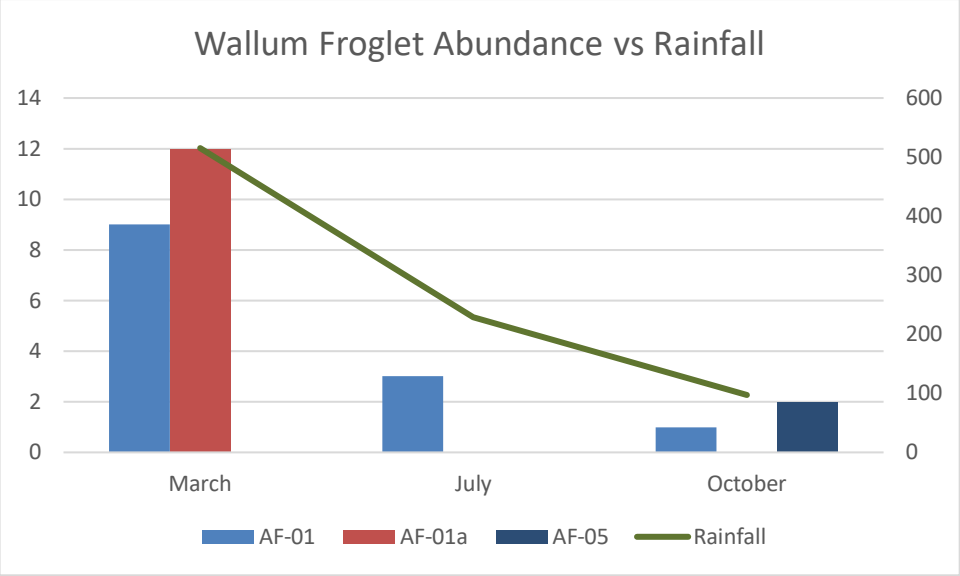

Figure 4.1 Graph of rainfall with records of Wallum Froglet

4.1 Survey and Assessment Limitations

Survey for the target species was limited to discrete periods of time and as such does not represent a census of populations at the site. The survey method was deemed appropriate for indicating the presence and abundance of the two target species as well as threatening processes identified in the AFMP.

Table 4.1 March 2023 monitoring results

Date: 21/03/2023													
Site	**Wallum Sedge Frog**	**No.**	**Wallum Froglet**	**No.**	**Depth (cm)**	**pH**	**DO (%)**	**Temp (˚C)**	**EC (µS/cm)**	**Turbidity (NTU)**	**Air Temp (˚C)**	**Humidity (%)**	**Incidentals**
AF-01	N	-	Y	4	-	n/a	n/a	n/a	n/a	n/a	24	78	-
AF-01a	N	-	Y	8	58	3.64	51.49	23.95	168	37.52	24	78	-
AF-02	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	24	78	*Crinia signifera*
AF-03	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	24	78	*Crinia signifera, Limnodynastes peronii*
AF-03a	N	-	N	-	35	3.72	41.81	24.23	388	5.61	24	78	*Crinia signifera, Litoria peroni*
AF-04	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	24	78	*Crinia signifera, Rhinella marina, Litoria fallax*
AF-05	Not Constructed												
AF-06	Not Constructed												
Date: 22/03/2023													
Site	**Wallum Sedge Frog**	**No.**	**Wallum Froglet**	**No.**	**Depth (cm)**	**pH**	**DO (%)**	**Temp (˚C)**	**EC (µS/cm)**	**Turbidity (NTU)**	**Air Temp (˚C)**	**Humidity (%)**	**Incidentals**
AF-01	N	-	y	5	-	n/a	n/a	n/a	n/a	n/a	22	82	-
AF-01a	N	-	y	4	125	3.69	61.48	24.19	167	13	22	82	-
AF-02	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22	82	*Crinia signifera*
AF-03	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22	82	*Crinia signifera, Limnodynastes peronii*
AF-03a	N	-	N	-	140	3.64	36.38	23.88	335	0.15	22	82	*Crinia signifera, Limnodynastes peronii, Litoria tyleri, Litoria peroni*
AF-04	N	-	N	-	88	4.24	44.07	23.25	139	9.25	22	82	*Crinia signifera, Rhinella marina*
AF-05	Not Constructed												
AF-06	Not Constructed												

Table 4.2 July 2023 monitoring results

Date: 26-07-2023													
Site	**Wallum Sedge Frog**	**No.**	**Wallum Froglet**	**No.**	**Depth (cm)**	**pH**	**DO (%)**	**Temp (˚C)**	**EC (µS/cm)**	**Turbidity (NTU)**	**Air Temp (˚C)**	**Humidity (%)**	**Incidentals**
AF-01	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.8	62	*Crinia signifera*
AF-01a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.8	62	-
AF-02	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.8	62	-
AF-03	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.8	62	*Crinia signifera*
AF-03a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.8	62	*Crinia signifera*
AF-04	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.8	62	-
AF-05	Not Constructed												
AF-06	Not Constructed												
Date: 27-07-2023													
Site	**Wallum Sedge Frog**	**No.**	**Wallum Froglet**	**No.**	**Depth (cm)**	**pH**	**DO (%)**	**Temp (˚C)**	**EC (µS/cm)**	**Turbidity (NTU)**	**Air Temp (˚C)**	**Humidity (%)**	**Incidentals**
AF-01	N	-	Y	3	-	n/a	n/a	n/a	n/a	n/a	16.3	65	-
AF-01a	N	-	N	-	-	n/a	n/a	n/a	168	n/a	16.3	65	*Crinia signifera*
AF-02	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	16.3	65	-
AF-03	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	16.3	65	-
AF-03a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	16.3	65	*Crinia signifera*
AF-04	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	16.3	65	-
AF-05	Not Constructed												
AF-06	Not Constructed												

Table 4.3 October 2023 monitoring results

Date: 27/10/2023													
Site	**Wallum Sedge Frog**	**No.**	**Wallum Froglet**	**No.**	**Depth (cm)**	**pH**	**DO (%)**	**Temp (˚C)**	**EC (µS/cm)**	**Turbidity (NTU)**	**Air Temp (˚C)**	**Humidity (%)**	**Incidentals**
AF-01	N	-	Y	1	-	n/a	n/a	n/a	n/a	n/a	17.5	94	*Crinia signifera*
AF-01a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.5	94	-
AF-02	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.5	94	-
AF-03	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.5	94	*Litoria gracilenta*
AF-03a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.5	94	-
AF-04	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	17.5	94	*Litoria fallax*
AF-05	N	-	N	-	5	4.4	80.4	18.1	355.3	877	17.5	94	*Rhinella marina*
AF-06	N	-	N	-	5	4.6	99	17.7	56.6	75.8	17.5	94	*Rhinella marina*
Date: 31/10/2023													
Site	**Wallum Sedge Frog**	**No.**	**Wallum Froglet**	**No.**	**Depth (cm)**	**pH**	**DO (%)**	**Temp (˚C)**	**EC (µS/cm)**	**Turbidity (NTU)**	**Air Temp (˚C)**	**Humidity (%)**	**Incidentals**
AF-01	N	-	Y	1	-	n/a	n/a	n/a	n/a	n/a	22.4	88	*Litoria nasuta*
AF-01a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22.4	88	-
AF-02	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22.4	88	-
AF-03	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22.4	88	-
AF-03a	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22.4	88	*Litoria nasuta*
AF-04	N	-	N	-	-	n/a	n/a	n/a	n/a	n/a	22.4	88	*Litoria nasuta*
AF-05	N	-	Y	2	10	3.97	92.2	26.4	247.6	131	22.4	88	*Litoria nasuta, Litoria fallax, Limnodynastes peronii, Rhinella marina*
AF-06	N	-	N	-	20	4.22	90.1	26.8	358.4	112	22.4	88	*Litoria nasuta, Limnodynastes peronii, Rhinella marina*

4.2 Key Performance Criteria

Key Performance Criteria prescribed by the AFMP and achievement status for Acid Frog management at Harvest Estate are detailed in Table 4.4.

Table 4.4 Key performance criteria and achievement status

Item	Performance Criteria	Achieved/Action required
Retained habitat areas		
Water quality	Water chemistry is between a pH range of 3 - 5	Yes
Wetland hydroperiod	Ponding of water for a minimum period of six weeks under >60th percentile rainfall conditions between January and May	No - investigate cause of moisture decline. Potentially undertake corrective civil works. While 2023 experienced below average rainfall it is reasonable to expect surface water during and immediately after the large rainfall events which occurred
Vegetation	Native vegetation continues to persist and is not degraded or disturbed.	No - Vegetation requires management action. See discussion
Weed control	Environmental weeds comprise < 10% total within each habitat area	Yes
Wallum Froglet / Wallum Sedge Frog populations	Existing/known habitat areas continue to be utilised by Wallum Froglet / Wallum Sedge Frog.	No – See discussion
Cane Toads	No observed breeding / tadpoles within created or retained habitat.	Yes – No tadpoles/ breeding observed
Mosquito Fish	Monitor Mosquito Fish population –include the drying out of water courses to control fish numbers.	Yes – None observed
Constructed habitat areas		
Water quality	As above	Yes
Wetland hydroperiod	Ponding of water for a minimum period of 6 weeks under >60th percentile rainfall conditions between January and May	Yes - Standing water observed since excavation in October
Weed control	Environmental weeds comprise < 10% total within each identified frog compensation area per precinct.	Yes
Habitat establishment	Survival rate of greater than 90% of all plantings and translocated material	No - Planting required in created habitat basins
Wallum Froglet / Wallum Sedge Frog populations	Utilisation by Wallum Froglet / Wallum Sedge Frog and persistence at constructed habitat areas over time.	No - Wallum Froglet – Present Wallum Sedge Frog - Absent
Cane Toad	No observed breeding / tadpoles within created or retained habitat.	Yes – None observed

5 Discussion

5.1 Climate context

Rainfall throughout 2023 exhibited a substantial decline throughout 2023 (refer Figure 4.1) and in comparison to previous years as the dominant climate drivers, including El Nino Southern Oscillation (ENSO), moved toward drier phases. The effect on habitat at the site was a reduction in moisture and standing water throughout the retained habitat areas. Throughout the year no standing water was identified at monitoring points AF-01, AF-02 and AF-03. March 2023 was the wettest period of survey, with three sites being inundated. A subsequent drying trend at the site is clear, as no retained habitat showed any signs of standing water for the rest of 2023. Weekly water monitoring that occurred at the same locations supports this result (refer Appendix A). Additionally, no water was opportunistically observed pooling anywhere in the retained habitat during the weekly water and weed inspections at the site.

5.2 Water quality and Hydrology

Hydrology at the site has undergone a noticeable shift in 2023. The most prominent aspect being the absence of standing water in retained habitat. Between 27th-30th October, 88mm of rainfall fell at the site. This rainfall failed to result in standing water or pooling at the site, and therefore it appears that climatic factors are playing only a background role in the drying out of habitat. No evidence of pooling water was found in the subsequent weeks also ruling out a groundwater lag. A potential cause lies in altered groundwater hydrology following the excavation of the central drain running parallel to Melaleuca Drive and the retained habitat in Lot 227. This should be investigated before initiating any rectifying civil works.

Water quality markers have only been taken in March at three sites (AF-01a, AF-03a and AF-04), in October in the created habitat basins and separately during weekly monitoring in the central drain. Measurements for key indicators remained stable and within the acceptable range (pH 3.5-5).

5.3 Frog records

5.3.1 Wallum Sedge Frog

No Wallum Sedge Frog have been recorded on site since December 2022. It is of note that observations dating back to January 2021 have only ever been recorded at AF-01a within the retained habitat basin. All records coincide with standing water which was last noted in March 2023.

It is suggested the lack of surface water is a key driver in the absence of Wallum Sedge Frog from the site. With records confined to the monitoring point AF-01, the population on site exists in a state highly vulnerable to altered habitat conditions. With a sustained absence of surface water it is expected the site will trend toward less suitable habitat for the Wallum Sedge Frog. Further efforts are therefore required to understand the cause in the changed hydrology at the site, following which, rectification is a priority.

5.3.2 Wallum Froglet

Records show a decline in Wallum Froglet abundance across the three monitoring events. The only change in presence occurred at AF-01a, where no individuals have been recorded since March. AF-01a is located in the same habitat basin as AF-01 where individuals were recorded across all monitoring events. While there is a

possibility Wallum Froglet has moved from AF-01a into AF-01, which provides greater macrophyte habitat, abundance has also declined.

No Wallum Froglet individuals were recorded in retained habitat within Lot 227 (ie. AF-02, AF-03, AF-03a and AF-04) throughout 2023. Habitat across this location exists primarily as a closed canopy dominated by woody vegetation, vines and ferns. The presence of sedgeland is limited to small extents with a lack of canopy cover. Following winter, soil moisture was observed to have decreased during weekly visits. As displayed in Figure 4.1 a decrease there is appears to be a relationship between decreasing rainfall and a decrease in Wallum Froglet observations. However, given as even large rainfall events are not resulting in the presence of standing water it is unlikely a drying climate is the sole reason for decreased abundance on site. As identified above altered hydrology appears to be leading to a shift away from suitable habitat for the species.

Excavation of two frog ponds in the southeast of the site was completed over four weeks in September-October. Following this, Pond 1 was transplanted with native macrophytes sourced in situ. Transplanting covered approximately 20% of the basin area. Survival of the transplanting occurred in line with the AFMP and under guidance of the appointed ecologist. To date survival rates are high, nursery plantings are awaited.

The October monitoring event followed two weeks after the completion of excavation at Basin 1 and one week after Basin 2. While the areas surrounding the two basins are vegetated with a partially exotic sedgeland/grassland, the only vegetation within the basins at the time of survey was the transplanted material in Basin 1. This survey was therefore the first to occur at monitoring points AF-05 (Basin 1) and AF-06 (Basin 2). Wallum Froglet was heard calling from AF-05; none were heard at the unvegetated AF-06. The presence of Wallum Froglet at AF-05 confirms the presence of Wallum Froglet at the site where suitable habitat is present, and the ability of the population to disperse into new habitats over short timeframes. From this it may be deduced the Wallum Froglet population is in healthy abundance and may be encouraged to locations of restored suitable habitat.

The survey in October also noted substantial numbers of Striped Rocket Frog (*Litoria nasuta*) and Striped Marsh Frog (*Limnodynastes peronii*), particularly in the grassy sedgeland between the central drain and created habitat basins. Of note is the increased abundance and distribution of frogs observed three days after the initial rains. Standing water in the created habitat ponds was also deeper, suggesting a lagged response in groundwater flows and associated frog activity across the site.

5.4 Habitat suitability

Continued presence of Wallum Froglet at AF-01 and rapid dispersal into AF-05 demonstrates that where suitable sedgeland habitat exists, presence is likely to occur. These two sites are comprised of the highest proportions of both standing water and macrophytes at the site. Despite the presence of standing water no Acid Frogs were observed at AF-06. Seen in comparison to AF-05, where transplanting has occurred and presence was observed, the absence is most likely due to a complete lack of vegetation.

Across the five other locations within retained habitat vegetation, structure and composition is shifting from sedgeland to a forested habitat dominated by regenerating *Melaleuca, Acacia* and *Leptospermum* species. This may be one contributing factor to the lower abundance of Acid Frog species recorded along the drainage line.

5.5 Weeds/Other

Weed control at the site is ongoing, with environmental weeds found to comprise <10% of total vegetation

within each habitat area. Although an increase was noted in Spring, this is to be expected as part of natural cycles. It should be noted, however, Lantana (*Lantana camara*), a State and Regional Priority Weed has been identified on site.

Of the monitoring sites surveyed, AF-02 and AF-04 were found to have the highest density of weeds, with species including Lantana and Whiskey Grass (*Andropogon virginicus*) being the most abundant. Large areas of Whiskey Grass are present along the edges of the retained habitat patches and within the planted-out habitat buffer areas. Weed control works targeting these species should continue to ensure native vegetation within these retained habitat areas does not become disturbed or degraded.

5.6 Pest species

No Mosquito Fish were recorded during 2023.

Cane Toad has been observed regularly across the site, including in and around retained habitat in Lot 227 and the constructed habitat basins. Cane Toads do not seem deterred by low pH in either the basins or central drain. Nonetheless, observations have recorded only adults with no breeding or tadpoles noted.

6 Recommendations

6.1 Thinning of woody vegetation

As part of weed control works, thinning of woody wetland species, in particular Blackwood (*Acacia melanoxylon*), Blueberry Ash (*Elaeocarpus reticulatus*), and to a lesser degree Broad-leaved Paperbark (*Melaleuca quinquenervia*), is recommended to encourage the establishment and retention of sedgeland habitat at the monitoring sites. This process may require approval and as such, liaison with Byron Shire Council (BSC) is required.

6.2 Completion of plantings

Priority recommendation is for plantings to occur at both created habitat basins. This is to occur promptly and prior to Summer to increase the likelihood of planting survival. From the October monitoring results it is clear the created habitat has the potential to provide much needed suitable habitat with a high probability of dispersal and colonisation.

6.3 Weed control

Given the low cover abundance of woody weeds there exists high potential to maintain suppression with minimal effort required. Continued weed control is required to maintain suppression of weeds in and around the habitat areas. Priority is to be placed on the removal of transformer species including Lantana and woody weeds.

6.4 Hydrology

A lack of standing water since March strongly suggests unforeseen changes to the groundwater regime have occurred. It is recommended an investigation occurs focusing on the suspected role of the central drain in the drying out of adjacent retained habitat. Civil works may be required to increase probability of ephemeral water in retained habitat as per KPI Wetland Hydroperiod (refer Table 4.4). Works to reinstate an ephemeral surface water regime will aid in efforts to return the habitat to a more suitable vegetation assemblage.

6.5 Increased survey effort

It is recommended more intensive surveying be undertaken following a significant Spring/Summer rain event (>20mm/day) to gain greater confidence in Wallum Sedge Frog survey results. Intensive surveying may include pitfall traps or song-meters and should occur over three nights.

7 References

AWC (2021) *Harvest Estate – West Byron Urban Release Area: Acid Frog Management Plan*. Australian Wetlands Consulting Pty Ltd. Document no. 1-201243_01d

Hines, H. B. and Meyer, E. A. (2011). *The frog fauna of Bribie Island: an annotated list and comparison with other Queensland dune islands.* Proceedings of the Royal Society of Queensland. **261-274**.

Meyer, E.A. 2004. *Acid adaptation and mechanisms for softwater acid tolerance in larvae of anuran species native to the 'wallum' of east Australia.* Unpublished PhD thesis. University of Queensland, St Lucia.

Meyer, E., Hero, J-M., Shoo, L., Lewis, B. (2006). *National Recovery Plan for the Wallum Sedgefrog and Other Wallum-dependent Frog Species.* Report to Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane.

Appendix A – Weekly water quality monitoring data

Date: 7-11-22		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	3.35	456	0-5	21.5	nil	55	0	ater, samples taken from upwelling und	
AF-01a	N	N/A	N	N/A	3.06	301	90	21.5	nil	55	0	No frogs, weed within habitat area <5%	
AF-02	N	N/A	N	N/A	4.1	117	25	21.5	nil	55	1x Crinia signifera	king next to habitat area -very loud and	
AF-03	N	N/A	N	N/A	3.97	99	85	21.5	nil	55	0	froglet calling from wetland habitat on	
AF-03a	N	N/A	Y	1	4.04	70	70	21.5	nil	55	0	No fence breaches	
AF-04	N	N/A	N	N/A	3.86	117	15	21.5	nil	55	0	No fence breaches	Fence intact throughout site. Weeds overall <10%. Some whisky grass starting to spread into frog habitat area apporximately on compound side of AF-02. Mimimal frogs calling - has been reasonably dry with no major rainfall in the last few days.
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Date: 17-11-22		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N	N	0	16.7	nil	49	0	No water, ground dry. No frogs	
AF-01a	N	N/A	N	N/A	3.85	264	15	16.7	nil	49	0	pond dry, minimal water surrounding lo	
AF-02	N	N/A	N	N/A	4.32	257	2	16.7	nil	49	0	water/creek dry, minimal water only in	
AF-03	N	N/A	N	N/A	N	N	0	16.7	nil	49	0	No water, creekline dry. No frogs.	
AF-03a	N	N/A	N	N/A	N	N	0	16.7	nil	49	0	No frogs. Small amount of water in cre	One pole on corner of AF-01 starting to fall over. Silt fence on compound side of AF03 over in one spot + 2 x holes eroded out underneith. Patrick (site foreman) notified and will fix.
AF-04	N	N/A	N	N/A	N	N	0	16.7	nil	49	0	No water, completely dry. No frogs.	
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Date: 22-11-22		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N	N	0	20.9	nil	40	0	No water, ground dry. No frogs	shabby. 2 x poles bent over. Silt fence loose. Silt fence on works area side of AF-02 down for 2-3m. Patrick informed. Other areas that were notified last week were fixed. Weedy grasses and cuphea starting to become mre pronounced on fence line of AF-02-04. Mainly whisky grass, paspalum. Some lantana and senna. Planted areas doing well with very low weed density.
AF-01a	N	N/A	N	N/A	N	N	in foot depressi	20.9	nil	40	0	th leaf litter + when depressed by boo	
AF-02	N	N/A	N	N/A	N	N	0	20.9	nil	40	0	No water, ground dry. No frogs. Snake	
AF-03	N	N/A	N	N/A	N	N	0	20.9	nil	40	0	vater, ground dry. No frogs. Weeds <1	
AF-03a	N	N/A	N	N/A	N	N	0	20.9	nil	40	0	No water, ground dry. No frogs	
AF-04	N	N/A	N	N/A	N	N	0	20.9	nil	40	0	ound dry. No frogs. Dense paspalum p	
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Date: 28-11-22		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N	N	0	23.4	nil	73	0	No water, ground dry. No frogs	
AF-01a	N	N/A	N	N/A	N	N	0	23.4	nil	73	0	No water, ground dry. No frogs	Sediment fnce interfacing AF-01 and swale needs repairing - not trenched in and top falling down in some areas. Same with works area side of AF-02. Guiseppe and Pat informed and will fix. Setaria on interface with AF-01 and swale needs controling. Weed control within planted areas looking good. Some weedy grasses on fence line of creekline habitat area.
AF-02	N	N/A	N	N/A	N	N	0	23.4	nil	73	0	No water, ground dry. No frogs	
AF-03	N	N/A	N	N/A	N	N	0	23.4	nil	73	0	No water, ground dry. No frogs	
AF-03a	N	N/A	N	N/A	N	N	0	23.4	nil	73	0	nd slightly damp when leaf litter moved	
AF-04	N	N/A	N	N/A	N	N	0	23.4	nil	73	0	No water, ground dry. No frogs	
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Date: 5.12.22		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	Y	2	4.07	663	150	20.7	derate (early morni	82	N		Water back across site - some issues with fencing,
AF-01a	N	N/A	Y	10+	3.47	334	220	20.7	derate (early morni	82	N	many wallum froglets calling	following points were emailed to planit.
AF-02	N	N/A	N	N/A	4.39	329	60	20.7	derate (early morni	82	N	no frogs, works happening adjacent	1.Silt fence between swale and habitat patch AF-01 – I
AF-03	N	N/A	N	N/A	4.18	326	170	20.7	derate (early morni	82	N	no frogs	can see that some efforts have been made to fix this
AF-03a	N	N/A	N	N/A	4.15	272	155	20.7	derate (early morni	82	Limnodynastes peror	lots of striped marsh frogs calling	fence after last week. The northern section looks better
AF-04	N	N/A	N	N/A	4.29	125	45	20.7	derate (early morni	82	N	no frogs	(good to see the bottom of the fence has been somewhat
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	buried in), however on the southern side it is still loose
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	and has areas where the bottom has not been buried.
Date: 13.12.2022		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	3.48	474	5	23.7	nil-slight	64	N	ing out, very little standing water. No fr	
AF-01a	N	N/A	N	N/A	3.55	292	120	23.7	nil-slight	64	N	No frogs	
AF-02	N	N/A	N	N/A	4.13	1058	10-Mar	23.7	nil-slight	64	N	No frogs	
AF-03	N	N/A	N	N/A	3.77	842	19-May	23.7	nil-slight	64	N	No frogs, passionfruit seedlings	Sed fences reinstalled - need some tweaking to get them
AF-03a	N	N/A	N	N/A	3.96	474	115	23.7	nil-slight	64	N	No frogs	up to spec, namely restapling to posts where the material
AF-04	N	N/A	N	N/A	4.19	138	40	23.7	nil-slight	64	N	gs. Weed control (broad leaf pasp) re	is sagging + tightening. Weed control on edges of habitat
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	required - many weedy grasses now in seed + areas of
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	lanatana and corky passionfruit emerging.
Date: 19.12.2022		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	0	20.5	nil	70	N	No water, no frogs	Sed fences need fixing to be compliant - many areas
AF-01a	N	N/A	N	N/A	4.03	297	90	20.5	nil	70	N	no frogs	where the material has become unstapled from the
AF-02	N	N/A	N	N/A	4.41	622	20	20.5	nil	70	N	cover 10-20% including senna, broad le	posts, the material is not pulled tight between posts,
AF-03	N	N/A	N	N/A	N/A	N/A	0	20.5	nil	70	N	frogs, some weed control required (bro	posts falling over and the material has not been burried
AF-03a	N	N/A	N	N/A	4.52	308	65	20.5	nil	70	N	no frgos	into the ground. Some places there is a visible gap
AF-04	N	N/A	N	N/A	N/A	N/A	0	20.5	nil	70	N	s, ground layer has a high cover of bro	underneith the fence. Today rubbish was observed within
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	the environmental protection, breacging the containment
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	line/fence. This included PVC piping, plastic sheeting and

Date: 11.01.2023		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	0	22.8	0	73	N	No water, No frogs	The weed control works that have been undertaken on
AF-01a	N	N/A	N	N/A	N/A	N/A	0	22.8	0	73	N	No water, No frogs	the edges of the frog habitat areas looks really good.
AF-02	N	N/A	N	N/A	N/A	N/A	0	22.8	0	73	N	No water, No frogs	Further works could focus on targeting woody weeds in
AF-03	N	N/A	N	N/A	N/A	N/A	0	22.8	0	73	N	No water, No frogs	particular:
AF-03a	N	N/A	N	N/A	N/A	N/A	0	22.8	0	73	N	No water, No frogs	-Poisoning of wo or three small camphor laurel trees
AF-04	N	N/A	N	N/A	N/A	N/A	0	22.8	0	73	N	No water, No frogs	(approx. 3-4m high) in southwestern corner of retained
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	frog habitat patch
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-Treatment of woody weeds including senna and
Date: 17.01.2023		Recorder: J.L, A.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	0	25.2	0	70	N	No water, No frogs	
AF-01a	N	N/A	N	N/A	N/A	N/A	0	25.2	0	70	N	No water, No frogs	
AF-02	N	N/A	N	N/A	N/A	N/A	0	25.2	0	70	N	, No frogs, senna, lantana, broad leaf	
AF-03	N	N/A	N	N/A	N/A	N/A	0	25.2	0	70	N	No water, No frogs	
AF-03a	N	N/A	N	N/A	N/A	N/A	0	25.2	0	70	N	No water, No frogs	some weed control works required within drainage line
AF-04	N	N/A	N	N/A	N/A	N/A	0	25.2	0	70	N	No water, No frogs	habitat (partiucarly around AF-02). Some camphors to be
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	poisoned within AF-01. Same issues around sediment
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	fences as last week.
Date: 25.01.23		Recorder: A.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	0	25.3	nil-slight	78	N	No water, No frogs	
AF-01a	N	N/A	N	N/A	N/A	N/A	0	25.3	nil-slight	78	N	No water, No frogs	
AF-02	N	N/A	N	N/A	N/A	N/A	0	25.3	nil-slight	78	N	No water, No frogs	Follow up weed control required within channel. Sed
AF-03	N	N/A	N	N/A	N/A	N/A	0	25.3	nil-slight	78	N	No water, No frogs	fence requires fixing in areas adjacent to the frog habitat.
AF-03a	N	N/A	N	N/A	N/A	N/A	0	25.3	nil-slight	78	N	No water, No frogs	Swale works underway and should be completed within
AF-04	N	N/A	N	N/A	N/A	N/A	0	25.3	nil-slight	78	N	No water, No frogs	the month. AWC need confirmations that this with
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	superseed existing sed plan. No go fencing down in
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	areas partiaclly retain habtat 1. Pat notified on the day.
Date: 30.01.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	0	25.5	nil-slight	79	N	No water, No frogs	
AF-01a	N	N/A	N	N/A	N/A	N/A	0	25.5	nil-slight	79	N	No water, No frogs	weed control works look good. Some additional weed
AF-02	N	N/A	N	N/A	N/A	N/A	0	25.5	nil-slight	79	N	, No frogs, senna, lantana, broad leaf	control works required within drainage line habitat
AF-03	N	N/A	N	N/A	N/A	N/A	0	25.5	nil-slight	79	N	lo water, No frogs, broad leaf paspalu	(partiucarly around AF-02) - within centre of habitat
AF-03a	N	N/A	N	N/A	N/A	N/A	0	25.5	nil-slight	79	N	No water, No frogs	rather than edges. Sed fences slightly improved along
AF-04	N	N/A	N	N/A	N/A	N/A	0	25.5	nil-slight	79	N	No water, No frogs	swale 03. Sed fences along swale soon to be reduntant -
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	works almost complete on swale. Exclusion bunting
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	down in several places around retained habitat patch 1.

Date: 07.02.2023		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	N/A	24.3	nil	72	N/A	ground dry	
AF-01a	N	N/A	N	N/A	N/A	N/A	N/A	24.3	nil	72	N/A	ground damp, no standing water	lots of regenerating wood vegetation in buffer zone next
AF-02	N	N/A	N	N/A	4.33	1464	(when depresse	24.3	nil	72	N/A	broad lead pasp	to swale 03. Weed control looking good - some areas of
AF-03	N	N/A	N	N/A	N/A	N/A	N/A	24.3	nil	72	N/A	vater in adjacent frog habitat - no callin	broadleaf pasp along drainange line. Corky passionflower
AF-03a	N	N/A	N	N/A	4.53	269	68	24.3	nil	72	N/A	no frogs calling	along northern bounday of drainage line starting to take
AF-04	N	N/A	N	N/A	N/A	N/A	N/A	24.3	nil	72	N/A	ground dry	off. Flagging tape down surrounding retained habitat
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	patch 1. Regen team onsite- may have sorted some of
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	these issues.
Date: 16.02.2023		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	Y	5-10	3.86	265	180	21.4	nil	73	n/a	ots of wallum froglet calling in buffer zo	
AF-01a	Y	2-4	Y	10+	3.4	236	260	21.4	nil	73	n/a	Lots of water, lots of AF calling	
AF-02	N	N/A	N/A	N/A	3.81	1111	35	21.4	nil	73	n/a	allow water, no frogs, weed density >1	
AF-03	N	N/A	N/A	N/A	3.22	775	140	21.4	nil	73	n/a	no frogs calling	
AF-03a	N	N/A	N/A	N/A	3.56	591	160	21.4	nil	73	era,Limnodynastes peronii (lots)		Lots of water across site - frogs both AF species and
AF-04	N	N/A	N/A	N/A	3.99	197	60	21.4	nil	73	nodynastes peronii (lots)		general very active. Swales working well. Vegetation
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	regenerating well - some bush regen works required in
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	northern end of drainage line retained habitat.
Date: 23/02/2023		Recorder: AL											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	NA	Y	10+	4.18	295	180	26	10mm /24hr	82			
AF-01a	Y	6	Y	10+	4.24	314	220	26	10mm /24hr	82			
AF-02	N	N/A	N	NA	3.9	360	150	26	10mm /24hr	82			
AF-03	N	N/A	N	NA	3.08	899	190	26	10mm /24hr	82	nastes peronii and C. signifera		
AF-03a	N	N/A	N	NA	3.97	237	200	26	10mm /24hr	82	nastes peronii and C. signifera		
AF-04	N	N/A	N	NA	3.74	150	80	26	10mm /24hr	82	nastes peronii and C.	within the contructed swale adjancent	Water across all sites and frog activity high.Swale
AF-05													completed, retaining wall works adjacent to habitat area
AF-06													started
Date: 27/02/23		Recorder: A.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	3.8	195	190	27	nil	65	N/A		
AF-01a	N	N/A	N	N/A	3.58	234	280	27	nil	65	N/A		
AF-02	N	N/A	N	N/A	3.75	197	140	27	nil	65	N/A		
AF-03	N	N/A	N	N/A	2.95	226	100	27	nil	65	N/A		
AF-03a	N	N/A	N	N/A	2.99	358	140	27	nil	65	N/A		
AF-04	N	N/A	N	N/A	3.78	130	80	27	nil	65	N/A		Water at all sites although pooling at AF3 and AF4. No
AF-05													frogs calling. Retaining wall works adjacent to habitat
AF-06													area started

Date: 08.03.2023		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	N	N/A	3.81	243	10	23.8	nil	86	n/a		*2/3/23 - crinia tinnula heard calling eastern end of
AF-01a	N	n/a	N	N/A	3.78	271	110	23.8	nil	86	n/a		drainage line - not sure if from new swale or retained
AF-02	N	n/a	N	N/A	n/a	n/a	0	23.8	nil	86	n/a	dry	habitat. Weed control works required across site - main
AF-03	N	n/a	N	N/A	2.84	3080	40	23.8	nil	86	n/a		weeds = whisky grass, lantana, senna pendula, cuphea,
AF-03a	N	n/a	N	N/A	3.89	464	85	23.8	nil	86	crinia signifera		setaria, passionfruit, broadleaf paspalum, megathrysis
AF-04	N	n/a	N	N/A	3.9	219	50	23.8	nil	86	n/a		maximus. Exclusion flagging down. Swale 03 bank near
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	AF-05 caved in - potential for run off to enter retained
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	habitat area, sed fence down in this section.
15.03.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	N	N/A	3.93	362	50	27	nil / 0.2mm over 24h	78	red belly black snake	oglets calling S of retained habitat in plan	
AF-01a	N	n/a	N	N/A	3.4	177	80	27	nil / 0.2mm over 24h	78	n/a		
AF-02	N	n/a	N	N/A	n/a	n/a	0	27	nil / 0.2mm over 24h	78	n/a		
AF-03	N	n/a	N	N/A	2.41	2660	70	27	nil / 0.2mm over 24h	78	n/a		exotic grasses need controlling across site. Water
AF-03a	N	n/a	N	N/A	3.17	577	60	27	nil / 0.2mm over 24h	78	n/a		quality readings in AF-02 now out of range for acid frogs
AF-04	N	n/a	N	N/A	3.91	113	65	27	nil / 0.2mm over 24h	78	n/a		- planit notified. Sediment control works around works
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		areas implemented. Swale built but banks not stabilised
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		- some areas eroding.
Date: 22.03.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	y	4	N/A	N/A	0	22	slight	96	N/A		
AF-01a	N	n/a	y	5	3.69	167	125	22	slight	96	N/A		
AF-02	N	n/a	N	N/A	N/A	N/A	0	22	slight	96	crinia signifera		
AF-03	N	n/a	N	N/A	N/A	N/A	0	22	slight	96	a signifera, Rhinella marina		
AF-03a	N	n/a	N	N/A	3.64	335	140	22	slight	96	a, Limnodynastes peroni, Litoria tyleri, Litoria peroni		exotic grasses need controlling. No water in upper
AF-04	N	n/a	N	N/A	4.24	139	88	22	slight	96	a signifera, Rhinella marina		drainage line. Lots of frogs calling from wetland habitat
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N of drainage line. Lots tinnula calling from buffer
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	habitat S of retained habitat.
Date: 30.03.23		Recorder: A.W											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	y	5	3.51	148	80	24.7	nil	73	N/A		
AF-01a	N	n/a	y	8	4.11	138	165	24.7	nil	73	N/A		
AF-02	N	n/a	N	N/A	3.32	1874	22.5	24.7	nil	73	crinia signifera 10+		
AF-03	N	n/a	N	N/A	2.72	1429	100	24.7	nil	73	crinia signifera 5+		
AF-03a	N	n/a	N	N/A	3.25	750	220	24.7	nil	73	crinia signifera 7+		
AF-04	N	n/a	N	N/A	4.57	107	80	24.7	nil	73	crinia signifera 8+		
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Date	PH	EC
27.02.23	2.95	226
08.03.23	2.84	3080
15.03.23	2.41	2660

Date: 06.04.2023		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	y	1	3.87	142.5	156	22.8	nil	74	N/A		
AF-01a	N	n/a	N	n/a	3.79	126.9	164	22.8	nil	74	N/A		
AF-02	N	n/a	N	n/a	n/a	n/a	0	22.8	nil	74	N/A		
AF-03	N	n/a	N	n/a	2.75	3223	90	22.8	nil	74	N/A		
AF-03a	N	n/a	N	n/a	3.49	684.26	174	22.8	nil	74	N/A		
AF-04	N	n/a	N	n/a	4.38	104.95	75	22.8	nil	74	N/A		
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Date: 14.04.2023		Recorder: A.W											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	N	n/a	N/A	N/A	0	21	nil	48	N/A		
AF-01a	N	n/a	N	n/a	4.35	125	112	21	nil	48	N/A		
AF-02	N	n/a	N	n/a	N/A	N/A	0	21	nil	48	N/A		
AF-03	N	n/a	N	n/a	N/A	N/A	0	21	nil	48	N/A		
AF-03a	N	n/a	N	n/a	3.67	370	115	21	nil	48	crinia signifera		
AF-04	N	n/a	N	n/a	N/A	N/A	0	21	nil	48	N/A		
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Date: 19.04.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	N	n/a	n/a	n/a	0	18.4	slight	87	N/A	buffer area to S and W has been mowed?	
AF-01a	N	n/a	N	n/a	3.72	139	111	18.4	slight	87	N/A		
AF-02	N	n/a	N	n/a	n/a	n/a	0	18.4	slight	87	N/A	looks as if weed control has taken place?	
AF-03	N	n/a	N	n/a	n/a	n/a	0	18.4	slight	87	N/A		
AF-03a	N	n/a	N	n/a	3.53	210	125	18.4	slight	87	crinia signifera		
AF-04	N	n/a	N	n/a	3.79	150	60	18.4	slight	87	N/A		
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Lots of whiskey grass across site. Passionfruit vines going
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	to seed on northern fence of drainage line.
Date: 27.04.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	N	N/A	3.66	250	86	20.5	slight	83		Crinia tinula in landscape area S of retained habitat patch	
AF-01a	N	n/a	Y	3	3.67	153	120	20.5	slight	83		Crinia tinula in landscape area S of retained habitat patch - 10-20	
AF-02	N	n/a	N	N/A	n/a	n/a	0	20.5	slight	83	crinia signifera	heaps of crinia signifera in drainage line to N	
AF-03	N	n/a	N	N/A	2.75	1,999	(in foot depresic	20.5	slight	83	crinia signifera	heaps of crinia signifera in drainage line to N	
AF-03a	N	n/a	N	N/A	3.7	282	187	20.5	slight	83	crinia signifera	heaps of crinia signifera in drainage line to N	
AF-04	N	n/a	Y - in swale to S	5+	4.32	97	80	20.5	slight	83	crinia signifera	Crinia tinula S of monitoring point towards swale 03	
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Date: 03.05.2023		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	n/a	N	n/a	n/a	n/a	0	21.1	nil	51	n/a	n/a	
AF-01a	N	n/a	N	n/a	3.76	159	104	21.1	nil	51	n/a	n/a	
AF-02	N	n/a	N	n/a	n/a	n/a	0	21.1	nil	51	n/a	n/a	
AF-03	N	n/a	N	n/a	n/a	n/a	0	21.1	nil	51	n/a	n/a	
AF-03a	N	n/a	N	n/a	3.96	192	130	21.1	nil	51	n/a	n/a	
AF-04	N	n/a	N	n/a	4.17	118.19	66	21.1	nil	51	n/a	n/a	
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	lots of whiskey grass in planting areas and along
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	interface of tracks/retained habitat
Date: 9/05/2023		Recorder: A.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	N/A	N/A	0	18.5	0	60	N	No water, No frogs	
AF-01a	N	N/A	N	N/A	N/A	N/A	0	18.5	0	60	N	No water, No frogs	
AF-02	N	N/A	N	N/A	N/A	N/A	0	18.5	0	60	N	No water, No frogs	
AF-03	N	N/A	N	N/A	N/A	N/A	0	18.5	0	60	N	No water, No frogs	
AF-03a	N	N/A	N	N/A	N/A	N/A	0	18.5	0	60	N	No water, No frogs	
AF-04	N	N/A	N	N/A	N/A	N/A	0	18.5	0	60	N	No water, No frogs	No go flagging still down along sites 1. whiskey grass in
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	planting areas and along interface of tracks/retained
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	habitat
Date: 18/05/2023		Recorder: AL											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	4.21	435	50	18	0	60	N		
AF-01a	N	N/A	N	N/A	3.71	162	200	18	0	60	N		
AF-02	N	N/A	N	N/A	n/a	n/a	0	18	0	60	N		
AF-03	N	N/A	N	N/A	2.78	212	100	18	0	60	N	C. signifera in drainage line to N	
AF-03a	N	N/A	N	N/A	3.92	509	180	18	0	60	N	C. signifera in drainage line to N	
AF-04	N	N/A	N	N/A	4.49	118	60	18	0	60	N		
AF-05	N/A	N/A	N/A	N/A	n/a	n/a	na	n/a	na	na	na		No go flagging still down along sites 1. Looks to of beebn
AF-06	N/A	N/A	N/A	N/A	n/a	n/a	na	n/a	na	na	na		weed control within planting area. Low pH at site 03.
Date: 24/05/2023		Recorder: A.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	4.27	318	25	19.5	0	60	N	no frogs calling	
AF-01a	N	N/A	N	N/A	3.98	262	185	19.5	0	60	N	no frogs calling	
AF-02	N	N/A	N	N/A	n/a	n/a	0	19.5	0	60	N	no frogs calling	
AF-03	N	N/A	N	N/A	n/a	n/a	0	19.5	0	60	N	no frogs calling	
AF-03a	N	N/A	N	N/A	4.37	387	65	19.5	0	60	N	no frogs calling	
AF-04	N	N/A	N	N/A	4.52	148	40	19.5	0	60	N	no frogs calling	
AF-05	N/A	N/A	N/A	N/A	n/a	n/a	na	n/a	0	na	na		
AF-06	N/A	N/A	N/A	N/A	n/a	n/a	na	n/a	0	na	na		same as last week
Date:		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01													
AF-01a													
AF-02													
AF-03													
AF-03a													
AF-04													
AF-05													
AF-06													

Date: 2.06.23		Recorder:AL											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A				15.8	0	54	N	no frogs calling	
AF-01a	N	N/A	N	N/A	3.7	229	80	15.8	0	54	N	no frogs calling	
AF-02	N	N/A	N	N/A	na	na	0	15.8	0	54	N	no frogs calling	
AF-03	N	N/A	N	N/A	na	na	0	15.8	0	54	N	no frogs calling	
AF-03a	N	N/A	N	N/A	3	na	50	15.8	0	54	N	no frogs calling	
AF-04	N	N/A	N	N/A	na	na	0	15.8	0	54	N	no frogs calling	
AF-05	N/A	N/A	N/A	N/A	na	na	0	15.8	0	54	na	na	Whisky grass starting to dry within planting area.
AF-06	N/A	N/A	N/A	N/A	na	na	0	15.8	0	54	na	na	Flagging still down in areas, Majority of sites dry
Date: 7.06.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	81	n	no water no frogs	
AF-01a	N	N/A	N	N/A	3.72	173	65	17.8	nil	81	n	no water no frogs	whiskey grass across site. Looks like weed control has
AF-02	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	81	ia signifera (in S swa	no water no frogs	taken place recently. Passionfruit vine still present on
AF-03	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	81	drainage line E of ro	no water no frogs	edges of retained habitat between AF-03A and AF-04.
AF-03a	N	N/A	N	N/A	3.45	266	108	17.8	nil	81	crinia signifera		planted area south of retained habitat patch AF-01 has
AF-04	N	N/A	N	N/A	4.25	163	85	17.8	nil	81	n		been recently slashed (again). Boyds Bay seem to have
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	installed exclusion fencing. Flagging still down across
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	majority of site.
Date: 15.06.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	15	nil	49	n	no water no frogs	All monitoring sites dry. No frogs heard calling (1x crinia
AF-01a	N	N/A	N	N/A	n/a	n/a	0	15	nil	49	n	no water no frogs	signifera heard calling in swale 03). Weed density <10%
AF-02	N	N/A	N	N/A	n/a	n/a	0	15	nil	49	n	no water no frogs	across site - some areas within environmental zone
AF-03	N	N/A	N	N/A	n/a	n/a	0	15	nil	49	n	no water no frogs	adjacent to swale 03 contain large patches of whisky
AF-03a	N	N/A	N	N/A	n/a	n/a	0	15	nil	49	n	no water no frogs	grass, however these are drying out. Significant natural
AF-04	N	N/A	N	N/A	n/a	n/a	0	15	nil	49	n	no water no frogs	regeneration taking place within cleared + planted areas
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	and within constructed swales. Exclusion flagging still
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	down in many areas.
Date: 22.06.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	16.6	nil	55	n	no water no frogs	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	16.6	nil	55	n	no water no frogs	
AF-02	N	N/A	N	N/A	n/a	n/a	0	16.6	nil	55	n	no water no frogs	
AF-03	N	N/A	N	N/A	n/a	n/a	0	16.6	nil	55	n	no water no frogs	
AF-03a	N	N/A	N	N/A	n/a	n/a	0	16.6	nil	55	n	no water no frogs	All monitoring sites dry. No frogs heard calling. Weed
AF-04	N	N/A	N	N/A	n/a	n/a	0	16.6	nil	55	n	no water no frogs	density <10% across site - some areas within
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	environmental zone adjacent to swale 03 contain large
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	patches of whisky grass, however these are drying out
Date: 28.06.23		Recorder: J.L											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	<
AF-01	N	N/A	N	N/A	n/a	n/a	0	18.2	nil	60	n	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	18.2	nil	60	n	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	18.2	nil	60	n	no water, no frogs, weeds <10%	all monitoring sites dry (all of the natural drainage line is
AF-03	N	N/A	N	N/A	n/a	n/a	0	18.2	nil	60	n	no water, no frogs, weeds <10%	dry - shallow water in swale 03). Weed density across
AF-03a	N	N/A	N	N/A	n/a	n/a	0	18.2	nil	60	crinia signifera x 3	no water, weeds <10%	site <10% - main issue to watch is passionfruit vine along
AF-04	N	N/A	N	N/A	n/a	n/a	0	18.2	nil	60	signifera x1 (in swa	no water, no frogs, weeds <10%	driveway adjacent to drainage line, there are areas where
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	the vine is starting to creep into the canopy. Some of the
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	eucs in the planting areas are starting to get big.

Date: 06.07.23		Recorder: JL											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	17.3	nil	58	n	no water, no frogs, weeds <10%	Rain earlier in the week has meant the site is somewhat
AF-01a	N	N/A	N	N/A	n/a	n/a	0	17.3	nil	58	n	no water, no frogs, weeds <10%	damper - however still no standing water within the
AF-02	N	N/A	N	N/A	n/a	n/a	0	17.3	nil	58	n	no water, no frogs, weeds <10%	retained creekline/habitat areas. Some common frogs
AF-03	N	N/A	N	N/A	n/a	n/a	0	17.3	nil	58	crinia signifera x 1	no water, weeds <10%	heard calling along the eastern half of the retained
AF-03a	N	N/A	N	N/A	n/a	n/a	0	17.3	nil	58	crinia signifera x 3	no water, weeds <10%	drainage line. Weed control acrtoss the site is looking
AF-04	N	N/A	N	N/A	n/a	n/a	0	17.3	nil	58	crinia signifera x 1	no water, weeds <10%	good. Same general issues as last week, plus the addition
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	of some flowering lantana on the edge of the
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	development and habitat near monitoring point 02.
13.07.23		JL											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	15.8	nil	80	n	no water, no frogs, weeds <10%	No standing water within the retained creekline/habitat
AF-01a	N	N/A	N	N/A	n/a	n/a	0	15.8	nil	80	n	no water, no frogs, weeds <10%	areas. Vegetation along the retaining wall adjacent to the
AF-02	N	N/A	N	N/A	n/a	n/a	0	15.8	nil	80	n	, weeds <10%, dead tree fallen over n	area of monitoring point AF-02 has been pushed back/
AF-03	N	N/A	N	N/A	n/a	n/a	0	15.8	nil	80	n	no water, no frogs, weeds <10%	cleared approximate 1m in from the edge to infill the
AF-03a	N	N/A	N	N/A	n/a	n/a	0	15.8	nil	80	n	no water, no frogs, weeds <10%	trench from the previous sediment fence that was in its
AF-04	N	N/A	N	N/A	n/a	n/a	0	15.8	nil	80	n	no water, no frogs, weeds <10%	place. This area will likely regenerate naturally however it
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	must be monitored for new weed incursions. Should
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	vegetation not regenerate, additional plantings may be
Date: 20.07.23		Recorder: JL											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	14.9	nil	55	n	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	14.9	nil	55	n	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	14.9	nil	55	n	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	14.9	nil	55	n	no water, no frogs, weeds <10%	
AF-03a	N	N/A	N	N/A	n/a	n/a	0	14.9	nil	55	n	no water, no frogs, weeds <10%	
AF-04	N	N/A	N	N/A	n/a	n/a	0	14.9	nil	55	n	no water, no frogs, weeds <10%	No standing water within the retained creekline/habitat
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	areas. No frogs heard calling. Whiskey grass starting to
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	die off in planted areas.
Date: 26.07.23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	62	crinia signifera x 2	no water, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	62	n	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	62	n	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	62	crinia signifera x 2	no water, weeds <10%	
AF-03a	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	62	crinia signifera x 1	no water, weeds <10%	
AF-04	N	N/A	N	N/A	n/a	n/a	0	17.8	nil	62	n	no water, no frogs, weeds <10%	No standing water within the retained creekline/habitat
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	areas. Only common frogs (Common Eastern Froglet)
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	heard calling including from swale at AF-03.
Date: 27.07.23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	Y	3	n/a	n/a	0	16.3	nil	65	n	no water, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	16.3	nil	65	crinia signifera x 1	no water, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	16.3	nil	65	n	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	16.3	nil	65	n	no water, no frogs, weeds <10%	
AF-03a	N	N/A	N	N/A	n/a	n/a	0	16.3	nil	65	crinia signifera x 1	no water, weeds <10%	No standing water within the retained creekline/habitat
AF-04	N	N/A	N	N/A	n/a	n/a	0	16.3	nil	65	n	no water, no frogs, weeds <10%	areas. Wallum froglet heard in the vicinity of AF-01.
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Common frogs (Common Eastern Froglet) heard calling
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	including at two sites.

Date: 16/8/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	18.6	nil	73	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	18.6	nil	73	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	18.6	nil	73	N	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	18.6	nil	73	crinia signifera x 1	no water, weeds <10%	Previous days rained, damp soil but no standing water
AF-03a	N	N/A	N	N/A	n/a	n/a	0	18.6	nil	73	N	no water, no frogs, weeds <10%	within the retained creekline/habitat areas. One Crinia
AF-04	N	N/A	N	N/A	n/a	n/a	0	18.6	nil	73	N	no water, no frogs, weeds <10%	signifera heard calling near AF-03 in retained drainage
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	line. Weed control across the site is looking good. Moth
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	vine noted within the retained drainage line.
Date: 23/8/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	22.1	nil	70	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	22.1	nil	70	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	22.1	nil	70	N	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	22.1	nil	70	N	no water, no frogs, weeds <10%	Dry. No rain previous week. No frogs heard calling. Weed
AF-03a	N	N/A	N	N/A	n/a	n/a	0	22.1	nil	70	N	no water, no frogs, weeds <10%	control across the site is looking good. Whiskey grass on
AF-04	N	N/A	N	N/A	n/a	n/a	0	22.1	nil	70	N	no water, no frogs, weeds <10%	edge of retained drainage line habitat starting to come
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	back. Adolescant Moth vine and Lantana noted within the
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	retained drainage line near AF-02.
Date: 30/8/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	18	nil	80	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	18	nil	80	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	18	nil	80	N	no water, no frogs, weeds <10%	Dry. No rain previous week. Crinia signifira heard calling
AF-03	N	N/A	N	N/A	n/a	n/a	0	18	nil	80	N	no water, no frogs, weeds <10%	in distance closest to AF-04. Weed control across the site
AF-03a	N	N/A	N	N/A	n/a	n/a	0	18	nil	80	N	no water, no frogs, weeds <10%	is still looking good. Weedy grasses beginning to
AF-04	N	N/A	N	N/A	n/a	n/a	0	18	nil	80	N	no water, no frogs, weeds <10%	encroach in the vicinity of AF-03a. Adolescant Moth Vine,
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Senna and Lantana noted within the retained drainage
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	line near AF-02.

Date: 07/09/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	18.8	nil	82	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	18.8	nil	82	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	18.8	nil	82	N	no water, no frogs, weeds <10%	Dry. No rain previous week. Crinia signifira heard calling
AF-03	N	N/A	N	N/A	n/a	n/a	0	18.8	nil	82	N	no water, no frogs, weeds <10%	in distance closest to AF-04. Weed control across the site
AF-03a	N	N/A	N	N/A	n/a	n/a	0	18.8	nil	82	N	no water, no frogs, weeds <10%	is still looking good. Weedy grasses beginning to
AF-04	N	N/A	N	N/A	n/a	n/a	0	18.8	nil	82	N	no water, no frogs, weeds <10%	encroach in the vicinity of AF-03a. Adolescant Moth Vine,
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Senna and Lantana noted within the retained drainage
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	line near AF-02.
Date: 13/09/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	15.9	nil	77	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	15.9	nil	77	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	15.9	nil	77	N	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	15.9	nil	77	N	no water, no frogs, weeds <10%	Moist but no standing water. Last rain 2 days previous.
AF-03a	N	N/A	N	N/A	n/a	n/a	0	15.9	nil	77	N	no water, no frogs, weeds <10%	Weed control across the site is still looking good. Weedy
AF-04	N	N/A	N	N/A	n/a	n/a	0	15.9	nil	77	N	no water, no frogs, weeds <10%	grasses beginning to encroach in the vicinity of AF-03a.
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Adolescant Moth Vine, Senna, Ochna and Lantana noted
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	within the retained drainage line near AF-02.
Date: 20/9/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	66	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	66	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	66	N	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	66	N	no water, no frogs, weeds <10%	
AF-03a	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	66	N	no water, no frogs, weeds <10%	Moist soil but no standing water. No rain recorded at
AF-04	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	66	N	no water, no frogs, weeds <10%	Cape Byron AWS in previous week. Weed control across
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	the site is still the same. Excavations beginning for
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	constructed habitat (AF-05 and AF-06)
Date: 27/9/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	79	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	79	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	79	N	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	79	N	no water, no frogs, weeds <10%	Moist soil but no standing water. No rain recorded at
AF-03a	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	79	N	no water, no frogs, weeds <10%	Cape Byron AWS in previous week. Potential
AF-04	N	N/A	N	N/A	n/a	n/a	0	19.9	nil	79	N	no water, no frogs, weeds <10%	(unrecorded)light rain over the weekend. Weed control
AF-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	across the site is still the same. Excavations continuing
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	for habitat at AF-05. No work started at AF-06

Date: 09/10/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	no water, no frogs, weeds <10%	
AF-02	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	no water, no frogs, weeds <10%	
AF-03	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	no water, no frogs, weeds <10%	Dry soil no standing water. Approx 30mm rain over the
AF-03a	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	no water, no frogs, weeds <10%	previous 2 days. No rain recorded at Cape Byron AWS in
AF-04	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	no water, no frogs, weeds <10%	previous week. Woody weeds (incl. Lantana & Ochna)
AF-05	N	N/A	N	N/A	n/a	n/a	0	24.6	nil	52	N	N/A	emerging. Excavations completed for habitat at AF-05.
AF-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Work started at AF-06
Date: 20/10/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, weeds <10%	Excavations completed for both created habitat ponds
AF-02	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, weeds <10%	(AF-05 and AF-06). Dry soil in retained habitat areas
AF-03	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, weeds <10%	waterlogged soil at AF-05. Standing water present in
AF-03a	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, weeds <10%	deepest cells of AF-06. Small amount of rain over the
AF-04	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, weeds <10%	previous 2 days. Woody weeds increasing on edge of
AF-05	N	N/A	N	N/A	n/a	n/a	0	23	nil	62	N	no water, no frogs, translocated veg	retained habitat parrallel to central drain although
AF-06	N	N/A	N	N/A	4.98	406	10	23	nil	62	N	no frogs, no veg	remain <10% emerging.
Date: 31/10/23		Recorder: GD											
Site	Wallum Sedge Frog Y/N	Number	Wallum Froglet Y/N	Number	PH	EC	Depth (mm)	Air Temp	Rainfall	Humidity %	Other species	Notes	Comments
AF-01	N	N/A	Y	1	n/a	n/a	0	22.4	nil	88	Y	no water, weeds <10%	
AF-01a	N	N/A	N	N/A	n/a	n/a	0	22.4	nil	88	Y	no water, weeds <10%	40mm of rain 3 days previous. Standing water in all but highest
AF-02	N	N/A	N	N/A	n/a	n/a	0	22.4	nil	88	N	no water, no frogs, weeds <10%	cells AF-05 and 06. AF-05 with translocated vegetation being
AF-03	N	N/A	N	N/A	n/a	n/a	0	22.4	nil	88	N	no water, no frogs, weeds <10%	colonised by frogs; Striped Rocket Frogs (Litoria nasuta)
AF-03a	N	N/A	N	N/A	n/a	n/a	0	22.4	nil	88	Y	no water, weeds <10%	dominating. Cane toads present. No standing water present in
AF-04	N	N/A	N	N/A	n/a	n/a	0	22.4	nil	88	Y	no water, weeds <10%	any of retained habitat despite large rains (including
AF-05	N	N/A	N	N/A	3.97	248	10	22.4	nil	88	Y	translocated veg only	immediately after rain event). Woody weeds and Whiskey Grass
AF-06	N	N/A	N	N/A	4.22	358	20	22.4	nil	88	Y	no veg	increasing on edge of retained habitat parrallel to central drain
													although remain <10% emerging.

Appendix B – Monthly rainfall data

Byron Bay, New South Wales
December 2022 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	15.4	19.3	10.8			SSE	78	15:44	16.4	90		S	56	1011.2	17.8	91		SSE	57	1007.9
2	Fr	15.5	21.5	40.4			S	89	05:59	19.3	72		SE	54	1009.3	21.2	62		SE	54	1009.8
3	Sa	15.4	22.3	8.0			SSE	74	02:04	21.1	69		SE	43	1014.1	21.6	64		SE	31	1013.8
4	Su	16.2	21.6	5.2			S	52	13:46	17.3	96		SW	20	1015.0	19.2	85		S	41	1013.3
5	Mo	16.6	26.6	9.0			ESE	41	23:50	20.7	82		SW	22	1011.4	24.4	70		ESE	22	1007.9
6	Tu	20.2	28.1	0.2			SSW	65	19:37	23.0	82		NNW	17	1006.4	27.0	73		N	28	1003.3
7	We	18.7	29.0	0			N	43	22:35	22.6	78		S	13	1009.3	28.1	67		ENE	15	1006.6
8	Th	21.6	30.0	0			SSE	67	21:51	23.3	84		WSW	13	1005.5	25.8	76		NNE	31	1002.2
9	Fr	19.5	23.0	19.6			SE	56	23:04	20.5	67		ESE	30	1012.2	21.8	66		E	22	1011.3
10	Sa	17.7	23.6	6.8			NE	44	21:28	18.9	92		NW	11	1016.4	22.1	74		E	13	1015.7
11	Su	18.2	24.3	1.0			N	54	18:35	22.9	68		NNE	19	1016.5	23.7	69		NNE	31	1013.2
12	Mo	21.4	25.4	0			N	63	15:51	24.2	74		NNW	31	1010.6	24.9	81		N	43	1006.6
13	Tu	21.8	26.4	0			SE	43	09:18	23.0	71		SE	26	1010.6	25.6	59		E	28	1009.2
14	We	19.3	29.2	0			NE	26	15:16	23.4	74		WSW	11	1008.0	28.6	62		ENE	15	1004.0
15	Th	17.4	25.0	0			E	43	15:23	19.2	67		SW	20	1008.4	23.8	55		E	28	1006.5
16	Fr	17.4	27.8	4.0			S	54	22:56	20.9	69		S	9	1011.5	26.4	54		ENE	15	1010.3
17	Sa	15.6	22.1	3.6			S	63	21:30	19.5	73		SSW	30	1016.6	21.4	65		S	37	1016.2
18	Su	15.5	21.8	0.2			SSW	65	08:40	19.0	72		SSW	37	1018.4	20.9	64		S	44	1017.3
19	Mo	15.0	21.9	0			S	70	14:13	18.6	70		SSW	33	1018.9	21.1	65		S	56	1018.1
20	Tu	14.3	21.7	0			S	63	23:29	18.7	70		SSW	33	1018.8	21.1	63		S	41	1016.8
21	We	14.7	22.7	0.8			S	50	01:55	17.7	86		SSW	24	1017.2	22.2	61		SSE	24	1015.5
22	Th	17.5	27.4	0			NNE	44	19:03	22.7	65		SE	9	1017.5	25.2	51		NE	31	1014.8
23	Fr	21.2	26.1	0			N	43	11:20	23.4	68		N	9	1014.7	23.8	74		N	26	1012.7
24	Sa	20.7	25.7	2.0			NNW	28	06:24	22.0	81		NNW	15	1012.7	23.6	82		NW	7	1011.7
25	Su	19.4	28.4	0.6			SSE	37	10:05	24.1	71		S	15	1014.4	26.3	72		SE	19	1015.5
26	Mo	21.2	27.0	0			E	39	11:35	25.0	74		E	19	1021.2	25.5	67		E	30	1020.5
27	Tu	21.2	26.7	0			ESE	44	04:55	24.2	69		E	31	1021.9	25.2	64		SE	28	1020.0
28	We	20.1	27.6	0			ESE	37	06:36	20.1	85		ESE	9	1016.9	25.8	64		E	22	1015.3
29	Th	18.9	25.8	5.4			E	50	21:15	22.1	81		S	22	1014.7	24.9	71		SE	28	1013.5
30	Fr	20.1	24.9	5.0			ESE	52	23:41	23.6	82		E	30	1014.7	22.0	93		ENE	24	1013.4
31	Sa	19.4	26.8	4.2			ENE	46	00:08	22.5	85		S	13	1014.8	26.1	70		ENE	20	1013.1
Statistics for December 2022																					
	Mean	18.3	25.2							21.3	76			23	1013.9	23.8	68			29	1012.1
	Lowest	14.3	19.3							16.4	65		#	9	1005.5	17.8	51		NW	7	1002.2
	Highest	21.8	30.0	40.4			S	89		25.0	96		S	56	1021.9	28.6	93		SSE	57	1020.5
	Total			126.8																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202212 Prepared at 13:00 UTC on 11 Nov 2023

Byron Bay, New South Wales
January 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Su	21.3	27.4	0.2			E	39	16:31	22.7	88		NE	13	1014.2	24.9	66		E	22	1012.7
2	Mo	19.1	26.0	0			ESE	37	14:19	22.6	75		SSW	26	1013.0	25.1	63		ESE	26	1010.4
3	Tu	19.0	30.2	0			WSW	31	04:18	22.9	67		S	13	1008.6	29.5	52		NE	17	1004.7
4	We	20.9	29.5	0			NE	57	19:28	24.3	73		NNW	6	1005.2	26.8	74		NE	37	1002.4
5	Th	20.8	26.5	6.0			S	78	16:48	21.7	97		NW	6	1003.9	26.1	83		NE	19	1002.6
6	Fr	18.3	23.5	26.0			SSW	61	12:44	20.1	90		SSW	30	1007.1	23.1	76		SSW	39	1007.4
7	Sa	18.4	24.1	0.4			S	59	21:58	21.2	79		SSW	24	1009.3	23.1	77		S	46	1007.6
8	Su	18.5	25.0	3.2			S	50	11:01	20.7	86		SW	28	1011.5	23.8	76		SSE	30	1010.1
9	Mo	19.1	27.3	0.2			SSE	39	23:14	22.7	71		S	17	1012.8	26.7	59		E	22	1010.5
10	Tu	19.3	25.0	0			SE	52	17:32	22.5	68		SSW	24	1012.0	24.7	64		S	33	1011.0
11	We	20.1	25.0	0			SSW	50	11:00	22.8	73		SSW	22	1013.8	24.7	69		SSE	31	1012.7
12	Th	19.8	28.4	0			E	35	13:46	23.4	75		S	15	1016.2	26.0	63		E	24	1015.1
13	Fr	19.8	28.1	0			E	37	14:42	23.1	74		S	15	1018.3	27.7	61		E	28	1016.6
14	Sa	21.2	26.1	0.2			ENE	44	06:18	22.0	85		ENE	17	1017.9	24.0	69		ENE	20	1016.5
15	Su	21.3	29.9	0			ENE	26	00:38	23.2	75		S	11	1018.3	28.7	57		ENE	17	1017.1
16	Mo	21.0	27.5	0			ENE	41	18:06	23.1	81		S	13	1019.5	26.8	69		ESE	28	1018.7
17	Tu	22.2	29.8	0.4			E	37	01:09	25.2	70		E	24	1018.6	27.5	62		E	24	1016.9
18	We	21.8	29.7	0			E	33	05:16	25.0	64		ENE	20	1014.4	29.4	51		ENE	19	1012.1
19	Th	18.7	27.8	0			NE	41	14:02	23.8	66		N	9	1009.6	26.8	60		NE	30	1006.3
20	Fr	20.0	23.8	1.2			ESE	63	12:30	21.4	95		SW	13	1011.7	23.4	66		SSE	31	1011.5
21	Sa	17.6	24.9	1.6			S	56	23:34	21.1	80		SW	24	1014.5	23.8	68		S	33	1012.9
22	Su	17.7	29.8	1.4			E	41	00:38	21.3	89		SW	17	1013.3	27.8	61		ENE	17	1012.4
23	Mo	20.9	31.2	0.2			NE	39	16:01	25.1	63		NE	13	1013.3	30.7	48		NE	24	1010.9
24	Tu	21.8	29.4	0			NE	52	16:28	25.3	73		N	7	1013.1	27.6	65		NE	35	1010.0
25	We	20.7	28.2	4.4			N	39	15:20	25.3	78		ENE	9	1012.9	26.9	77		NNE	20	1010.7
26	Th	21.8	30.6	0			NNE	46	18:42	24.9	77		SSW	2	1014.8	28.7	77		N	20	1012.1
27	Fr	22.6	29.4	0			WSW	39	08:37	24.2	70		WSW	20	1015.6	26.0	69		WSW	19	1012.7
28	Sa	22.1	33.3	0			NE	44	21:42	26.5	81		N	6	1015.0	32.9	60		NE	24	1013.4
29	Su	24.0	32.2	0.2			NE	44	16:13	26.7	79		NNW	7	1015.2	31.0	60		NE	30	1013.6
30	Mo	23.8	29.1	2.0			NE	48	13:46	25.5	79		NNE	17	1013.2	27.1	72		NE	39	1009.9
31	Tu	22.2	27.9	3.2			N	50	14:20	22.7	93		N	11	1005.6	27.3	70		N	24	1001.2
Statistics for January 2023																					
	Mean	20.5	28.0							23.3	77			15	1013.0	26.7	65			26	1011.1
	Lowest	17.6	23.5							20.1	63		SSW	2	1003.9	23.1	48		#	17	1001.2
	Highest	24.0	33.3	26.0			S	78		26.7	97		SSW	30	1019.5	32.9	83		S	46	1018.7
	Total			50.8																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202301 Prepared at 13:00 UTC on 10 Nov 2023

Byron Bay, New South Wales
February 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	21.4	28.7	77.8			SE	37	14:58	23.5	97		WSW	9	1002.1	26.2	78		SSE	24	1001.2
2	Th	23.1	31.0	0			NNE	46	19:43	25.8	81		E	2	1002.5	30.2	69		NE	22	999.3
3	Fr	23.0	31.7	0			N	56	19:21	25.9	87		NNE	11	998.3	28.6	79		N	17	996.5
4	Sa	24.4	29.4	0			NNW	37	23:28	25.5	87		SSW	22	1003.9	27.2	75		E	24	1005.5
5	Su	23.5	30.0	0.2			E	44	23:21	26.3	69		E	20	1014.3	29.5	54		E	22	1014.2
6	Mo	21.6	30.2	0			ENE	28	17:57	24.0	77		S	13	1018.0	28.0	59		ENE	15	1016.2
7	Tu	21.4	27.2	0			ESE	33	16:17	24.3	72		SSW	11	1015.3	26.4	60		SE	24	1014.0
8	We	20.8	28.7	0			E	35	17:32	22.8	79		SSW	13	1014.4	27.8	57		E	19	1013.1
9	Th	22.6	28.6	0			ENE	37	06:36	24.9	68		ENE	17	1012.8	27.1	63		ENE	19	1011.4
10	Fr	22.0	26.9	0			ESE	43	13:20	23.0	76		SSW	17	1008.9	25.6	63		SE	30	1006.0
11	Sa	19.5	27.7	0			WSW	35	05:55	23.2	74		SW	20	1007.4	26.7	64		SE	22	1006.2
12	Su	21.5	29.9	0			NE	46	21:45	23.8	80		NNW	7	1005.4	28.5	69		NNE	20	1001.3
13	Mo	23.8	30.5	1.2			ESE	46	19:17	27.3	77		ENE	13	1007.0	25.5	84		S	35	1005.8
14	Tu	21.3	26.4	2.4			ESE	69	19:11	23.4	93		SW	15	1008.3	23.9	82		SSE	20	1007.1
15	We	19.2	25.9	42.0			ESE	57	04:02	22.4	89		ESE	22	1013.5	23.5	75		ESE	39	1014.2
16	Th	18.4	27.3	0.2			E	35	00:00	21.4	73		SW	17	1018.3	25.6	52		E	24	1016.7
17	Fr	20.6	29.2	0			ENE	22	19:08	23.2	66		S	9	1018.3	27.9	52		ENE	15	1015.9
18	Sa	21.1	30.6	0			NNE	37	22:36	25.0	72		ENE	2	1017.2	29.8	54		ENE	19	1014.8
19	Su	20.8	29.8	0			N	30	23:01	24.7	72		N	9	1017.5	28.7	56		E	13	1018.0
20	Mo	23.3	30.8	0			E	39	17:53	25.2	69		E	17	1020.8	28.5	61		ENE	15	1020.2
21	Tu	22.7	30.3	0.2			ENE	33	06:13	25.0	71		E	13	1021.2	27.2	58		E	13	1020.1
22	We	20.9	26.5	1.4			ESE	67	05:42	24.2	68		ESE	43	1018.3	25.1	63		SSE	28	1017.8
23	Th	19.8	26.2	8.4			ESE	70	02:13	23.9	66		ESE	39	1017.4	22.5	78		S	39	1017.0
24	Fr	18.1	24.0	64.0			E	78	04:40	19.8	96		ENE	35	1017.9	22.1	81		ENE	33	1016.7
25	Sa	17.8	27.0	33.2			SSW	41	02:19	19.7	91		SW	19	1017.3	26.4	66		NE	11	1015.4
26	Su	19.7	29.4	0.6			NE	37	16:09	23.6	75			Calm	1016.2	29.0	63		NE	20	1014.0
27	Mo	22.3	26.8	0			N	41	21:22	24.3	77		N	11	1014.6	26.3	69		NNE	24	1011.9
28	Tu	22.0	27.3	0			NE	43	11:57	23.8	81		NNW	9	1013.1	26.4	69		NNE	20	1011.2
Statistics for February 2023																					
	Mean	21.3	28.5							23.9	77			15	1012.9	26.8	66			22	1011.5
	Lowest	17.8	24.0							19.7	66			Calm	998.3	22.1	52		NE	11	996.5
	Highest	24.4	31.7	77.8			E	78		27.3	97		ESE	43	1021.2	30.2	84		#	39	1020.2
	Total			231.6																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202302 Prepared at 13:00 UTC on 9 Nov 2023

Byron Bay, New South Wales
March 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	22.7	26.1	0			N	54	13:12	24.1	76		N	26	1008.6	25.7	75		NNE	35	1005.3
2	Th	20.2	25.9	3.0			W	43	00:44	21.6	93		SW	28	1010.5	24.1	83		S	30	1010.0
3	Fr	20.4	25.9	16.8			SSE	48	22:00	21.5	97		SW	15	1013.5	25.0	67		SSE	33	1013.1
4	Sa	18.5	25.1	2.8			ESE	65	00:47	22.1	86		SE	19	1014.3	24.9	60		SE	35	1012.5
5	Su	18.9	28.7	2.0			E	46	00:12	21.4	84		WSW	15	1014.2	28.0	65		E	17	1012.1
6	Mo	20.3	26.5	0.2			N	56	21:07	24.1	77		N	15	1013.2	25.9	67		NNE	33	1010.1
7	Tu	23.1	27.9	0			N	54	01:33	24.8	70		N	28	1011.4	26.0	71		NNE	35	1008.2
8	We	23.4		0			N	48	23:01	23.8	86		NNW	24	1008.5	25.9	78		N	17	1006.9
9	Th	22.7	27.7	0.2			S	37	11:26	24.2	87		WNW	17	1009.3	23.5	80		S	19	1009.2
10	Fr	21.9	25.5	0			ESE	39	12:53	23.9	91		SSW	17	1015.6	24.8	79		ESE	33	1014.4
11	Sa	21.8	28.0	0			N	39	21:14	23.9	91		SSW	6	1015.7	25.8	82		E	13	1013.3
12	Su	22.9	27.0	0.4			SW	37	13:37	24.0	97		W	6	1010.4	22.2	98		SSE	11	1007.8
13	Mo	21.2	24.7	27.0			SSW	57	16:27	21.8	94		SSW	28	1010.9	23.9	85		S	41	1009.9
14	Tu	20.4	24.6	13.4			SSW	43	23:03	22.3	93		SW	19	1014.3	24.4	85		S	28	1013.0
15	We	20.4	28.9	0.2			NNE	37	15:42	23.8	78		NNW	6	1014.2	27.0	78		N	17	1011.0
16	Th	21.7	30.2	0			WSW	33	03:02	24.3	88			Calm	1013.8	29.6	73		ENE	15	1011.1
17	Fr	22.5	32.2	0			NNW	28	23:13	26.1	76			Calm	1014.1	30.9	70		ENE	11	1013.1
18	Sa	21.7	28.8	0.2			E	30	13:06	24.0	87		SSW	13	1020.7	27.9	76		E	24	1019.3
19	Su	22.4	30.5	0			NE	43	20:58	25.5	84		NE	2	1021.7	29.7	64		NE	26	1019.3
20	Mo	21.1	30.3	0			SSE	39	22:59	24.8	76		NW	6	1020.6	29.7	60		ENE	17	1019.3
21	Tu	23.5	29.3	0			ESE	65	19:50	25.8	72		E	26	1023.4	25.5	78		S	13	1021.7
22	We	20.2	24.8	5.6			ESE	67	01:16	23.2	82		E	30	1022.3	23.2	82		SSE	19	1020.4
23	Th	21.0	28.7	1.4			NE	31	16:14	23.5	68		ENE	13	1021.1	27.9	55		NE	17	1019.2
24	Fr	19.6	29.5	0			SW	35	07:14	20.6	83		W	22	1018.5	29.1	63		ENE	15	1014.3
25	Sa	20.6	26.6	0			ESE	31	14:05	23.0	85		SSW	19	1016.4	25.9	70		ESE	24	1014.2
26	Su	19.2	25.8	22.6			WSW	35	05:36	20.9	98		SW	13	1016.1	24.3	82		SSE	19	1014.3
27	Mo	20.4	27.9	0			N	39	20:27	22.7	84		WSW	6	1016.4	26.4	73		NNE	20	1013.2
28	Tu	22.1	28.9	0			SSW	28	22:58	23.5	86		S	7	1015.1	25.7	72		SSE	22	1012.8
29	We	21.3	24.3	0			N	37	16:25	21.4	91		WSW	22	1013.5	23.5	95		NW	6	1009.8
30	Th	20.0	29.2	10.2			WSW	46	22:11	21.6	80		WSW	26	1007.4	28.5	46		W	19	1005.0
31	Fr	18.5	24.4	0			WSW	46	23:14	19.4	56		SW	22	1012.5	23.2	58		ESE	13	1010.5
Statistics for March 2023																					
	Mean	21.1	27.5							23.1	83			16	1014.8	26.1	73			21	1012.7
	Lowest	18.5	24.3							19.4	56			Calm	1007.4	22.2	46		NW	6	1005.0
	Highest	23.5	32.2	27.0			ESE	67		26.1	98		E	30	1023.4	30.9	98		S	41	1021.7
	Total			106.0																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202303 Prepared at 13:00 UTC on 8 Nov 2023

Byron Bay, New South Wales
April 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Sa	18.2	23.3	0			SW	31	04:09	18.7	71		SW	19	1013.1	22.9	72		SSE	13	1011.7
2	Su	16.5	23.5	0						20.0	84		SW	24	1015.3	22.2	73		S	31	1013.7
3	Mo	16.6	24.3	6.8			E	46	13:29	19.3	96		SSW	13	1017.3	22.4	73		E	30	1015.2
4	Tu	17.6	22.9	26.6			SW	48	07:51	18.0	99		SW	35	1015.3	21.9	82		S	33	1012.8
5	We	17.9	24.2	1.2			S	72	14:25	21.2	72		SW	33	1012.0	23.2	72		S	56	1009.9
6	Th	17.6	24.3	1.0			SW	43	00:07	20.8	77		SSW	24	1014.1	22.6	78		E	19	1011.6
7	Fr	18.8	24.9	0.4			N	61	13:05	23.5	74		N	7	1011.5	22.7	83		N	35	1004.9
8	Sa	19.8	26.8	4.4			W	57	09:53	23.5	57		WNW	20	1003.1	26.4	34		WSW	30	1001.3
9	Su	17.9	26.3	0.2			W	56	10:43	20.7	47		WSW	20	1007.4	25.8	33		W	26	1004.0
10	Mo	16.6	25.5	0			SW	44	21:51	19.7	44		WSW	19	1009.6	25.2	38		W	13	1005.9
11	Tu	15.9	25.5	0			W	41	09:14	19.0	48		WSW	24	1012.3	24.4	40		SW	11	1008.6
12	We	16.5	24.9	0			SW	31	00:34	19.2	49		WSW	17	1012.3	23.7	46		NNE	13	1008.0
13	Th	16.7	25.2	0			S	59	13:40	22.9	50		W	9	1004.9	21.9	59		S	43	1005.1
14	Fr	16.8	22.1	0			S	56	14:55	19.8	65		SSW	28	1010.4	22.0	72		S	41	1008.2
15	Sa	17.0	25.5	0			NNW	43	20:47	20.6	72		SSW	11	1012.6	24.2	65		NE	20	1009.1
16	Su	20.6	26.3	0			N	48	14:46	24.5	66		NNW	17	1011.4	25.1	70		N	31	1008.0
17	Mo	20.6	23.2	0.2			S	78	20:51	23.0	73		S	46	1017.4	21.9	82		S	43	1017.9
18	Tu	17.1	22.7	3.6			E	54	22:55	19.6	79		SSW	26	1022.8	22.1	60		S	37	1019.4
19	We	16.3		3.4			ESE	56	03:02	18.4	87		SW	22	1018.2	22.3	62		S	35	1015.2
20	Th									19.0	76		SW	22	1018.4	22.0	67		SSE	43	1016.4
21	Fr	16.1	23.1				SSE	70	17:25	22.7	68		SE	33	1021.9	21.0	76		S	48	1021.3
22	Sa	15.7	22.2	18.2			SSE	65	15:57	16.7	97		SW	26	1026.1	21.1	74		SSE	41	1024.3
23	Su	16.5	23.1	0			ESE	65	23:20	22.0	55		SE	31	1026.6	22.3	63		SE	35	1025.9
24	Mo	19.1	23.4	0.8			ESE	81	06:17	22.4	73		E	57	1027.2	19.0	94		E	54	1026.4
25	Tu	18.5	22.6	4.0			E	63	20:07	21.1	78		E	26	1027.3	19.6	85		E	33	1024.1
26	We	18.0	23.2	2.4			E	61	08:09	19.8	82		E	44	1025.3	21.4	72		E	39	1023.5
27	Th	18.1	24.0	0.2			ENE	54	00:03	22.0	71		ENE	20	1024.1	22.0	71		ENE	17	1021.5
28	Fr	16.7	23.0	1.4			ESE	35	12:40	19.5	85		SSW	11	1020.8	22.3	62		E	13	1017.2
29	Sa	17.2	24.8	0			NE	35	14:25	19.9	79		W	9	1013.7	22.3	78		NE	22	1010.0
30	Su	17.8	24.3	3.2			WSW	35	23:55	18.6	82		SW	17	1011.6	23.0	63		ENE	11	1010.5
Statistics for April 2023																					
	Mean	17.5	24.1							20.5	71			23	1016.1	22.6	66			30	1013.7
	Lowest	15.7	22.1							16.7	44		N	7	1003.1	19.0	33		#	11	1001.3
	Highest	20.6	26.8	26.6			ESE	81		24.5	99		E	57	1027.3	26.4	94		S	56	1026.4
	Total			78.0																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202304 Prepared at 16:00 UTC on 7 Nov 2023

Byron Bay, New South Wales
May 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Mo	15.6	21.7	0			WSW	44	05:14	17.7	60		WSW	11	1014.8	21.6	45		WSW	15	1012.7
2	Tu	14.8	21.0	0			WSW	41	03:43	16.1	55		WSW	19	1019.7	19.9	52		SW	9	1016.2
3	We	16.1	24.6	0			WSW	39	03:16	18.7	57		SW	20	1021.0	23.2	57		ENE	11	1016.6
4	Th	16.9	21.9	0			ESE	43	18:19	19.5	50		SW	19	1018.8	21.5	58		SE	19	1016.4
5	Fr	14.6	21.7	0			SW	35	05:56	17.4	71		SW	19	1020.1	20.5	66		ESE	17	1017.1
6	Sa	17.0	24.3	0			N	35	20:31	21.5	64		N	2	1020.6	22.3	62		NE	20	1016.5
7	Su	18.9	24.6	0			WSW	52	22:06	20.4	70		NNW	6	1016.9	22.7	62		NNE	19	1012.7
8	Mo	9.7	19.9	0			WSW	54	08:18	12.6	46		WSW	31	1016.3	19.7	24		SW	24	1013.6
9	Tu	10.5	19.0	0			S	50	15:49	14.1	43		SW	28	1020.0	18.2	61		S	33	1018.6
10	We	14.1	19.9	0			S	52	11:30	16.8	63		SSW	30	1024.7	18.9	74		S	35	1023.2
11	Th	13.3	19.9	2.0			ENE	44	18:41	16.5	90		SSW	20	1028.3	19.8	82		SSW	19	1026.9
12	Fr	14.0	20.1	7.8			ESE	41	19:20	15.5	95		SW	20	1030.4	19.8	76		SE	17	1027.8
13	Sa	14.3	21.2	0.4			ESE	46	22:53	16.0	93		SW	15	1029.8	20.5	69		ESE	26	1026.7
14	Su	14.3	18.2	2.0			ENE	54	19:17	14.9	97		WSW	22	1027.7	16.5	89		SSW	15	1023.8
15	Mo	14.9	19.5	24.8			ESE	44	01:20	16.6	98		SW	17	1024.9	18.9	86		S	28	1020.9
16	Tu	16.6	17.5	53.2			S	56	11:11	17.2	97		E	39	1015.5	15.8	93		SSW	35	1012.4
17	We	14.8	19.7	19.6			SSW	72	15:58	16.9	69		SW	44	1016.7	18.9	74		SSW	43	1015.5
18	Th	12.6	17.9	0			SSW	50	02:21	14.4	65		SW	24	1019.1	17.6	63		S	28	1015.5
19	Fr	11.9	17.8	0			SW	41	05:40	13.8	73		SW	17	1017.3	17.0	62		S	30	1014.8
20	Sa	13.7	21.5	0			WSW	39	22:58	15.4	56		WSW	19	1018.2	20.1	53		NE	13	1015.2
21	Su	11.4	19.8	0			WSW	46	07:23	13.9	53		WSW	24	1019.3	19.5	38		W	20	1015.3
22	Mo	12.6	18.3	0			SW	46	01:18	14.6	55		SW	26	1026.0	17.8	61		S	28	1024.9
23	Tu	14.6	20.9	0			SW	22	04:58	16.3	62		SW	9	1028.1	20.2	59		E	11	1026.5
24	We	14.2	21.3	0			SW	30	03:42	15.9	73		SW	15	1028.4	20.4	60		ENE	9	1025.4
25	Th	14.8	22.2	0			N	37	16:14	18.7	66		NNW	11	1025.2	21.0	56		NNE	22	1019.9
26	Fr	15.8	22.2	0			SW	56	18:28	20.0	66		NNW	15	1014.6	20.9	65		N	24	1008.8
27	Sa	13.6	18.2	0			SW	56	05:17	15.3	64		SSW	31	1016.2	17.7	64		S	28	1014.3
28	Su	13.1	20.5	0			WSW	43	23:17	15.0	71		SW	13	1017.0	19.2	59		NE	13	1014.4
29	Mo	11.0	18.6	0			WSW	44	00:15	13.2	52		SW	22	1020.4	18.2	41		SW	13	1019.0
30	Tu	12.8	22.1	0			SW	41	00:09	15.7	51		SW	19	1025.3	20.5	46		NE	11	1022.4
31	We	13.4	21.6	0			N	41	15:43	18.2	53		ENE	4	1023.7	20.6	52		NNE	22	1019.8
Statistics for May 2023																					
	Mean	14.1	20.6							16.4	67			19	1021.5	19.7	61			21	1018.5
	Lowest	9.7	17.5							12.6	43		N	2	1014.6	15.8	24		#	9	1008.8
	Highest	18.9	24.6	53.2			SSW	72		21.5	98		SW	44	1030.4	23.2	93		SSW	43	1027.8
	Total			109.8																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202305 Prepared at 13:00 UTC on 6 Nov 2023

Byron Bay, New South Wales
June 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	13.7	23.1	0			W	30	10:43	19.3	58		NNW	9	1021.0	22.2	54		NNE	9	1018.4
2	Fr	15.8	21.1	0			SW	35	05:48	17.1	75		SW	19	1025.0	20.8	74		SSE	17	1023.5
3	Sa	16.0	22.2	0			E	24	00:37	16.8	87		SW	13	1026.8	20.9	75		E	11	1024.6
4	Su	14.8	20.2	0			E	59	23:27	16.9	93		SSW	24	1029.0	19.9	79		E	28	1026.6
5	Mo	16.4	19.8	0.2			E	69	03:16	18.6	68		SE	33	1029.6	18.7	69		SE	26	1026.4
6	Tu	13.9	19.1	0.8			SSE	35	15:41	15.2	96		SW	17	1028.9	18.0	82		S	17	1025.9
7	We	14.2	20.1	0			S	35	11:05	16.3	88		SSW	15	1027.4	19.4	66		E	13	1024.1
8	Th	15.9	21.9	0			N	37	16:18	17.4	77		SW	6	1022.7	20.1	75		NE	22	1017.8
9	Fr	14.7	20.3	0			WSW	41	09:37	16.2	66		WSW	22	1019.0	20.0	50		SW	11	1016.8
10	Sa	13.7	20.4	0			SW	37	06:16	15.3	57		WSW	19	1023.1	19.6	60		ESE	9	1021.2
11	Su	15.3	21.2	0			WSW	19	06:17	16.0	76		SW	15	1025.5	20.2	63		ENE	9	1022.7
12	Mo	15.0	21.0	0			ESE	20	14:23	15.8	81		SSW	11	1023.3	19.4	77		ESE	13	1020.5
13	Tu	15.7	21.6	0			NNE	39	14:20	19.9	78			Calm	1019.0	20.5	78		N	20	1014.9
14	We	15.2	23.0	0			W	48	13:13	20.1	43		WNW	9	1016.3	21.9	30		SW	15	1013.7
15	Th	11.7	18.5	0			WSW	43	00:32	13.3	53		WSW	22	1018.7	17.3	54		ESE	15	1015.9
16	Fr	10.5	18.4	0			WSW	39	03:41	13.1	61		SW	24	1021.9	17.7	59		SSE	15	1020.1
17	Sa	12.5	18.7	0			SW	35	06:54	13.8	71		SW	24	1023.1	18.4	63		SE	13	1020.0
18	Su	12.9	21.1	0			NNE	39	15:02	17.3	63		NNW	11	1019.9	19.8	69		NNE	24	1014.9
19	Mo	14.5	20.4	0			WSW	50	22:56	15.6	51		SW	24	1018.1	19.4	35		WSW	13	1015.0
20	Tu	10.9	16.8	0			SW	48	07:17	12.9	42		WSW	20	1019.4	15.2	45		SW	13	1018.7
21	We	9.4	17.1	0			SW	41	03:42	11.0	50		WSW	22	1023.8	16.9	37		SSW	17	1021.1
22	Th	11.0	20.1	0			SW	31	03:06	13.3	57		WSW	19	1021.7	17.7	64		NNE	17	1017.9
23	Fr	13.3	21.7	0.8			W	52	05:48	18.0	76		NE	11	1014.4	20.6	75		NNW	19	1011.5
24	Sa	12.5	22.5	0			WSW	46	03:51	15.5	37		WSW	13	1017.5	19.5	46		N	19	1014.8
25	Su	13.4	23.1	0			N	37	17:15	20.2	31		NNW	11	1018.0	21.2	64		N	22	1013.2
26	Mo	15.0	22.9	0			WNW	50	04:38	17.5	28		W	30	1017.2	22.3	24		W	15	1014.9
27	Tu	12.5	18.0	0			SW	50	03:30	14.1	39		SW	26	1022.4	17.3	50		ESE	19	1019.4
28	We	13.1	21.8	0			NNW	33	15:05	15.9	73		NW	15	1018.4	19.5	69		N	20	1012.7
29	Th	15.1	18.0	0			SW	52	03:39	15.8	68		SW	20	1014.9	17.3	52		SSE	28	1015.0
30	Fr	9.7	18.2	0			WSW	46	02:46	12.3	39		SW	26	1019.5	16.9	46		SE	13	1017.2
Statistics for June 2023																					
Mean		13.6	20.4							16.0	62			17	1021.5	19.3	59			16	1018.6
Lowest		9.4	16.8							11.0	28			Calm	1014.4	15.2	24		#	9	1011.5
Highest		16.4	23.1	0.8			E	69		20.2	96		SE	33	1029.6	22.3	82		#	28	1026.6
Total				1.8																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202306 Prepared at 13:00 UTC on 5 Nov 2023

Byron Bay, New South Wales
July 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Sa	12.2	19.4	0			SSE	43	21:00	16.9	56		N	6	1021.4	18.6	59		E	9	1018.7
2	Su	12.1	17.8	0			ESE	63	19:52	13.3	68		SSW	28	1028.0	17.3	75		S	39	1026.3
3	Mo	12.9	17.0	2.6			ESE	48	00:06	13.3	90		SW	20	1029.3	16.0	92		SSW	24	1025.2
4	Tu	13.3	19.6	1.2			NE	43	10:59	16.3	96		ENE	9	1021.7	17.3	95		NNW	13	1017.9
5	We	16.3	23.2	14.0			NW	52	08:34	18.9	92		N	7	1015.7	22.8	60		NW	7	1013.0
6	Th	13.0	19.8	0			WSW	43	22:21	15.4	58		W	24	1016.4	19.1	57		NNE	13	1012.6
7	Fr	13.3	20.3	0			WSW	69	07:24	16.5	49		W	19	1016.8	19.8	38		W	22	1012.7
8	Sa	11.1	19.1	0			WSW	43	02:26	13.6	52		W	15	1020.4	18.6	45		N	20	1016.8
9	Su	12.8	19.5	0			WSW	46	04:03	14.0	52		W	17	1020.5	19.2	40		WSW	19	1017.6
10	Mo	13.7	21.0	0			SW	41	07:03	15.1	49		WSW	19	1023.6	20.0	56		ENE	11	1021.5
11	Tu	12.9	19.0	0			SSW	28	23:50	16.2	75			Calm	1025.1	18.4	70		ESE	15	1023.1
12	We	12.4	19.1	0			SW	43	05:54	14.5	83		SW	22	1029.0	18.1	74		SSW	19	1027.2
13	Th	12.6	18.9	0			SW	30	03:32	14.9	83		SSW	17	1029.8	18.5	72		ESE	15	1027.1
14	Fr	14.2	21.5	0			N	31	22:57	15.7	73		SW	11	1028.9	20.1	67		ENE	11	1025.4
15	Sa	13.7	21.4	0			NNW	35	18:27	18.4	64		NW	6	1026.2	20.9	48		NNW	15	1023.7
16	Su	14.3	23.6	0			ESE	33	19:46	17.2	61		SW	13	1027.1	21.6	51		E	15	1024.8
17	Mo	13.7	17.9	0			ESE	50	11:25	15.0	83		SW	26	1028.1	15.1	97		SSW	19	1026.2
18	Tu	13.4	17.7	21.4			S	30	09:54	15.1	94		SSW	15	1025.0	17.3	87		WSW	13	1020.9
19	We	14.5	18.9	0			SSE	48	16:39	16.1	77		SW	24	1020.4	18.1	58		S	31	1018.8
20	Th	10.4	19.4	0			SW	44	05:13	12.7	60		SSW	20	1022.5	18.8	53		ENE	9	1018.5
21	Fr	12.5	21.0	0			WSW	35	07:40	16.8	45		W	19	1018.8	20.0	42		ESE	20	1015.5
22	Sa	11.7	17.2	0			S	48	13:15	14.2	59		SSW	28	1019.9	16.7	59		S	33	1018.2
23	Su	11.7	18.3	0			SW	48	08:06	13.9	60		SW	26	1020.5	16.5	80		SSE	24	1019.1
24	Mo	12.3	18.3	0			ESE	61	22:48	17.1	56		SSE	37	1023.9	17.6	70		SSE	46	1023.9
25	Tu	11.8	19.2	0			SSE	52	00:04	14.9	73		SSW	22	1033.0	18.2	54		SSE	22	1032.7
26	We	13.0	18.9	0			S	35	13:17	14.5	89		SW	20	1034.8	18.7	62		ESE	26	1031.9
27	Th	12.8	18.8	0			ESE	30	13:06	15.4	79		SSW	15	1032.0	18.3	57		ESE	19	1029.1
28	Fr	14.6	21.0	0			NNE	35	17:48	17.0	60		NW	9	1028.0	19.8	51		NE	22	1023.0
29	Sa	13.7	22.6	0			N	24	19:43	17.7	61		N	6	1025.0	22.3	56		ENE	13	1021.7
30	Su	14.0	22.7	0			N	37	21:07	19.2	63		ENE	6	1024.0	21.3	61		NE	15	1020.3
31	Mo	17.5	23.2	0			SSE	46	23:19	19.8	61		WNW	6	1023.0	21.9	67		ESE	19	1021.2
Statistics for July 2023																					
	Mean	13.2	19.8							15.8	68			16	1024.5	18.9	63			19	1021.8
	Lowest	10.4	17.0							12.7	45			Calm	1015.7	15.1	38		NW	7	1012.6
	Highest	17.5	23.6	21.4			WSW	69		19.8	96		SSE	37	1034.8	22.8	97		SSE	46	1032.7
	Total			39.2																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202307 Prepared at 13:00 UTC on 4 Nov 2023

Byron Bay, New South Wales
August 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Tu	15.7	21.4	2.6			SW	28	06:09	17.7	87		SW	11	1026.8	20.8	77		E	19	1024.8
2	We	14.8	20.0	0			ESE	50	10:32	19.2	59		SE	24	1033.0	19.3	62		ESE	24	1032.3
3	Th	15.3	19.7	0			ENE	48	00:57	18.6	65		ENE	24	1035.0	17.3	84		SE	26	1033.5
4	Fr	13.1	18.5	0			ENE	35	00:31	16.0	85		SSW	13	1035.1	18.0	82		SSE	19	1032.2
5	Sa	13.1	20.1	0			SW	26	07:44	15.1	90		SW	19	1032.1	18.9	70		E	13	1028.9
6	Su	12.6	18.6	0			SSW	44	00:00	14.9	84		SSW	19	1029.7	18.2	74		S	17	1027.3
7	Mo	12.3	17.5	6.0			SW	50	03:23	14.0	93		SW	28	1028.0	15.0	96		S	30	1025.9
8	Tu	12.3	18.5	5.2			SSW	44	05:39	14.5	92		SW	20	1029.5	17.8	60		SSE	33	1027.3
9	We	11.5	18.6	0			SSW	43	01:29	14.1	79		SSW	28	1030.7	18.3	58		SE	24	1028.5
10	Th	13.7	20.3	0			N	46	14:59	17.2	64		NNW	11	1028.1	19.5	57		N	28	1022.8
11	Fr	13.7	25.2	0			W	43	10:59	19.5	54			Calm	1022.9	20.9	64		E	19	1019.6
12	Sa	14.1	22.0	0			SW	37	00:14	18.0	78		SSW	6	1022.7	21.7	66		N	22	1017.3
13	Su	16.6	21.6	0			SSE	44	10:04	20.8	40		WSW	17	1019.0	20.2	69		SE	20	1016.8
14	Mo	15.4	22.8	0			N	43	14:06	20.1	76		NNW	9	1018.4	22.6	68		N	28	1012.8
15	Tu	16.2	20.8	0			SSE	43	18:55	19.5	80			Calm	1017.4	18.8	75		SE	24	1016.2
16	We	12.8	19.8	1.4			SSE	39	13:48	15.4	80		SW	20	1021.9	18.0	74		SSE	30	1018.3
17	Th	14.5	21.2	0.2			N	54	15:31	18.8	82		NNW	20	1017.4	21.1	79		N	37	1011.5
18	Fr	17.8	24.7	0.2			WSW	57	12:45	19.3	81		NNW	7	1008.9	24.6	36		W	20	1007.0
19	Sa	12.0	19.6	0			SSW	52	08:53	14.0	41		SSW	37	1017.6	19.2	23		SW	20	1016.5
20	Su	12.9	19.5	0			SW	41	06:10	15.4	46		SSW	20	1023.8	18.8	63		E	19	1022.2
21	Mo	14.7	22.5	0			N	39	15:45	18.0	67		WSW	4	1025.7	20.4	61		N	24	1021.9
22	Tu	16.7	22.5	0			N	44	13:30	20.0	72		N	17	1024.2	21.5	69		N	28	1020.3
23	We	17.3	23.4	0			S	74	21:03	20.5	73		NW	11	1023.3	22.0	72		N	26	1019.5
24	Th	13.7	19.4	0			S	57	00:20	17.1	78		SSW	20	1027.2	18.4	77		SSE	37	1024.9
25	Fr	13.0	19.4	0.2			ESE	39	18:10	16.8	78		SSW	24	1026.9	19.1	61		SE	22	1024.5
26	Sa	12.6	19.3	0			SSW	41	04:11	16.0	76		SSW	22	1027.8	18.6	67		SE	28	1025.5
27	Su	12.6	20.3	0.4			SSW	43	03:04	16.2	80		SSW	20	1027.4	18.4	78		SE	26	1025.0
28	Mo	13.4	20.1	0			S	35	04:39	16.6	77		S	20	1025.8	19.8	70		E	24	1022.1
29	Tu	14.1	24.0	0			NE	35	17:07	17.9	74		SSW	9	1022.8	21.1	60		NE	22	1018.7
30	We	15.2	23.6	0			NE	46	20:04	17.8	79		ENE	9	1018.8	20.3	69		N	28	1014.3
31	Th	13.9	21.9	4.4			N	39	13:47	18.7	72		NNW	9	1017.0	21.1	65		N	24	1012.8
Statistics for August 2023																					
	Mean	14.1	20.9							17.3	73			16	1024.7	19.7	67			24	1021.7
	Lowest	11.5	17.5							14.0	40			Calm	1008.9	15.0	23		E	13	1007.0
	Highest	17.8	25.2	6.0			S	74		20.8	93		SSW	37	1035.1	24.6	96		#	37	1033.5
	Total			20.6																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202308 Prepared at 13:00 UTC on 3 Nov 2023

Byron Bay, New South Wales
September 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Fr	14.3	20.9	0.2			SE	57	20:43	18.2	80		S	17	1017.1	20.8	71		ESE	20	1014.1
2	Sa	13.2	19.1	0			SE	50	00:26	16.1	62		S	24	1022.1	18.9	51		ESE	19	1018.6
3	Su	14.5	23.5	0			NE	39	20:31	18.3	72		ESE	9	1022.3	23.1	59		ENE	13	1018.0
4	Mo	15.4	21.0	0.4			N	56	17:07	15.4	96		S	20	1019.8	19.2	89		N	28	1014.9
5	Tu	15.3	22.3	0.2			N	63	13:52	20.9	72		N	30	1015.9	21.5	81		N	41	1012.9
6	We	17.7	22.2	4.0			S	39	05:19	20.0	78		SE	28	1022.6	21.0	57		E	24	1021.5
7	Th	17.2	22.3	0			N	46	12:28	20.2	83		NNW	9	1024.7	21.6	80		N	31	1020.7
8	Fr	18.6	22.2	0			N	57	12:02	20.9	81		N	19	1023.4	21.7	77		N	31	1018.6
9	Sa	13.1	19.1	0			SSW	46	01:10	17.0	36		SE	22	1026.7	18.2	39		E	22	1022.6
10	Su	11.3	18.7	0			ESE	57	12:12	15.8	67		SE	24	1027.3	17.7	58		E	31	1025.6
11	Mo	11.9	18.7	0			E	50	00:13	14.5	87		SE	24	1029.6	15.8	79		E	24	1027.9
12	Tu	11.8	19.3	0			ENE	43	12:26	16.0	76		E	19	1030.1	18.9	68		E	24	1027.1
13	We	13.7	20.7	0			ENE	35	14:50	18.0	71		NE	15	1029.6	19.7	66		ENE	28	1025.8
14	Th	14.5	21.1	0				39	13:40	18.3	70		NNE	17	1029.3	20.0	61				1026.4
15	Fr	13.2	21.3	0				31	05:24	18.3	67				1028.1	20.0	63				1025.5
16	Sa	16.0	24.4	0				31	12:54	21.3	65				1027.0	21.3	63				1024.0
17	Su	15.8	22.3	0				46	12:10	20.8	69				1026.0	21.6	64				1022.4
18	Mo	17.4	22.4	0				44	23:11	20.9	63				1025.7	22.0	62				1022.5
19	Tu	16.7	22.7	0				48	13:51	20.4	61				1024.7	21.4	56				1019.4
20	We	16.5		0						21.8	73				1018.9	22.3	73		NNE	31	1014.2
21	Th	18.5	26.7				SSW	69	16:48	21.4	76		NNW	20	1014.6	24.1	68		N	35	1010.1
22	Fr	16.0	19.5				SE	69	23:53	16.4	92		SSE	31	1024.4	17.7	74		SSE	33	1023.6
23	Sa	12.7	19.5				SE	59	00:01	16.5	81		SSW	28	1027.1	15.8	87		S	39	1025.1
24	Su	14.4	19.5				ESE	61	01:21	16.8	69		SSE	22	1027.3	18.3	72		ESE	31	1024.4
25	Mo	14.4	24.6				SW	31	03:22	18.4	70		SW	13	1025.8	22.7	52		NE	19	1021.9
26	Tu	14.6	22.8				N	46	17:26	20.6	64		N	13	1022.9	21.3	68		NNE	24	1018.5
27	We	17.7	24.0				N	50	17:39	21.1	65		NNW	17	1020.7	23.0	69		N	26	1016.5
28	Th	17.9	22.9				ESE	54	10:24	21.7	81		S	17	1025.0	19.5	81		SE	35	1025.0
29	Fr	17.2	24.9				N	41	18:14	22.0	71		ENE	9	1027.7	22.0	66		NNE	19	1023.0
30	Sa	16.4	23.5				N	52	20:41	21.7	74		N	22	1024.8	22.4	65		NNE	22	1021.3
Statistics for September 2023																					
Mean		15.3	21.8							19.0	72			19	1024.4	20.4	67			27	1021.1
Lowest		11.3	18.7							14.5	36		#	9	1014.6	15.8	39		ENE	13	1010.1
Highest		18.6	26.7	4.0			#	69		22.0	96		SSE	31	1030.1	24.1	89		N	41	1027.9
Total				4.8																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202309 Prepared at 16:00 UTC on 2 Nov 2023

Byron Bay, New South Wales
October 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Su	18.3	22.2				N	61	14:18	20.3	64		N	24	1023.1	21.9	64		N	43	1019.0
2	Mo	18.6	23.4				N	54	12:33	20.6	73		N	24	1022.6	22.9	70		N	30	1020.5
3	Tu	17.9	23.3				NNE	52	12:55	20.5	70		NNW	20	1024.3	22.3	66		NNE	31	1020.9
4	We	20.2	22.2				N	74	10:19	21.6	74		NNE	37	1020.8	21.2	83		N	43	1017.3
5	Th	17.9	26.7				N	48	00:24	19.5	70		WSW	22	1018.8	26.5	55		NE	17	1016.3
6	Fr	16.0	21.0				S	44	13:23	18.0	66		SSW	24	1022.7	19.0	75		S	33	1021.4
7	Sa	13.4	18.5				S	63	10:33	16.7	86		SE	39	1026.2	16.6	90		SSE	24	1025.8
8	Su	13.6	19.5				ESE	59	23:38	14.6	97		SW	19	1030.5	17.8	71		SSW	20	1028.2
9	Mo	14.3	25.0				SE	37	23:49	17.8	77		SW	9	1028.1	24.4	51		ENE	15	1024.5
10	Tu	15.3	23.4				NE	43	15:55	19.5	63		NNW	9	1023.4	23.3	59		NE	28	1020.0
11	We	17.3	27.5	0			NE	37	16:12	21.5	61		NNW	9	1024.4	27.1	55		ENE	17	1022.5
12	Th	17.5	23.3	0			N	61	18:45	21.1	70		N	13	1024.0	22.8	65		NNE	37	1018.7
13	Fr	18.9	26.5	0			NNW	61	02:45	20.9	73		N	26	1015.6	22.8	64		E	35	1015.4
14	Sa	16.8	27.0	0			NE	39	16:40	20.2	69		S	13	1020.6	26.4	51		ENE	15	1016.4
15	Su	18.0	27.9	0			NNW	50	22:23	21.9	68		SE	6	1019.0	27.1	56		ENE	15	1015.8
16	Mo	20.4	23.9	0			S	76	22:10	22.0	77		N	28	1014.8	23.4	79		N	44	1009.4
17	Tu	16.8	20.5	1.4			SSW	81	22:04	17.6	59		SSW	31	1021.3	19.8	60		S	46	1021.7
18	We	13.7	19.5	1.6			S	69	23:02	16.5	83		SW	22	1026.2	18.7	70		S	41	1024.4
19	Th	14.8	21.4	2.0			SE	48	23:31	17.9	72		SSW	20	1024.0	19.8	58		S	30	1020.8
20	Fr	14.9	24.1	3.2			E	35	13:46	18.3	81		SW	20	1020.7	23.0	62		E	26	1017.7
21	Sa	18.2	27.0	0			N	46	19:00	21.2	72		NNE	6	1020.0	25.3	58		NE	30	1016.7
22	Su	19.9	24.0	0			N	63	13:46	22.3	71		N	28	1016.1	23.5	73		NNE	39	1011.5
23	Mo	20.5	24.5	0			N	54	18:57	22.6	77		NNW	19	1014.5	24.0	77		N	30	1011.0
24	Tu	20.4	24.0	0			N	56	12:57	22.9	84		N	15	1016.6	23.8	75		N	35	1013.4
25	We	20.7	23.7	0			N	70	11:21	22.7	74		N	35	1014.7	23.5	77		N	41	1010.8
26	Th	20.1	22.0	0			S	57	09:25	21.5	78		SSW	33	1015.9	21.1	81		S	46	1014.5
27	Fr	15.9	18.4	32.0			S	87	13:02	16.7	96		SE	41	1019.1	15.6	94		S	65	1020.4
28	Sa	12.9	20.4	30.4			SSE	63	01:39	16.2	81		SSW	30	1025.4	18.9	66		S	43	1023.9
29	Su	13.2	24.3	1.2			E	39	00:44	17.1	82		SSW	17	1023.3	22.9	52		E	15	1020.3
30	Mo	14.4	23.2	0			S	50	14:13	20.3	65		N	11	1020.1	22.6	65		WSW	31	1015.4
31	Tu	19.7	25.1	0			SE	65	15:47	22.7	65		N	24	1013.8	24.3	73		ENE	37	1009.5
Statistics for October 2023																					
	Mean	17.1	23.3							19.8	74			21	1021.0	22.3	67			32	1018.2
	Lowest	12.9	18.4							14.6	59		#	6	1013.8	15.6	51		#	15	1009.4
	Highest	20.7	27.9	32.0			S	87		22.9	97		SE	41	1030.5	27.1	94		S	65	1028.2
	Total			71.8																	

Observations were drawn from Byron Bay (Cape Byron AWS) {station 058216}

IDCJDW2022.202310 Prepared at 13:00 UTC on 7 Nov 2023

Appendix C – Year 1 Annual Revegetation / Rehabilitation Monitoring Report

Year 1 – Annual Revegetation / Rehabilitation Monitoring Report

Harvest Estate, West Byron

Prepared for OZTON Pty Ltd

By Planit Consulting Pty Ltd

V.1 - October 2023

Company Details

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Document Control

Document	Year 1 Revegetation/Rehabilitation Monitoring Report
Project Name	Harvest Estate, West Byron
Client	OZTON Pty Ltd
Planit Reference	J7148
Revision Number	V.1

Revision History

Revision	Date	Prepared By	Reviewed By	Approved By
V.1	3/10/2023	TR	GF	TR

Approval Details

Approved By	Tomy Rados
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Signature	

Disclaimer

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1 Introduction

Planit Consulting has been commissioned by OZTON Pty Ltd to prepare a Revegetation/Rehabilitation Monitoring Report associated with an approved subdivision of 149 allotments located within part of the West Byron Urban Release Area, known as the Harvest Estate (refer **Figure 1**).

In order to track the progress of revegetation/rehabilitation zones associated with the estate, the approved Vegetation Management Plan (VMP) stipulates that regular flora/vegetation ground surveys of permanent monitoring plots to be performed.

These ongoing surveys qualify and quantify the condition of representative flora/vegetation habitat will enable periodic comparison of vegetation condition (to the baseline surveys performed) to assess compliance with the set performance criteria of the approved VMP.

The first Annual Monitoring Report is required 1 year after the substantial commencement works, which was accepted 26th July 2022.

Table 1: Approved Harvest Estate Development Details

Approval Information	
Applicant	Villa World Byron Pty Ltd
Application	Development Consent 10.2017.201.1 (Villa World Byron Pty Ltd v Byron Shire Council - LEC No. 2019/00310612)
Address	342 Ewingsdale Road, 22A and 22B Melaleuca Drive, Byron Bay
Development Consent Description	Staged subdivision of 9 lots into 149 residential lots (comprised of 145 smaller residential lots and 4 large lifestyle lots) and the creation of 7 green infrastructure lots, together with associated works including vegetation removal, earthworks, landscaping, creation of public reserves, roads, environmental management and protection and stormwater works at 342 Ewingsdale Road, 22A and 22B Melaleuca Drive, Byron Bay
Modification Consent Description	Development Consent 10.2017.201.1 S4.56 Modification to amend staging and timeframes Determination Date 4th November 2021

In association with the issued approval and subsequent subdivision certificate assessment a Vegetation Management Plan has been approved which stipulate the frequency and parameter specifications necessary to routinely monitor and assess the success of the rehabilitation/revegetation plans/works being:

Table 2: Approved Vegetation Management Plan Details

Document/Plan Title	Job No.	Revision	Date	Author	Approval Date
Vegetation Management Plan Harvest Estate, West Byron prepared for Villa World Byron P/L November 2021	6681	H	03-02-2022	Planit Consulting	10-02-2022

The relevant sections identifying rehabilitation/revegetation monitoring requirements of the VMP (which are also echoed in other site management plans) are tabulated below for ease of reference:

Table 3: Rehabilitation/Revegetation [RR] Monitoring Requirement Sections of Conditioned Management Plans

Vegetation Management Plan		
Report Section	**Brief Description**	**Timing/Frequency**
5.2 Monitoring	Establish Baseline monitoring plots for all RR zones, Complete monitoring Form C photographs for later comparison prior to works. Complete Monitoring Form C	Baseline [prior to commencement]
	Complete Monitoring Forms & visual monitoring/photographs for each RR zone	Six monthly from commencement until Year 5. Annually thereafter
5.5 Reporting	Report to include All Monitoring Results, Assessment against Performance Criteria, Incidence of non-compliance, Corrective Action	Annually
	Report to include Landscaper/bush regenerator work logs for RR annual report	Annually

Biodiversity Conservation Management Plan		
Report Section	**Brief Description**	**Timing/Frequency**
4.1 Monitoring and Reporting	Establish Baseline monitoring plots for all RR zones, Complete monitoring Form C photographs for later comparison prior to works. Complete Monitoring Form C	Baseline [prior to commencement]
	Complete Monitoring Forms & visual monitoring/photographs for each RR zone	Six monthly from commencement until Year 5. Annually thereafter

Biodiversity Conservation Management Plan		
Report Section	**Brief Description**	**Timing/Frequency**
	Report to include All Monitoring Results, Assessment against Performance Criteria, Incidence of non-compliance, Corrective Action	Annually
	Report to include Landscaper/bush regenerator work logs for RR annual report	Annually

Threatened Species Management Plan		
Report Section	**Brief Description**	**Timing/Frequency**
6.2.1 Monitoring	Minor mention of RR monitoring and management for minimum of ten years	Baseline [prior to commencement]
6.3 Reporting	Minor mention of RR reporting also required on an annual basis	Annually

Figure 1: Harvest Estate Aerial Photograph (Nearmap, 2020)

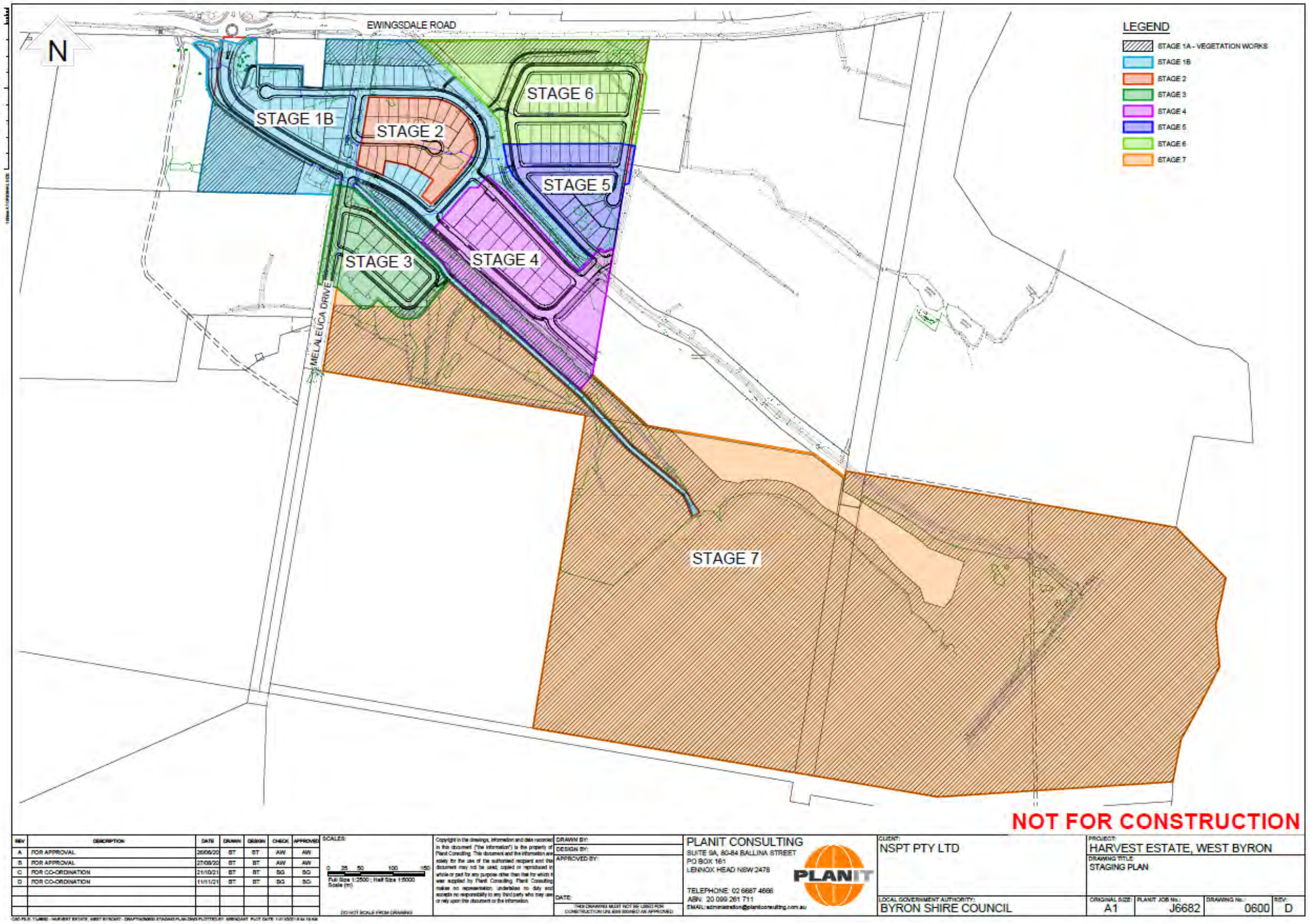


Figure 2: Harvest Estate Approved Layout

2 Revegetation/Rehabilitation Zones

The approved rehabilitation/revegetation zones (RZs) associated with the Harvest Estate are depicted in **Figures 3** and **Appendix 1**. Detailed management plans have been prepared and approved which identify the management requirements and objective for each rehabilitation zone which are summarized below:

Table 4: Rehabilitation Zone Details

Zone	Area (ha)	Rehabilitation Strategy	Targeted Vegetation Type
1	0.87	Reconstruction + Assisted Natural Regeneration	Freshwater Wetland
2	3.90	Reconstruction + Assisted Natural Regeneration	Freshwater Wetland
3	4.60	Reconstruction + Assisted Natural Regeneration	Freshwater Wetland
4	4.38	Reconstruction + Assisted Natural Regeneration	Swamp Sclerophyll Forest
5	0.89	Reconstruction + Assisted Natural Regeneration	Landscaped Buffer
6	35	Assisted Natural Regeneration	Existing Vegetation Communities Protection

NB. in accordance with the approved Harvest Estate Vegetation Management Plan rehabilitation monitoring is not required for the landscape buffer to Ewingsdale Road (RZ5).

2.1 Revegetation/Rehabilitation Monitoring Objective

The design of the approved monitoring protocol for the RZs is simple, replicable and aims to prove the following hypotheses.

Rehabilitation/revegetation of the RZs site will:

- Protect existing native vegetation communities, and associated habitat, within the RZs
- Increase the extent of native habitat (including potential habitat for threatened fauna species) within the RZs
- Increase the abundance and diversity of native flora species within the RZs
- Increase native canopy, mid-strata and ground layer cover across the RZs
- Significantly reduce weed cover and weed diversity within the RZs

2.2 Existing Vegetation Communities

Detailed surveying of the existing vegetation communities contained within the RZs are documented within the *Terrestrial Flora and Fauna Assessment (Planit, 2020)* and include the following as presented in **Figure 4**:

1. Mid-High to Tall Open Forest (Broad-Leaved Paperbark
2. Mid-High to Tall Open Dry Heath +/- Broad-Leaved Paperbark
3. Tall to Very Tall Open Forest (Brush Box)
4. Tall to Very Tall Open Forest (Swamp Mahogany)
5. Mid-High to Tall Open Forest (Swamp Oak)
6. Low to Mid-High Open Woodland (Coastal Banksia)
7. Paperbark Swamp Forest of The Coastal Lowlands
8. Freshwater Wetland
9. Grassed Paddocks with Scattered Trees and Regrowth

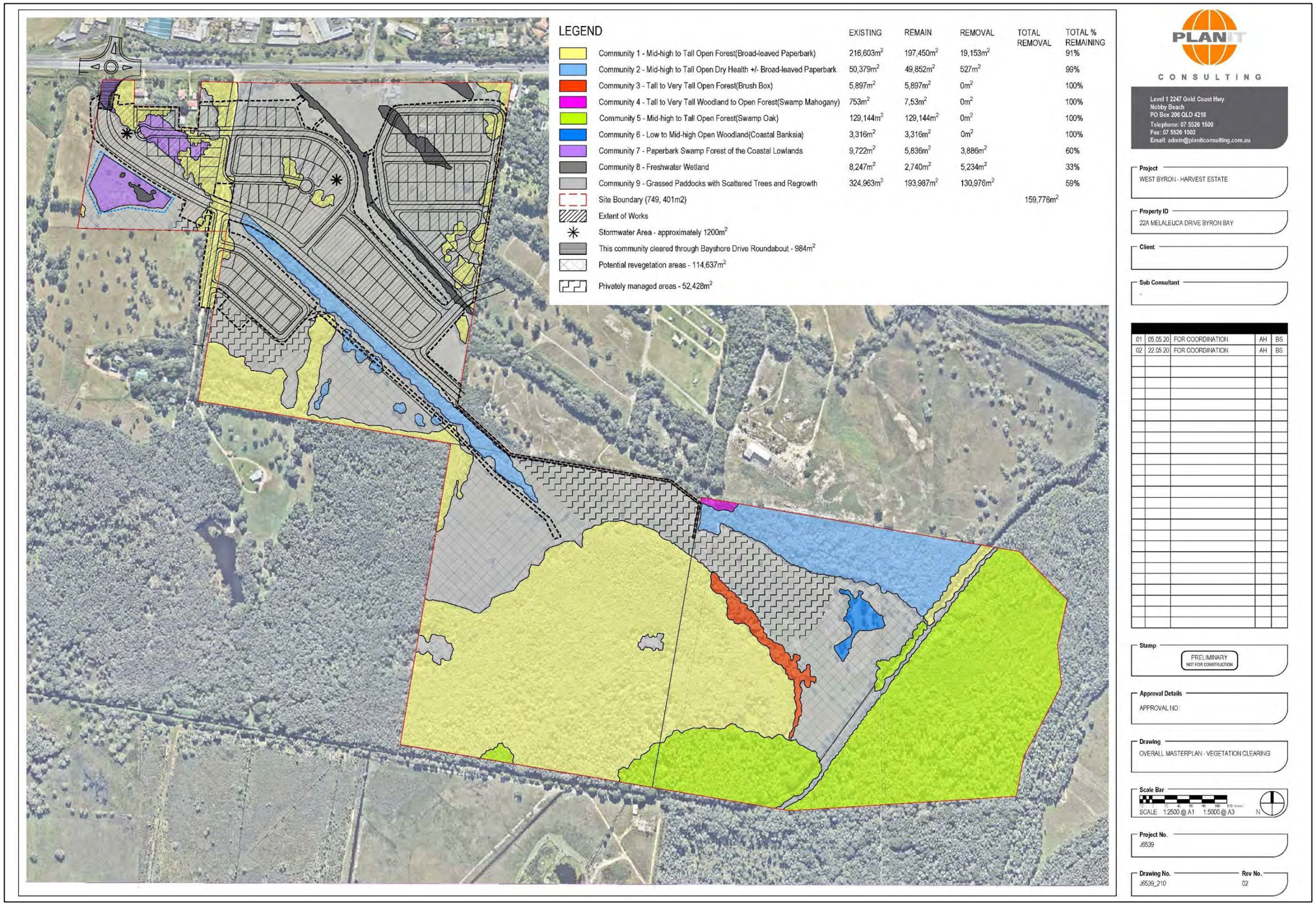
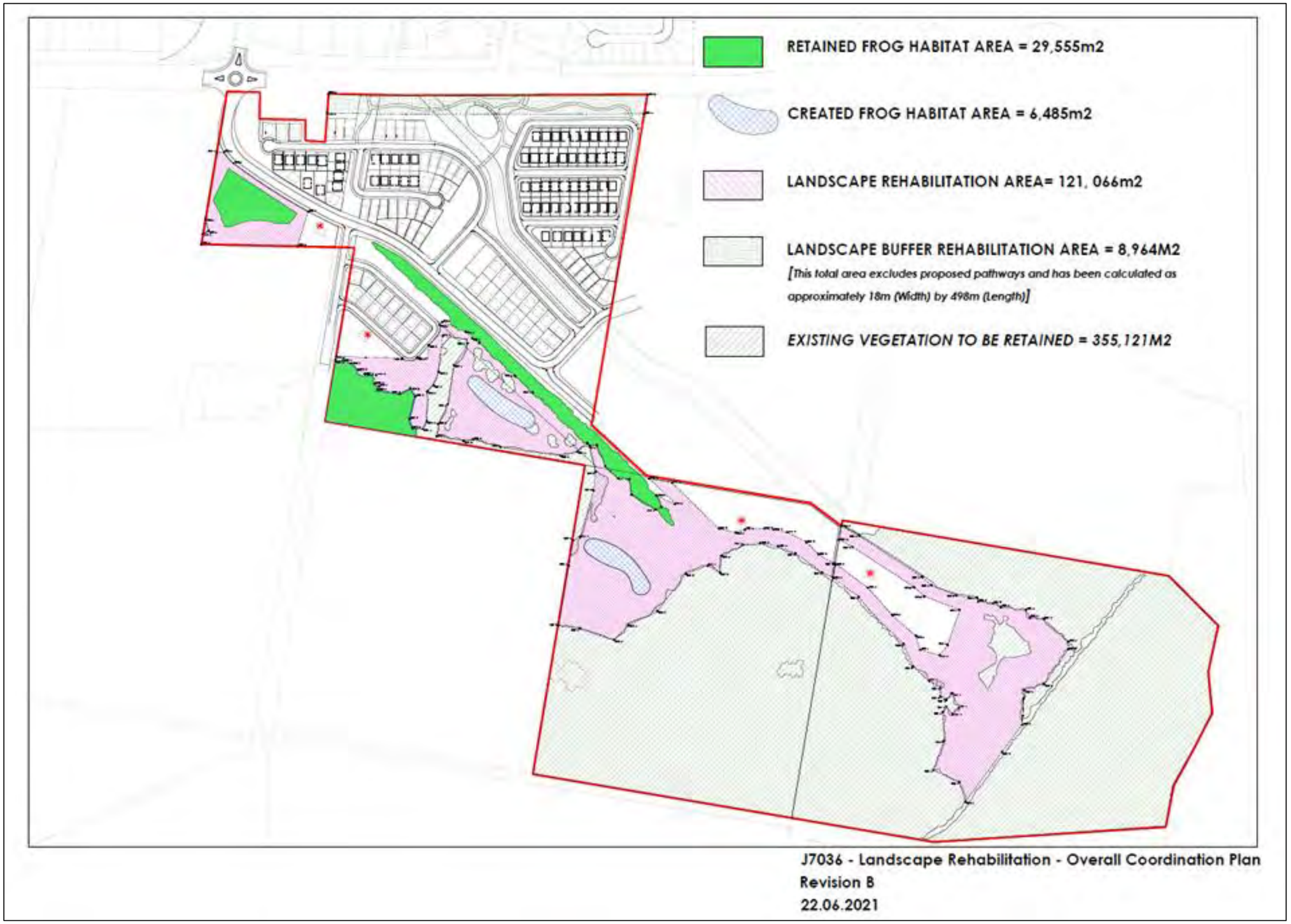


Figure 3: Harvest Estate Existing Vegetation Communities


RETAINED FROG HABITAT AREA = 29,555m2
CREATED FROG HABITAT AREA = 6,485m2
LANDSCAPE REHABILITATION AREA= 121, 066m2
LANDSCAPE BUFFER REHABILITATION AREA = 8,964M2
[This total area excludes proposed pathways and has been calculated as approximately 18m (Width) by 498m (Length)]
EXISTING VEGETATION TO BE RETAINED = 355,121M2
J7036 - Landscape Rehabilitation - Overall Coordination Plan
Revision B
22.06.2021

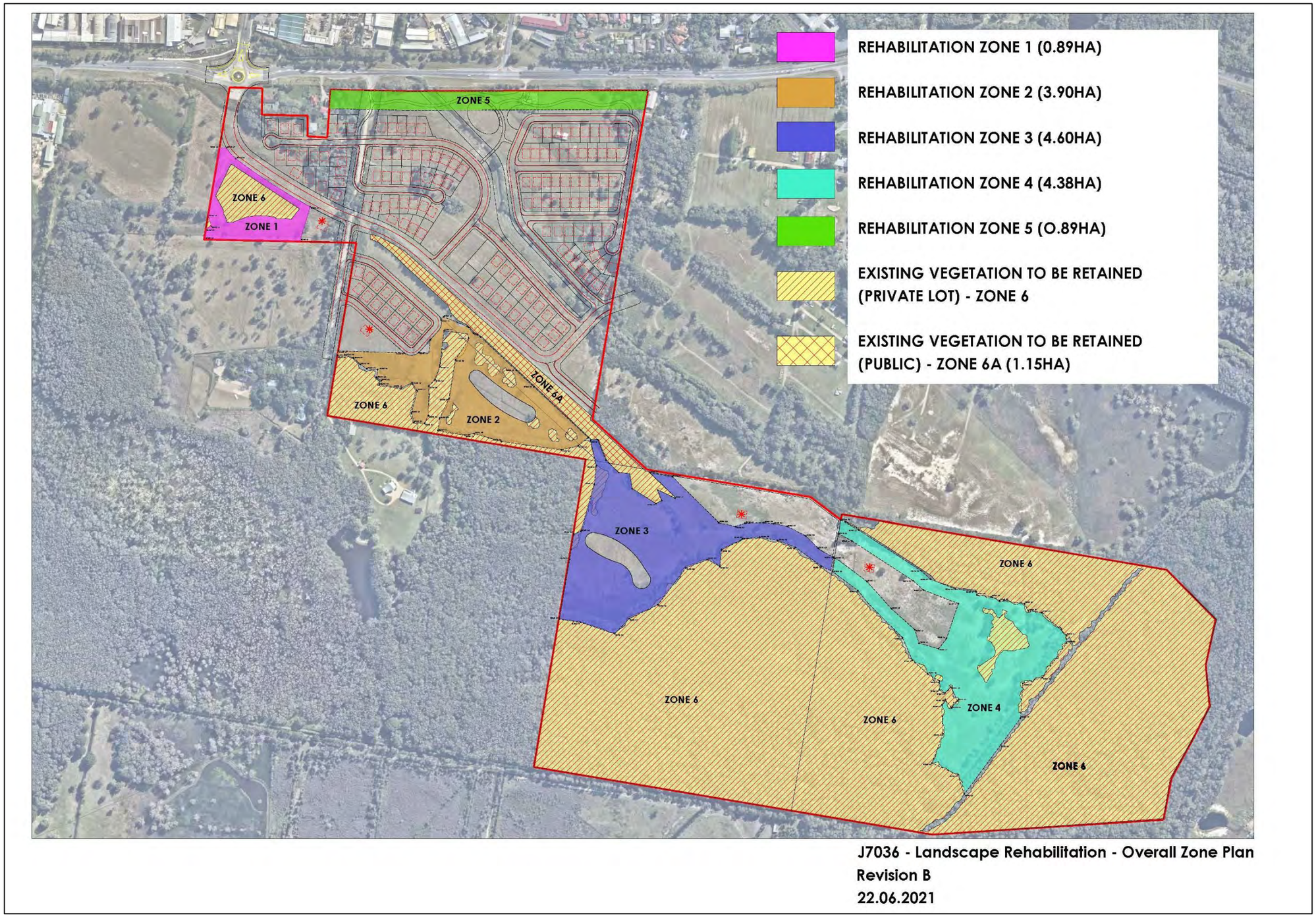


Figure 4: Approved Rehabilitation/Revegetation Zone

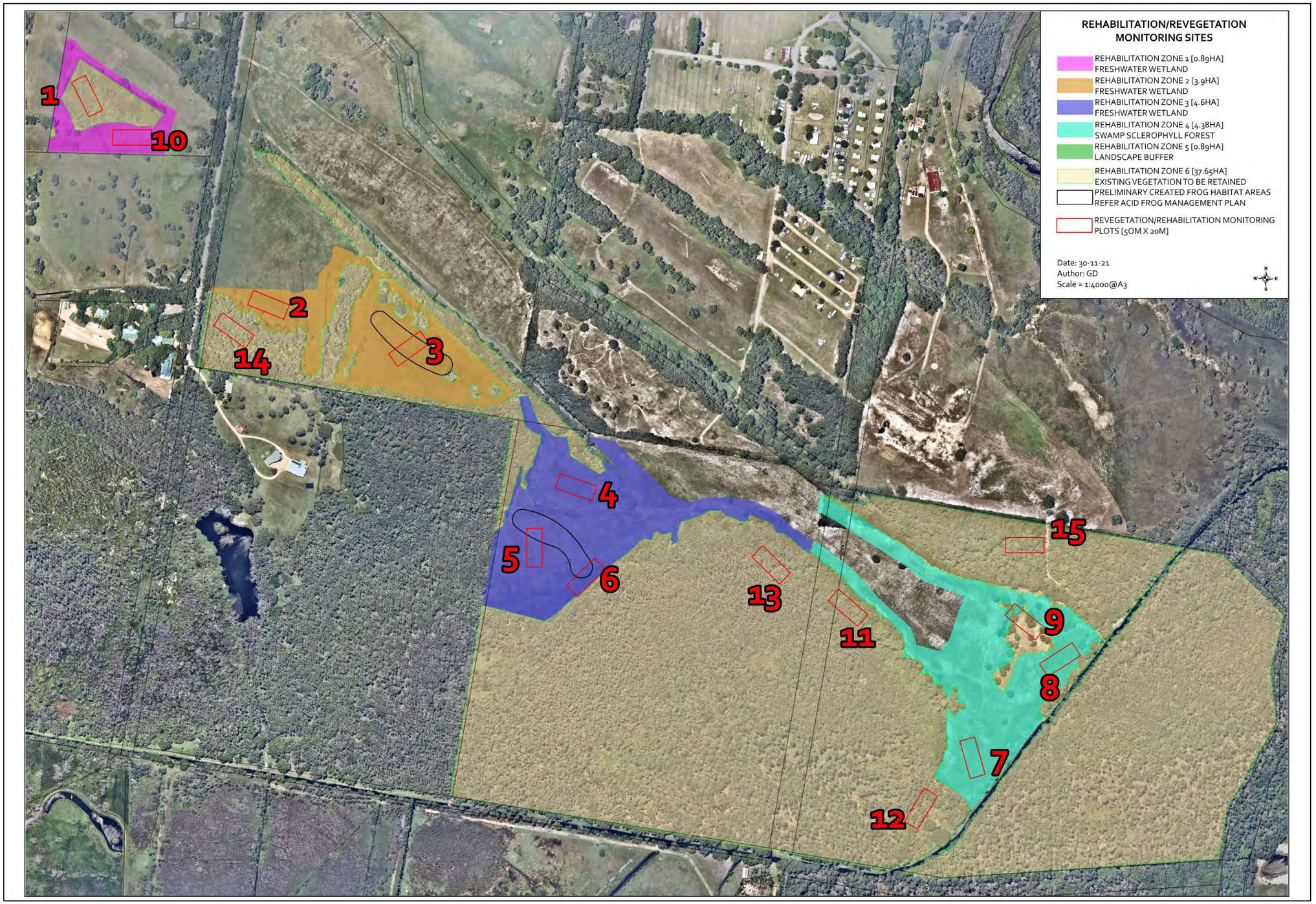


Figure 5: 50m x 50m Revegetation/Rehabilitation Monitoring Plots

3 Monitoring Requirements

This section provides a summary of the RZ monitoring requirements. Revegetation/rehabilitation progress shall be performed twice a year for the first five years and annually thereafter with an annual report produced as required by the provisions of the approved Harvest Estate Vegetation Management Plan.

3.1 Monitoring Frequency

In accordance with the approved Harvest Estate Vegetation Management Plan revegetation/rehabilitation monitoring is to occur for each rehabilitation zone:

YEARS 1-5

- Six monthly visual monitoring results and photographs
- Six monthly monitoring and completion of the required monitoring forms for the 15 x 1000m^2 permanent monitoring quadrats
- Six-monthly monitoring of compliance with the rehabilitation zone performance criteria (refer approved Vegetation Management Plan Section 5.3)

AFTER YEAR 5

- Annual visual monitoring results and photographs as outlined above
- Annual monitoring and completion of the required monitoring forms for the 15 x 1000m^2 permanent monitoring quadrats
- Annual monitoring of compliance with the rehabilitation zone performance criteria (refer approved Vegetation Management Plan Section 5.3)

The monitoring efforts will inform maintenance requirements (particularly with regard to weed management), enable assessment against performance criteria, trigger for maintenance and/or correction actions and allow comparison of the rehabilitation zones to their pre-management condition.

Note that a less intensive regime is approved following a five-year period when the rehabilitation zones are likely to be well established with native vegetation cover.

3.2 Monitoring Methodology

The monitoring methodology is described in Section 5.2 of the approved Vegetation Management Plan and the baseline results established in accordance with the VMP prepared in February 2022. The September 2023 monitoring results for the 15 x 1000m2 permanent monitoring plots are presented in **Appendix 2**.

4 Results Summary

Upon completion of the required surveys an Annual Monitoring Report (hard copy and electronic PDF document) is to be prepared including:

- Formal monitoring of the 15 x 1000m2 permanent monitoring plots including forms and photographs
- Assessment of progress against revegetation/rehabilitation performance requirements (refer approved Vegetation Management Plan Section 5.3)
- Incidences of non-compliance and corrective action (if applicable) (refer approved Vegetation Management Section 5.3)
- A work log of all monitoring/maintenance (and corrective action where required) activities performed by the appointed landscape contractor/bush regenerator during the preceding 12 months.

4.1 Monitoring Plot Results

The monitoring forms and photographs for the 15 x 1000m^2 permanent monitoring plots are presented within **Appendix 2**. Condition improvement was observed (between baseline and September 2023) across all plots except for one plot (P14) which maintained its excellent overall condition score. A slight decrease in condition was observed between November 2022 and September 2023 for plots P1, P2, P4, P5 and P6. The main reason for this was due to the increase in pasture grass coverage observed within these areas, although other factors such as the plant survival rate and native coverage also contributed to these slightly lower condition scores. The recent drought conditions are also a likely contributing factor for the increase in pasture growth, which as a result, is supressing the natural regeneration of wetland species.

It is noted however, that most monitoring plots displayed obvious rehabilitation improvement from baseline as a result of weed control and subsequent rehabilitation, weed control and revegetation, or a combination of both.

A summary score table, spider graph and example comparison photos between Baseline, November 2022 and September 2023 are provided below.

Table 5: Condition Score Summary

Form B Overall Condition Score Summary			
Plot No.	**Baseline**	**Nov. 22**	**Sep. 23**
P1	100	100	99
P2	60	92.5	80
P3	55	67.5	70
P4	52.5	85	80
P5	65	70	67.5
P6	90	92.5	92.5
P7	52.5	80	75

Form B Overall Condition Score Summary			
Plot No.	**Baseline**	**Nov. 22**	**Sep. 23**
P8	70	82.5	85
P9	80	92.5	95
P10	52.5	80	80
P11	99	99.5	99.5
P12	80	82.5	95
P13	97.5	97.5	99
P14	100	100	100
P15	99	100	100

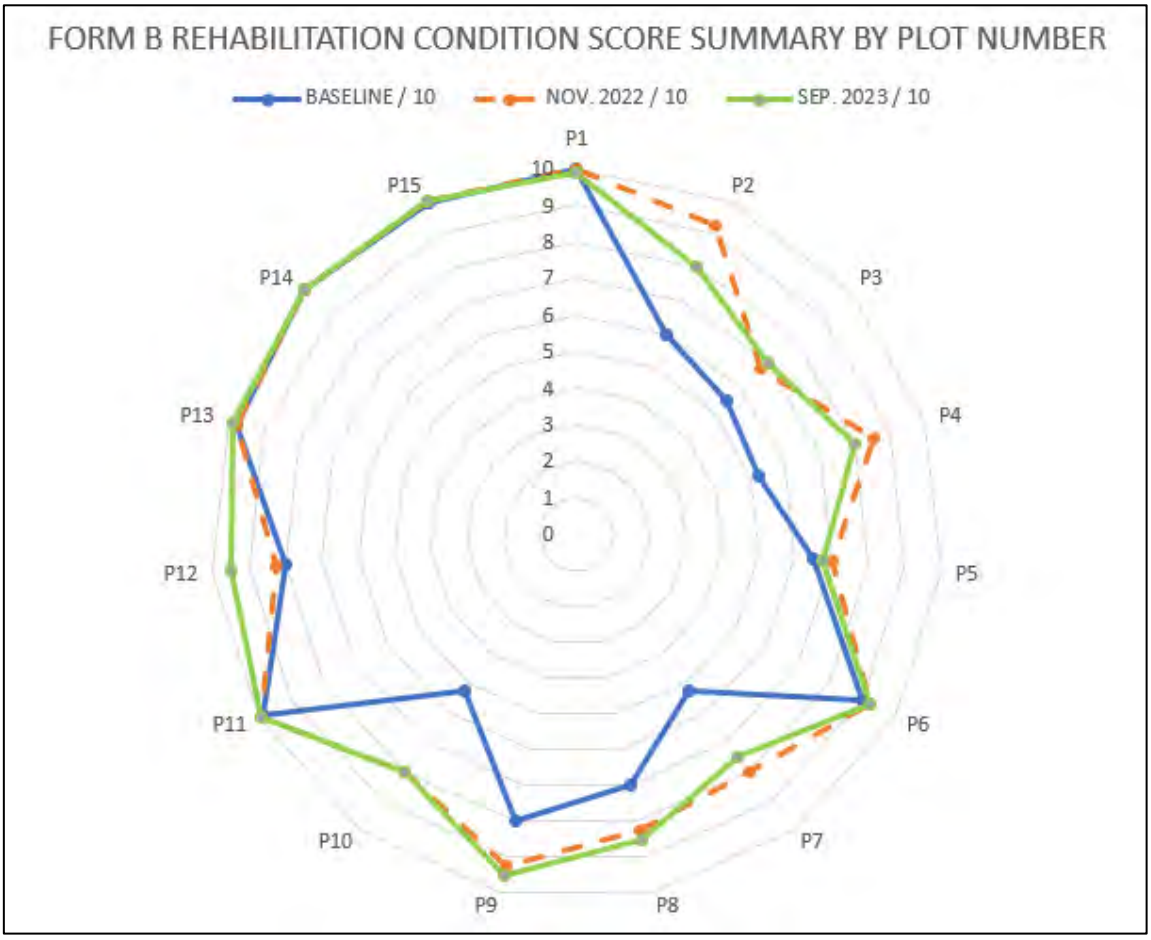


Figure 6: Condition Score Baseline Comparison

Table 6: Examples of Improvement Between Baseline, November 2022, and September 2023

		
PLOT 2 BASELINE @ 25M	PLOT 2 NOV 2022 @ 25M	PLOT 2 SEP 2023 @ 25M
		
PLOT 4 BASELINE @ 0M	PLOT 4 NOV 2022 @ 0M	PLOT 4 SEP 2023 @ 0M

		
PLOT 6 BASELINE @ 50M	PLOT 6 NOV 2022 @ 50M	PLOT 6 SEP 2023 @ 50M
		
PLOT 8 BASELINE @ 0M	PLOT 8 NOV 2022 @ 0M	PLOT 8 SEP 2023 @ 0M

PLOT 9 BASELINE @ NW 50M

PLOT 9 NOV 2022 @ NW 50M

PLOT 9 SEP 2023 @ NW 50M

PLOT 10 BASELINE @ N 25M

PLOT 10 NOV 2022 @ N 25M

PLOT 10 SEP 2023 @ N 25M

		
EXTERNAL TO FORMAL PLOT BASELINE	EXTERNAL TO FORMAL PLOT NOV 2022	EXTERNAL TO FORMAL PLOT SEP 2023
		
EXTERNAL TO FORMAL PLOT BASELINE	EXTERNAL TO FORMAL PLOT NOV 2022	EXTERNAL TO FORMAL PLOT SEP 2023

Minor typical rehabilitation issues were observed within several of the monitoring plots and rehabilitation zones in general which are summarised below, although none are considered to be reasonable threats of failure at this early stage of the management program. These are predominately related to weed re-establishment, areas of browned off/treated pasture grass which have not yet regenerated and require monitoring, and loss of plated stock (due to drought conditions or wallaby related foraging impacts). Such issues are summarised below but are not present to a significant degree such that the plots have been inhibited in improving from baseline surveys:

Table 7: Minor Issue Summary and Nomination of Routine/Reactive Maintenance Responses

Plot No.	Rehabilitation Issue	Maintenance-Routine	Maintenance Reactive
P1	Camphor Laurel sapling recorded.	Monitor for weeds and apply control as needed.	Remove Camphor Laurel sapling.
P2	Re-establishment of pasture grass and Columbian Waxweed Some loss of planted trees due to dry conditions. Performance criteria for weeds, coverage and tree survival rate not achieved.	Follow up spot weed control.	Routine weed control. Replacement of planted trees required. Year 2 supplementary plantings to increase diversity and coverage as per the approved Rehabilitation Plan (Planit, 2020). Water plantings if drought conditions persist.
P3	Re-establishment of pasture grass. Minimal intervention in central areas to date which will be subject to later construction to establish designated frog ponds. Dry at the time of inspection. Performance criteria for weeds not achieved.	Follow up spot weed control.	Frog pond construction to be followed by revegetation of freshwater wetland in accordance with timeframe specified by Australia Wetlands Consultancy. Weed control required for pasture grasses in areas external to the proposed frog pond. Remove rubbish. Top up mulch where needed to landscape plan specifications
P4	Re-establishment of pasture grass and Columbian Waxweed. Some loss of planted trees due to drought and wallaby grazing. Protection fencing required at the interface of the constructed swale and rehabilitation zone. Dry at the time of inspection. Performance criteria for weeds and coverage and tree survival rate not achieved.	Follow up spot weed control.	Ongoing routine management of pasture grasses. Weed control required for pasture grasses. Year 2 supplementary plantings to increase diversity and coverage as per the approved Rehabilitation Plan (Planit, 2020). Monitor wallaby grazing and install protection barriers if it persists. Protection fencing required.

Plot No.	Rehabilitation Issue	Maintenance-Routine	Maintenance Reactive
			May require watering if drought conditions persist. Top up mulch where needed to landscape plan specifications.
P5	Pasture grasses within designated 'no spray areas. Minimal intervention in northern areas to date within area which will be subject to later construction to establish designated frog ponds. Protection fencing required at the interface of the constructed swale and rehabilitation zone. Dry at the time of inspection. Performance criteria for weeds and coverage not achieved.	Continued monitoring of pasture grasses for natural regeneration in low lying and interim no spray area per BSC and liaison with council as required.	Frog pond construction to be followed by revegetation of freshwater wetland in accordance with timeframe specified by Australia Wetlands Consultancy. Year 2 supplementary plantings to increase diversity and coverage as per the approved Rehabilitation Plan (Planit, 2020). Weed control required for pasture grasses in areas external to the proposed frog pond. Protection fencing required.
P6	Minimal intervention in a small northwestern area to date within area which will be subject to later construction to establish designated frog ponds. Pasture grasses within designated 'no spray areas. Protection fencing required at the interface of the constructed swale and rehabilitation zone. Dry at the time of inspection. Performance criteria for weeds not achieved.	Continued monitoring of pasture grasses for natural regeneration in low lying and interim no spray area per BSC and liaison with council as required.	Frog pond construction to be followed by revegetation of freshwater wetland in accordance with timeframe specified by Australia Wetlands Consultancy Weed control required for pasture grasses in areas external to the proposed frog pond. Protection fencing required.
P7	Pasture grass re-establishing and minor impacts due to wallabies and drought conditions. Dry at the time of inspection. Protection fencing required at the interface of the rehabilitation zone and development footprint. Dry at the time of inspection. Performance criteria for weeds, survival rate of plants and coverage not achieved.	Follow up spot weed control.	Ongoing routine management of pasture grasses. Treatment of pasture grasses required. Replacement of planted trees required. Year 2 supplementary plantings to increase coverage as per the approved Rehabilitation Plan (Planit, 2020). Top up mulch where needed to landscape plan specifications.

Plot No.	Rehabilitation Issue	Maintenance-Routine	Maintenance Reactive
			Monitor wallaby grazing and install protection barriers if it persists. May need to water plants if drought conditions persist. Protection fencing required at the interface of the rehabilitation zone and development footprint.
P8	Pasture grass re-establishing and minor impacts due to wallabies and drought conditions. Dry at the time of inspection. Protection fencing required at the interface of the rehabilitation zone and development footprint. Dry at the time of inspection. Performance criteria for weeds and survival rate of plantings not achieved.	Follow up spot weed control.	Ongoing routine management of pasture grasses. Treatment of pasture grasses required. Replacement of planted trees required. Top up mulch where needed to landscape plan specifications. Monitor wallaby grazing and install protection barriers if it persists. May need to water plants if drought conditions persist. Protection fencing required at the interface of the rehabilitation zone and development footprint.
P9	Pasture grass re-establishing and minor impacts due to wallabies and drought conditions. Isolated occurrence of Easter Cassia but monitoring and follow-up treatment required. Dry at the time of inspection. Protection fencing required at the interface of the rehabilitation zone and development footprint. Dry at the time of inspection. Some rubbish noted within rehabilitation zone. Performance criteria for weeds not achieved.	Follow up spot weed control.	Ongoing routine management of pasture grasses. Treatment of pasture grasses and easter cassia required. Top up mulch where needed to landscape plan specifications. Monitor wallaby grazing and install protection barriers if it persists. May need to water plants if drought conditions persist. Removal of rubbish required. Protection fencing required at the interface of the rehabilitation zone and development footprint.
P10	Pasture grass and some herbaceous weeds re-establishing and minor impacts	Follow up spot weed control.	Ongoing routine management of pasture grasses.

Plot No.	Rehabilitation Issue	Maintenance-Routine	Maintenance Reactive
	due to wallabies and drought conditions. Isolated occurrence of Easter Cassia but monitoring and follow-up treatment required. Dry at the time of inspection. Protection fencing requires repairing. Dry at the time of inspection. Performance criteria for weeds, coverage and tree survival rate not achieved.		Treatment of pasture grasses and herbaceous weeds required. Year 2 supplementary plantings to increase diversity and coverage as per the approved Rehabilitation Plan (Planit, 2020). Top up mulch where needed to landscape plan specifications. Monitor wallaby grazing and install protection barriers if it persists. May need to water plants if drought conditions persist. Repair protection fencing.
P11	Minor areas of Paspalum present.	Follow up spot weed control.	Treat areas of Paspalum.
P12	Minor areas of Paspalum and Easter Cassia present.	Follow up spot weed control.	Treat areas of Paspalum and Easter Cassia. Monitor previously treated and browned-off areas of paspalum for natural regeneration.
P13	Minor areas of Paspalum present.	Follow up spot weed control.	Treat minor areas of Paspalum.
P14	Nil.	Monitor for weeds and apply control as needed.	Nil.
P15	Nil.	Monitor for weeds and apply control as needed.	Nil.

Plot surveys are contained within **Appendix 2.**

4.2 Performance Criteria Assessment

An assessment of the rehabilitation/revegetation project against the performance criteria of Section 5.3 of the approved VMP is a bi-annual requirement. Areas of non-compliance are proposed to be managed as identified in **Table 7** and **Table 8** and progress will be re-assessed in association with the next monitoring survey undertaken in early 2024.

Table 8: Interim Performance Criteria Assessment

Performance Criteria	Compliance	Additional Comments
The contractor undertaking regeneration works is to be a suitably qualified professional with necessary licencing/permits.	Complies.	No action required.
Existing native vegetation and areas of natural regeneration to be retained (where applicable).	Generally compliant across the ~48ha rehabilitation zone. Approximately 3000sqm of Rehabilitation Zone 1 was slashed in May 2023 allegedly by a slashing contractor as part of maintenance occurring on an adjoining lot. Council was immediately informed by the applicant of this non-compliance (refer to **Appendix 5**). This area has since been rehabilitated (refer to the below image from Sep 2023).	Previous mishap within Rehabilitation Zone 1 resolved through corrective actions. Clearing was restricted to areas displayed on approved clearing plans and as set out onsite prior to clearing. Ongoing monitoring of vegetation protection and exclusion fencing proximate to works interface to occur. As noted within **Table 7** and **Appendix 2.**
All rubbish/vegetation dumping, non-approved structures etc. are removed from the Rehabilitation Zones.	Generally compliant across the ~48ha rehabilitation zone. Some minor rubbish debris noted within areas associated with P3 and P9.	Removal of rubbish to occur. Ongoing monitoring required.
Cattle and domestic animals are excluded.	Complies.	Ongoing monitoring required.
A significant reduction in the presence of weed species is evident. In practice it is noted that the removal of all individuals of all weed species for 100% of the time is unachievable. Therefore, it is considered appropriate that the following performance criteria be adopted: • **All large weed/ornamental trees are treated;** • **No weed shrubs/trees older than six months of age are present;** • **Densities of such shrubs/trees is not to exceed 1 per 20m2; and** • **Scattered groundcover weed species may occur but not in any covering an area greaterthan 5m^2.**	Generally compliant across the ~48ha rehabilitation zone. The non-compliant areas occur within sections of Rehabilitation Zones 1-4 which has seen an increase in pasture grass coverage since the previous inspection, likely due to the recent favourable dry conditions for pasture grass. Treatment of these areas are required. Minimal intervention within areas which will be subject to later construction and revegetation of designated frog ponds has occurred. Adaptive management in consultation with BSC has previously occurred to several areas subject to ponding over extended rain periods (assigned as 'low assisted regeneration-weed control-no spray areas) and displayed in **Appendix 1**.	Routine monitoring and control in accordance with VMP to occur. Frog pond construction to be followed by revegetation of freshwater wetland within in accordance with timeframe specified by Australia Wetlands Consultancy. Continued monitoring of treated pasture grasses for natural regeneration. Treatment of pasture grass and some areas of herbaceous weeds required as depicted within **Table 7** and **Appendix 2**.

Performance Criteria	Compliance	Additional Comments
	These areas have since dried out due to prolonged periods without rainfall. Routine maintenance weed control is to continue to occur for the balance of the first and second year per the VMP. Previously treated camphor laurel trees have since died.	
A survival rate of the following minimum standards are to apply for all planted trees, shrubs and groundcovers: • **One year following planting: 95%** • **Three years following planting: 90%** • **Five years following planting: 90%**	Not yet compliant. Loss of planted trees including 'topped' specimens from wallaby graze and drought periods has occurred.	Corrective action proposed: Replacement of planted trees and supplementary plantings required before at end of year 2 (July 2024) to increase cover. Top up mulch where needed to landscape plan specifications. Monitor wallaby grazing and install protection barriers if it persists. Water plantings if drought conditions persist. Additional adaptive management proposed: Treat grazed stock with to treat the stock with 'Sen-Tree'.
Growth rate targets per VMP table 6.	Generally compliant. An increase in native height and coverage was noted throughout all rehabilitation zones. The recent drought conditions, some planted dead stock and an increase in pasture grass coverage has likely affected the growth rate potential.	Ongoing monitoring proposed. Dead planted stock to be replaced to 95% as per above cell. Top up mulch where needed to landscape plan specifications. Water plantings if drought conditions persist. Monitor wallaby grazing and install protection barriers if it persists. Additional adaptive management proposed: Treat grazed stock with to treat the stock with 'Sen-Tree'.
Inappropriate public access to the Rehabilitation Zones is to be effectively restricted (through fencing or signage).	Complies.	No dwellings/residents yet. Ongoing monitoring of vegetation protection and exclusion fencing proximate to works interface to occur. As previously noted, some areas of protection fencing requiring installation/repairs.

Performance Criteria	Compliance	Additional Comments
Assisted natural regeneration per VMP Section 5.3.1 Coverage Success	Not yet compliant across all areas. An increase in height, diversity and coverage was noted throughout all rehabilitation zones. Areas of Rehabilitation zones 1-4 did not meet the performance criteria for coverage. The main issue for this was the increased pasture grass coverage which has occurred in recent months. The combination of drought conditions and an increase in pasture grass coverage has likely affected the natural regeneration potential throughout the rehabilitation zones.	Corrective action proposed: Routine monitoring and control in accordance with VMP to occur. Treatment of pasture grass within Rehabilitation Zones 1-4 (excluding the future frog pond areas) are to occur. The recent dry conditions have resulted in favorable spraying conditions within those areas which are usually ponded. At the end of year 1 and 2 areas below coverage success are to be treated with supplementary planting in accordance with VMP Section 5.3.1 and 4.4.1 (refer to **Table 7** and **Appendix 2**).

PREVIOUSLY SLASHED AREAS OF REHABILITATION ZONE 1 (SEP 2023)

PREVIOUSLY SLASHED AREAS OF REHABILITATION ZONE 1 (SEP 2023)

VEGETATION PROTECTION/REHABILITATION FENCING & SIGNAGE

VEGETATION PROTECTION/REHABILITATION FENCING & SIGNAGE

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: FENCNG REQUIRING REPAIRS

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: FENCING REQUIRED AT THE INTERFACE OF REHAB ZONE AND DEVELOPMENT FOOTPRINT/SWALE

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: PLANTED TREE DEAD/WALLABY GRAZED

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: PLANTED TREE DEAD/WALLABY GRAZED

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: WEEDS / GROUNDCOVER COVERAGE

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: WEEDS / NATIVE GROUNDCOVER COVERAGE

INCIDENCE OF NON-COMPLIANCE TO BE RECTIFIED: RUBBISH WITHIN REHABILITATION ZONE

NESTBOX INSTALLED WITHIN REHABILITATION ZONE

In accordance with the VMP, the next flora survey shall be performed in early 2024 and will be the third monitoring report to be performed after initiation of the rehabilitation/revegetation project. Data collected during the next survey shall be compared to the baseline survey as well as previous surveys to track progress across time and report back on the success on the ongoing routine management and the recommended adaptive/reactive measures proposed in this document.

Appendix 1 – Approved Rehabilitation / Revegetation Plans

Appendix 2 – September 2023 Rehabilitation Plot Monitoring Results

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. One small sapling (<1 m height).

What species?

Camphor Laurel

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 6-10m
- Shrub species: 1.5-4m
- ground covers: <1.5m

Area already well established.

What are the dominant species within each layer?

- Tree: Melaleuca quinquernervia
- Shrub: Acacia melanoxylon
- ground covers: Blechnum indicum

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Reptiles (i.e. Red-bellied black-snake)

Large nectar feeding birds (i.e. lorikeets, friarbirds, honeyeaters etc.)

Small tree and ground birds (i.e. finches, fairy wrens)

Amphibians (i.e. eastern sedge-frog)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? Yes. Camphor Laurel sapling.

Extent of other Weeds? No.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Weed removal to be undertaken to remove Camphor Laurel sapling.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

PROJECT DESCRIPTION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 146. Paperbark/Heath Swamp Forest.@ 556849, 6831798		**Monitoring Site ID:** P1
Type of on-grounds: approved for assisted natural regeneration to maintain Paperbark/Heath Swamp Forest	**Years since site commenced:** 1	**When was this site last assessed?** 12-09-22
Current assessment conducted by: TR	**Date of current assessment:** 12-11-23	
Overall comments on site condition: Closed Sedgeland/Fernland/ Rushland with scattered Paperbark Low Woodland. Excellent condition.		
Has the condition of the site changed since last assessment? No, with the exception of it being dry.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	99	Native swamp in excellent condition. Currently fenced off from surrounding pasture	20-30% Summed for plot but only in NE, NW and SW corner	Dense native species	One small Camphor Laurel sapling (<1m height) recorded.	No change.		Assisted rehabilitation (weed management) is approved for this zone. Remove Camphor Laurel sapling. Maintain exclusion from surrounding paddocks.
B = Uncertain significant problems	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A (describe)
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A (describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								99 %

LOCATION

Site No.	P1						**Date:**	12-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT									
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 146. Paperbark/Heath Swamp Forest. Rehabilitation Zone 6									
GPS coordinates centre plot/meander:	**Zone**	5	6	**E**	Centred @ 556849	**N**	Centred @ 6831798	**Datum:**	MGA94256	

VEGETATION STRUCTURE

Stratum	Est. Median Height (m)	Est. cover density (D,M,S,V)
E	-	-
T1	5-9	S-V
T2	3-5	S-V
S1	1.5-3	S-V
G	0-2	D

Structural formation: (including height)	Closed Sedgeland/Fernland/ Rushland with scattered Paperbark Low Woodland
Ecologically dominant layer:	G

Small clusters at northern and southern ends of plot

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
T1	D	*Melaleuca quinquenervia*
T1	S	*Glochidion ferdinandi*
T2		*Melaleuca quinquenervia*
T2		*Melicope elleryana*
S		*Elaeocarpus reticulatus*
S		*Oxylobium robustum*
S		*Leptospermum juniperinum*
S		*Banksia oblongifolia*
S		*Acacia melanoxylon*
S		*Austromyrtus dulcis*
S		*Homalanthus populifolius*

Str.	Scientific Name
G	*Blechnum indicum*
G	*Gahnia clarkei*
G	*Pteridium esculentum*
G	*Hibbertia scandens*
G	*Gleichenia dicarpa*
G	*Entolasia stricta*
G	*Imperata cylindrica*
G	*Paspalidium distans*
G	*Baloskion tetraphyllum*
G	*Pomax umbellata*
G	*Lygodium microphyllum*
G	*Selaginella uliginosa*
G	*Sphagnum cuspidatum*
G	*Baumea rubiginosa*
G	*Parsonsia straminea*
G	*Cinnamomum camphora**

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	The overall 0.65ha vegetation zone is comprised of an open canopy layer of Melaleuca quinquenervia and a sparse midstorey/shrub layer including species such as Gahnia clarkei, Elaeocarpus reticulatus, Leptospermum juniperinum, Oxylobium robustum and Acacia ulicifolia. The ground layer was relatively dense and included a 0.06 ha area of ephemeral sedge swamp dominated by Baumea rubiginosa, with occasional Blechnum indicum and patches of Baloskion tetraphyllum. Outside of the sedge swamp, the balance of the vegetation zone comprised dense understorey vegetation dominated by Baloskion tetraphyllum, with Hibbertia scandens and Parsonsia straminea in areas and various ferns throughout (e.g. Blechnum indicum, Pteridium esculentum, Gleichenia dicarpa, Lygodium microphyllum). Grasses were present throughout the site, and included native species such as Entolasia stricta, Imperata cylindrica and Paspalidium distans. Forbs included Pomax mbellate and Selaginella uliginosa. With the exception of one very small Camphor Laurel sapling, it's weed free within the 1000m² plot and currently fenced. Recorded Wallum Froglet and Wallum Sedge Frog habitat. Dry at the time of survey.

SITE FORM C

Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6. Existing Sedgeland/Fernland/Rushland Swamp to be managed by assisted natural regeneration.

Centreline @ om

Centreline @ om

NE corner @ om

NE corner @ om

NE corner @ om

NE corner @ om

NW corner @ om

NW corner @ om

Centreline @ 25m

Centreline @ 25m

Centreline @ 25m

Centreline @ 25m

Centre east @ 25m

Centre east @ 25m

Centre east @ 25m

Centre east @ 25m

Centre west @ 25m

Centre west @ 25m

Centreline @ 50m

Centreline @ 50m

SW Corner @ 50m

SW Corner @ 50m

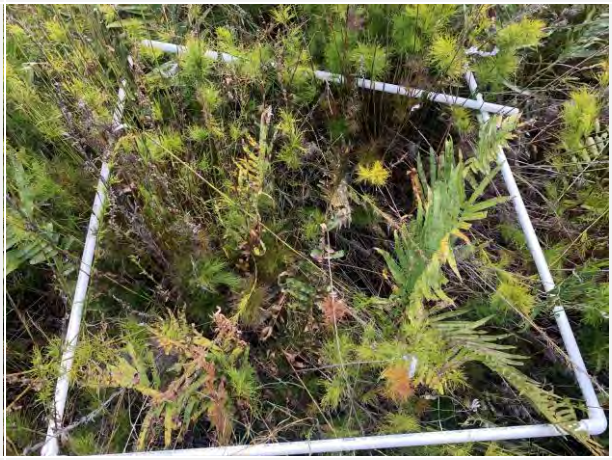
SW Corner @ 50m

SW Corner @ 50m

SE Corner @ 50m

SE Corner @ 50m

Ground centre @ 5m



Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Previously treated Camphor Laurel Trees

Camphor Laurel sapling to be treated

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses re-establishing.

What species?

Andropogon virginicus and Paspalum.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 1-2m
- ground covers: <1m

What are the dominant species within each layer?

- Tree: N/A
- Shrub: Melaleuca quinquenervia
- ground covers: Baumea spp / Andropogon virginicus

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Centella asiatica

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and grassbird)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? Yes.

Condition of Plants? No.

Canopy Coverage? Yes.

Tree, Small Tree & Shrub Diversity? N/A. Rehab Zone 2 is exempt from the diversity performance requirement.

Groundcover Coverage? N/A. Rehab Zone 2 is exempt from the groundcover coverage requirement.

General Coverage/Success? Yes.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Weed removal to be undertaken. Supplementary and replacement plantings to be undertaken post pasture grass treatment to increase coverage and replace dead plantings. Protection fencing to be replaced/installed. Water plantings if drought conditions persist.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 147 @ 557080, 6831531		**Monitoring Site ID:** P2
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Freshwater Wetland habitat	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 12.09.23	
Overall comments on site condition: Good conversion from grazed pasture to Freshwater Wetland since baseline survey, although exotic grasses have started to re-establish since the previous inspection. Very dry.		
Has the condition of the site changed since last assessment? YES. Decreased since the previous inspection. Likely due to prolonged drought periods allowing for exotic grasses to re-establish and wetland species to subside.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	60	Freshwater wetland flora establishing although the prolonged drought period has affected the natural regeneration progress of the wetland, allowing exotic grasses to re-establish in areas.	0 Juvenile phase	Dense establishing native flora species.	Nil	Sporadic melaleuca quinequenrvia + planted species. Some loss of planted trees due to drought conditions.		Routine weed control. Supplementary plantings required. Replacement of planted trees required.
B = Uncertain significant problems	40	Freshwater wetland flora establishing although the prolonged drought period has likely affected the natural regeneration progress of the wetland, allowing exotic grasses to re-establish in areas. 40% estimate of area is estimated to have exotic grasses regenerating.	0 Juvenile phase	Mid – dense of pasture grasses	Pasture grasses, Columbian waxweed	Sporadic melaleuca quinequenrvia + planted species. Some loss of planted trees due to drought conditions. Performance criteria for weeds, coverage and tree survival rate not achieved.		Routine weed control. Supplementary plantings required. Replacement of planted trees required. Water plantings if drought conditions persist.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								80%

LOCATION

Site No.	P2						**Date:**	12-09-23	
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT								
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 147 Rehabilitation Zone 2								
GPS coordinates centre plot:	**Zone**	5	6	**E**	557080	**N**	6831531	**Datum:**	MGA94256

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	-	-
T2	-	-
S1	0.25-1.0	V
G	0.1-0.1.0	D

Structural formation: (including height)	rushland/ sedgeland/ wetland
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		*Melaleuca quinquenervia*
S		*Callistemon salignus*
S		*Lophostemon suaveolens*

Str.	Scientific Name
G	Pasture Grasses
G	*Baloskion tetraphylla*
G	*Eleocharis dulcis*
G	*Blechnum indicum*
G	*Juncus usitatus*
G	*Cyperus* spp.
G	*Persicaria decipiens, P. strigosa*
G	*Imperata cylindrica*
G	*Philydrum lanuginosum*
G	*Liparophyllum exaltatum*
G	*Baumea spp*
G	*Cuphea carthagenensis**
G	*Centella asiatica*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Previously established Pasture Grassland managed and transforming to wetland vegetation under natural regeneration efforts. Area very dry at the time of survey. Exotic grasses starting to re-establish (dominant in some areas), requiring additional weed control measures. Year 2 supplementary plantings required to increase coverage.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 2: Freshwater Wetland

Centreline @ om

Centreline @ om

NW corner @ om

NW corner @ om

SW corner @ om

SW corner @ om

Centre @ 25m

Centre @ 25m

SE corner @ 50m

SE corner @ 50m

Centreline @ 50m

Centreline @ 50m

NE corner @ 50m

NE corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Pasture grass re-establishing and requires treatment

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

Some leftover plastic tube stock containers observed.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses re-establishing.

What species?

Andropogon virginicus and Paspalum.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 1m
- ground covers: <1m

What are the dominant species within each layer?

- Tree: N/A
- Shrub: Melaleuca quinquenervia
- ground covers: Baumea spp / Andropogon virginicus

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Callistemon salignus and Banksia robur

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and grassbird)

Reptiles (i.e. skinks)

Amphibians (i.e. striped marsh frog)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? N/A. Rehab Zone 2 is exempt from the diversity performance requirement.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Minimal intervention in central areas to date which will be subject to later construction to establish designated frog ponds. Weed control to treat pasture grass required within areas external to the proposed frog ponds. Remove rubbish. Water plantings if drought conditions persist.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 147 @ 557262, 6831473		**Monitoring Site ID:** P3
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Freshwater Wetland habitat / frog ponds	**Years since site commenced:** 1	**When was this site last assessed?** 15-11-22
Current assessment conducted by: TR	**Date of current assessment:** 12-09-23	
Overall comments on site condition: Pasture Grassland with regenerating wetland flora		
Has the condition of the site changed since last assessment? YES. Pasture grass has re-established since the last survey. Designated area for future construction of frog ponds. Very dry.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	40	Freshwater wetland flora establishing amongst the pasture grassland supplemented by native plantings.	0 Juvenile stage.	Mid-dense establishing native flora species.	Pasture grasses	Persoonia stradbrokensis, Melaleuca quinquenervia + planted species on fringe Some loss of planted trees due to drought conditions.		Ongoing routine management of pasture grasses. Water plantings if drought conditions persist. Monitor mulch around tree bases and top up as needed. Recent supplementary plantings noted within areas external to frog ponds.
B = Uncertain significant problems	60	Minimal intervention in central areas to date within area which will be subject to later construction to establish designated frog ponds. Pasture grasses have re-established within the zone. Weed control required. Some leftover plastic tube stock containers were observed.	0	Dense	Pasture grasses	Isolated *Persoonia stradbrokensis*		Frog pond construction to be followed by revegetation of freshwater wetland within. Ongoing routine management of pasture grasses. Remove rubbish. Treat pasture grass within areas external to the proposed frog ponds.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								70 %

LOCATION

Site No.	P3	**Date:**	12-09-23
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT		
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 147. In the southeast. Rehabilitation Zone 2		

GPS coordinates centre plot:	**Zone**	5	6	**E**	557262	**N**	6831473	**Datum:**	MGA94256

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	-	-
T2	-	-
S1	0.25-1	M
G	0.1-1	D

Structural formation: (including height)	Closed Grassland
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		*Persoonia stradbrokensis*
S		*Melaleuca quinquenervia*
S		*Eucalyptus tereticornis*
S		*Lophostemon suaveolens*
S		*Banskia robur*
S		*Callistemon salignus*

Str.	Scientific Name
G	Pasture Grasses (*Andropogon virginicus, Axonopus compressus, A. fissifolius, Cynodon dactylon, Paspalum* spp,) codominant
G	*Baloskion tetraphylla*
G	*Blechnum indicum*
G	*Juncus usitatus*
G	*Cyperus* spp.
G	*Philydrum lanuginosum*
G	*Lygodium microphyllum*
G	*Ischaemum australe*
G	*Baumea rubiginosa*
G	*Carex appressa*
G	*Fimbristylis ferruginea*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Freshwater wetland flora establishing amongst the pasture grassland supplemented by native plantings. Much greater incidence of native flora than baseline. Exotic grasses starting to re-establish, likely to due very dry conditions. NOTE: the bulk of this monitoring plot has not received initial treatment and is located within the future designated frog ponds. External to the future designated frog ponds the initial plantings have occurred. Treatment of pasture grasses are required within these areas. The construction of the frog ponds is expected to occur prior to the next monitoring round.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 2: Freshwater Wetland & Constructed Frog Pond

Centreline @ om

Centreline @ om

SE corner @ om

SE corner @ om

SW corner @ om

SW corner @ om

Centre east @ 25m

Centre east @ 25m

Centre @ 25m

Centre @ 25m

Centre west @ 25m

Centre east @ 25m

NW corner @ 50m

NW corner @ 50m

Centreline @ 50m

Centreline @ 50m

NE corner @ 50m

NE corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Supplementary planting within Rehabilitation Zone

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<table>
<tr>
<td>
<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A
</td>
<td>
<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses re-establishing.

What species?

Andropogon virginicus, Setaria sphacelata and Paspalum.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.
</td>
<td>
<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 0.5-1.5m
- ground covers: <0.5m

What are the dominant species within each layer?

- Tree: N/A

- Shrub: Melaleuca quinquenervia +/- Eucalyptus spp.

- ground covers: Andropogon virginicus

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Liparophyllum exaltatum

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.
</td>
</tr>
<tr>
<td>
<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and wrens)

Reptiles (i.e. skinks)
</td>
<td>
<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences
- Good
- Need minor repair
- Poor (need replacement)

Protection fencing required south of the swale.
</td>
<td>
Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? Yes.

Condition of Plants? No.

Canopy Coverage? Yes.

Tree, Small Tree & Shrub Diversity? N/A. Rehab Zone 3 is exempt from the diversity performance requirement.

Groundcover Coverage? N/A. Rehab Zone 3 is exempt from the groundcover coverage requirement.

General Coverage/Success? Yes.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Weed removal to be undertaken. Supplementary and replacement plantings to be undertaken post pasture grass treatment to increase coverage and replace dead plantings. Protection fencing to be replaced/installed. Water plantings if drought conditions persist.
</td>
</tr>
</table>

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 148. In the north @ 557480, 6831293		**Monitoring Site ID:** P4
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Freshwater Wetland habitat	**Years since site commenced:** 1	**When was this site last assessed?** 15-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Previous pasture grassland re-establishing. Zone revegetated with freshwater wetland module. Dry at the time of site inspection. Plantings going well, although some plants exhibited wallaby grazing		
Has the condition of the site changed since last assessment? YES. Although a vast improvement from the baseline survey, pasture grasses are becoming re-established and require treatment.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	60	Revegetation zone with some natural recruitment. Substantial replacement of previous pasture.	0 Juvenile phase	Planted species, mostly rushes and sedge.	Pasture grass	Several species mostly planted with some regeneration (refer preceding page). Increasing in height and coverage. Some loss of planted trees including 'topped' specimens from wallaby graze.		Ongoing routine management of pasture grasses. Supplementary plantings required. Monitor mulch around tree bases and top up as needed.
B = Uncertain significant problems	40	Nominal 40% representing pasture grasses re=establishing and some loss of plant stock due to dry weather conditions and wallabies. Protection fencing required at the interface between the constructed swale and the rehabilitation zone. Dry conditions.	0 Juvenile phase	Planted species, mostly rushes and sedge with pasture regeneration	Pasture grass	Several species mostly planted with some regeneration (refer preceding page) Some loss of planted trees including 'topped' specimens from wallaby graze. Performance criteria for coverage and tree survival rate not achieved.		Ongoing routine management of pasture grasses. Weed control required for pasture grasses. Supplementary plantings required. Barriers required from wallaby grazing. Protection fencing required. May require watering if drought conditions persist.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								80 %

LOCATION

Site No.	P4						**Date:**	14-09-23			
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 148. In the north. Rehabilitation Zone 3										
GPS coordinates centre plot:	**Zone**	5	6	**E**	557480	**N**	6831293	**Datum:**	MGA94z56		

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)	
E	-	-	
T1	-	-	
T2	-	-	
S1	0.25-1	S	Mostly planted natives
G	0.1-0.5	S	Planted and recruited natives
G	0.05-0.5	S-M	Pasture grass and planted wetland natives

Structural formation: (including height)	Open Rush/Sedgeland revegetation zone over low controlled pasture grass
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		*Persoonia stradbrokensis*
S		*Acacia melanoxylon*
S		*Acacia sophorae*
S		*Leptospermum spp.*
S		*Melaleuca quinquenervia*
S		*Oxylobium robustum*
S		*Bansia robur*
S		*Eucalyptus tereticornis*
S		*Callistemon salignus*
S		*Leptospermum polygalifolium*
S		*Lophostemon suaveolens*
S		*Eucalyptus robusta*
S		*Melastoma affine*
S		*Callistemon salignus*

Str.	Scientific Name
G	Pasture Grasses
G	*Baloskion tetraphylla*
G	*Centella asiatica*
G	*Cyperus spp.*
G	*Pteridium esculentum*
G	*Ischaemum australe*
G	*Baumea juncea/rubiginsoa*
G	*Juncus usitatus*
G	*Carex appressa*
G	*Liparophyllum exaltatum*
G	*Histiopteris incisa*
G	*Lobelia stenophylla*

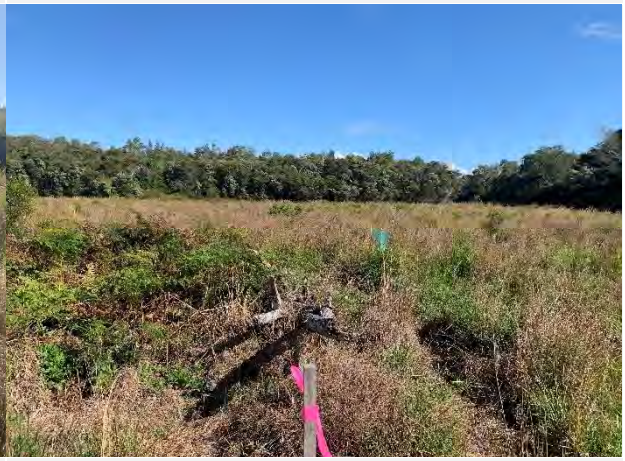
OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Previous tall, closed grassland now managed as a revegetation zone. Much improved from baseline with planted native species and retained regenerating species becoming established and grassland reduced in height to reduce competition, although pasture grasses are re-establishing and require treatment. Dry at the time of inspection.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 3: Freshwater Wetland

Centreline @ om

Centreline @ om

SE corner @ om



SE corner @ om

NE corner @ om

NE corner @ om

Centre north @ 25m

Centre south @ 25m

Centre @ 25m

Centre @ 25m

Centreline @ 50m

Centreline @ 50m

SW corner @ 50m

SW corner @ 50m

NW corner @ 50m

NW corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Protection guard installed around planting

Dead planting requiring replacing

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<table>
<tr>
<td>
<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A
</td>
<td>
<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses established.

What species?

Andropogon virginicus, Setaria sphacelata and Paspalum.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.
</td>
<td>
<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 0.25-1.5m
- ground covers: <1m

What are the dominant species within each layer?

- Tree: N/A

- Shrub: Melaleuca quinquenervia

- ground covers: Andropogon virginicus

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.
</td>
</tr>
<tr>
<td>
<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and wrens)
</td>
<td>
<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences
- Good
- Need minor repair
- Poor (need replacement)

Protection fencing required south of the constructed swale.
</td>
<td>
Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? Yes.

Tree, Small Tree & Shrub Diversity? N/A. Rehab Zone 3 is exempt from the diversity performance requirement.

Groundcover Coverage? N/A. Rehab Zone 3 is exempt from the groundcover coverage requirement.

General Coverage/Success? Yes.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Minimal intervention in northern areas to date within area which will be subject to later construction to establish designated frog ponds. Pasture grass dominates the understory of this community. Frog pond construction to be followed by revegetation of freshwater wetland in accordance with timeframe specified by Australia Wetlands Consultancy. External to the proposed frog pond area, weed removal to be undertaken.
</td>
</tr>
</table>

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 148. Centre. @ 557425, 557425		**Monitoring Site ID:** P5
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Freshwater Wetland habitat. Southern 2/3 not currently sprayed for grasses as per agreement with BSC with monitoring of supplementary plantings and natural regeneration ongoing	**Years since site commenced:** 1	**When was this site last assessed?** 15-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Established Pasture Grassland with regenerating wetland flora from 30m south. Less pasture grass and more establishing native species than baseline, although there's a slight increase in pasture grass since the previous inspection, likely due to the dry conditions. Designated area for future construction of frog ponds in the north. Paperbark stems regenerating nicely. Weed removal required to allow tree plantings and natural regeneration to thrive.		
Has the condition of the site changed since last assessment? YES Less pasture grass and more establishing native species than baseline, although a slight increase in pasture grass since previous inspection, likely due to the dry conditions. Designated area for future construction of frog ponds in the north. Paperbark saplings increasing in height and coverage.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	35	Freshwater wetland flora establishing amongst the pasture grassland supplemented by native plantings. Continued ponding of water without cattle spread of seed should assist native flora.	0 Juvenile phase	Mid-dense establishing native flora species.	Pasture grasses	Performance criteria for coverage not achieved.		Ongoing monitoring of pasture grasses for natural regeneration in low lying and interim no spray area per BSC.
B = Uncertain significant problems	65	65% estimate of pasture grasses or areas not containing regenerated or planted native species. Minimal intervention in northern areas to date within area which will be subject to later construction to establish designated frog ponds. Continued ponding of water without cattle spread of seed should assist native flora, although it has been very dry lately. Protection fencing required at the interface of the constructed swale and rehabilitation zone.	0 Juvenile phase	Dense non-native	Pasture grasses	Performance criteria for coverage not achieved.		Frog pond construction to be followed by revegetation of freshwater wetland within in the north. Ongoing monitoring of pasture grasses for natural regeneration in low lying and interim no spray area per BSC. Weed control required within areas external to the frog pond construction area. Protection fencing required.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								67.5 %

LOCATION

Site No.	P5							**Date:**	14-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 148. Centre. Rehabilitation Zone 3										
GPS coordinates centre plot:	**Zone**	5	6	**E**	557425		**N**	557425	**Datum:**	MGA94z56	

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	-	-
T2	-	-
S1	0.25-1	V-S
G	0.1-1	D

Structural formation: (including height)	Closed Grassland with regenerating rushland/ sedgeland/ wetland flora in the south
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		Melaleuca quinquenervia
S		Persoonia stradbrokensis
S		Acacia melanoxylon
S		Acacia sophorae
S		Eucalyptus tereticornis

Str.	Scientific Name
G	Pasture Grasses
G	Baloskion tetraphylla
G	Eleocharis dulcis
G	Juncus usitatus
G	Cyperus spp.
G	Lygodium microphyllum
G	Fimbristylis ferruginea
G	Liparophyllum exaltatum
G	Centella asiatica
G	Baumea juncea, B. rubiginosa
G	Xyris complanata
G	Ischaemum australe

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Established Pasture Grassland in the north which will be occupied by future constructed frog pond. Regenerating wetland flora in the south from 30-50 metres with supplementary tree plantings amongst grassland. Southern 2/3 not currently sprayed for grasses as per agreement with BSC with monitoring of supplementary plantings and natural regeneration ongoing. Pasture grasses are dominant and smothering the natural regeneration/plantings. Weed control required within areas external to the proposed frog pond. Dry at the time of inspection.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 3: Freshwater Wetland and interim no spray area per BSC.

Centreline @ om

Centreline @ om

NW corner @ om

NW corner @ om

NE corner @ om

NE corner @ om

Centreline North @ 25m

Centreline South @ 25m

Centre west @ 25m

Centre east @ 25m

Centreline @ 50m

Centreline @ 50m

SW corner @ 50m

SW corner @ 50m

SE corner @ 50m

SE corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Paperbark regenerating amongst dense pasture grass

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses established.

What species?

Andropogon virginicus and Paspalum.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 0.25-2m
- ground covers: <1m

What are the dominant species within each layer?

- Tree: N/A
- Shrub: Melaleuca quinquenervia
- ground covers: Baumea spp. +/- Cyperus spp.

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and wrens)

Mammals (i.e. swamp wallaby)

Waders (i.e. great egret)

Reptiles (i.e. common tree snake, skinks)

Amphibians (i.e. rocket frog)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Protection fencing required south of the constructed swale.

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? N/A. Rehab Zone 3 is exempt from the diversity performance requirement.

Groundcover Coverage? N/A. Rehab Zone 3 is exempt from the groundcover coverage requirement.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Generally in good condition and regenerating nicely, although exotic grass present, in particularly within the northern areas which are proposed for future frog ponds. Protection fencing required. Pasture grass requiring treatment in areas external to the proposed frog ponds. May require watering is drought conditions persist.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 148. Southeast. @ 557494, 6831176		**Monitoring Site ID:** P6
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Freshwater Wetland habitat. not currently sprayed for grasses as per agreement with BSC with monitoring of supplementary plantings and natural regeneration ongoing	**Years since site commenced:** 1	**When was this site last assessed?** 15-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Regenerating freshwater wetland with pasture grasses present but not dominant. Regenerating paperbark in the 0.25-2m height range common. Dry at the time of inspection.		
Has the condition of the site changed since last assessment? YES More establishing native species than baseline and previous inspection. Melaleuca quinquenervia juveniles very common and increasing in height and coverage.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	85	Freshwater wetland flora establishing amongst the pasture grassland supplemented by native plantings Continued ponding of water without cattle spread of seed should assist native flora	0	Mid-dense to dense establishing native flora species.	Pasture grasses	Excellent regeneration of paperbark. Native species height and coverage increasing and achieving performance criteria.		Ongoing monitoring of pasture grasses for natural regeneration in low lying and interim no spray area per BSC.
B = Uncertain significant problems	15	15% estimate of pasture grasses or areas not containing regenerated or planted native species (majority occurring within proposed frog pond location). Minimal intervention in a small northwestern area to date within area which will be subject to later construction to establish designated frog ponds. Ponding of water without cattle spread of seed should assist native flora.	0	Dense non-native	Pasture grasses	Dry at the time of inspection which may impact natural regeneration progress.		Frog pond construction to be followed by revegetation of freshwater wetland within in a small area of the northwest. Ongoing monitoring of pasture grasses for natural regeneration in low lying and interim no spray area per BSC. May need to water plantings if drought conditions persist. Protection fencing required.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
		Dry at the time of inspection. Protection fencing required at the interface of the constructed swale and rehabilitation zone.						
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								92.5 %

LOCATION

Site No.	P6							**Date:**	14-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 148. Southeast. Rehabilitation Zone 3										
GPS coordinates centre plot:	**Zone**	5	6	**E**	557494		**N**	6831176	**Datum:**	MGA94z56	

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	-	-
T2	-	-
S1	0.25-2	S-M
G	0.1-0.75	D

Structural formation: (including height)	Closed Freshwater Wetland/Rushland/Sedgeland with Pasture Grassland Associated
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		*Melaleuca quinquenervia*
S		*Breynia oblongifolia*

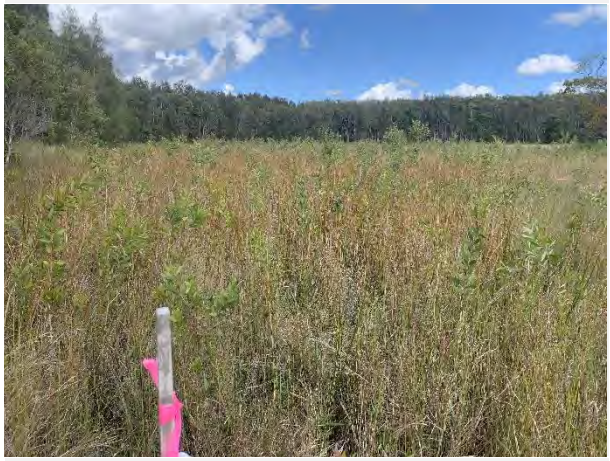
Str.	Scientific Name
G	Pasture Grasses
G	*Baloskion tetraphylla*
G	*Eleocharis dulcis*
G	*Juncus usitatus*
G	*Cyperus* spp. x 2
G	*Lygodium microphyllum*
G	*Fimbristylis ferruginea*
G	*Liparophyllum exaltatum*
G	*Centella asiatica*
G	*Baumea juncea, B. rubiginosa*
G	*Blechnum indicum*
G	*Gahnia clarkei*
G	*Lepironia articulata*
G	*Philydrum lanuginosum*
G	*Schoenus brevifolius*
G	*Centella asiatica*
G	*Phragmite australis*
G	*Xyris complanata*
G	*Lobelia stenophylla*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Regenerating freshwater wetland with pasture grasses present, in particularly in the north. Excellent regeneration of paperbark saplings and aquatic flora from baseline and previous inspection. Not currently sprayed for grasses as per agreement with BSC with monitoring of supplementary plantings and natural regeneration ongoing. Dry at the time of inspection. Increase in Whiskey Grass density since previous inspection which requires treatment.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 3: Freshwater Wetland and interim no spray area per BSC.

Centreline @ om

Centreline @ om



NE corner @ om

NE corner @ om

NW corner @ om

NW corner @ om

Centre west @ 25m

Centre east @ 25m

Centre south @ 25m

Centre north @ 25m

Centreline @ 50m

Centreline @ 50m

SW corner @ 50m

SW corner @ 50m

SE corner @ 50m

SE corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Protection fence required at the interface of the maintained constructed swale and the rehabilitation zone

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<table>
<tr>
<td>
<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A
</td>
<td>
<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses re-established.

What species?

Andropogon virginicus

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.
</td>
<td>
<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 0.25-2m
- ground covers: <0.75m

What are the dominant species within each layer?

- Tree: N/A

- Shrub: Melaleuca quinquenervia +/- Eucalyptus spp.

- ground covers: Whiskey Grass

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.
</td>
</tr>
<tr>
<td>
<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and wrens)

Reptiles (i.e. red-bellied black snake, skinks)
</td>
<td>
<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences
- Good
- Need minor repair
- Poor (need replacement)

Protection fencing required at the interface of the rehabilitation zone and development footprint.
</td>
<td>
Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? Yes.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? Yes.

General Coverage/Success? Yes.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Natural regeneration and plantings establishing nicely, although exotic grass (primarily Whiskey Grass) is becoming re-established and requires treatment. Evidence of wallaby grazing on plantings. Bandicoot diggings common. Fresh mulch required in some areas. May require watering if drought conditions persist. Protection fencing required at the interface of the rehabilitation zone and development footprint. Supplementary plantings required to increase diversity.
</td>
</tr>
</table>

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 149. In south of paddock. @ 557990, 6830947		**Monitoring Site ID:** P7
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Swamp Sclerophyll Forest Habitat	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Previous pasture grassland previously controlled and revegetated with swamp sclerophyll module, although whiskey grass becoming re-established. Dry at the time of inspection. Wallaby grazing evident on several plantings.		
Has the condition of the site changed since last assessment? YES. Plantings establishing nicely and increasing in height and coverage. Increase in exotic grass coverage since previous inspection.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	50	Revegetation zone with natural recruitment. Substantial replacement of previous pasture. Wetland species such as Paperbark regenerating nicely.	0 Juvenile phase	Planted species	Pasture grass	Several species mostly planted with some regeneration (refer preceding page) Native plantings increasing in height and coverage. Some loss of planted trees including 'topped' specimens from wallaby graze.		Ongoing routine management of pasture grasses. Treatment of pasture grasses required. Supplementary plantings required following treatment of pasture grasses. Monitor mulch around tree bases and top up as needed. Plantings may require watering if drought conditions persist.
B = Uncertain significant problems	50	50% representing pasture re-establishing and impacts due to wallabies and drought conditions. Dry at the time of inspection. Protection fencing required at the interface of the rehabilitation zone and development footprint.	0 Juvenile phase	Dense non-native	Pasture grasses	Several species mostly planted with some regeneration (refer preceding page) Some loss of planted trees including 'topped' specimens from wallaby graze. Performance criteria for weeds, survival rate of plants and coverage not achieved.		Ongoing routine management of pasture grasses. Treatment of pasture grasses required. Supplementary plantings required following treatment of pasture grasses. Install protection barriers to restrict wallaby grazing. Plantings may require watering if drought conditions persist. Protection fencing required at the

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
								interface of the rehabilitation zone and development footprint
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								75 %

LOCATION

Site No.	P7	**Date:**	14-09-23
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT		
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 149. In south of paddock. Rehabilitation Zone 4		

GPS coordinates centre plot:	**Zone**	5	6	**E**	557990	**N**	6830947	**Datum:**	MGA94z56

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)	
E	-	-	
T1	-	-	
T2	-	-	
S1	0.25-2	V	Mostly planted natives
G	0.1-0.75	M	Planted and recruited natives
G	0.1-0.0.75	S-M	Pasture grass and planted natives with some natural recruitment

Structural formation: (including height)	Very Open Shrubland revegetation zone over low controlled pasture grass
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		Melaleuca quinquenervia
S		Persoonia stradbrokensis
S		Acacia sophorae
S		Lophostemon suaveolens
S		Zieria smithii
S		Lophostemon confertus
S		Eucalyptus tereticornis
S		Bankisa robur
S		Austromyrtus dulcis
S		Leptospermum polygalifolium
S		Callistemon salignus
S		Casuarina glauca
S		Corymbia intermedia
S		Eucalyptus robusta
S		Callistemon pachyphyllus
S		Syzygium oleosum

Str.	Scientific Name
G	Pasture Grasses *
G	Baloskion tetraphylla
G	Blechnum indicum
G	Hibbertia scandens
G	Cyperus spp.
G	Gahnia clarkei
G	Centella asiatica
G	Pteridium esculentum
G	Wahlenbergia gracilis
G	Drosera spatulata
G	Liparophyllum exaltatum
G	Lomandra hystrix
G	Histiopteris incisa
G	Fimbristylis ferruginea
G	Xyris complanata
G	Hardenbergia violaceae

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes	Previous tall, closed grassland now managed as a revegetation zone. Much improved from baseline with planted native species and retained regenerating species becoming established and grassland reduced in height to reduce competition. Increase in pasture grass since previous inspection. Dry at the time of inspection. Evidence of wallaby grazing on plantings and some dead plantings. Nest boxes noted in rehab zone. Bandicoot diggings common within zone.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 4: Swamp Sclerophyll Forest.

Centreline @ om

Centreline @ om

SE corner @ om

SW corner @ om

Centre south @ 25m

Centre north @ 25m

Centre east @ 25m

Centre west @ 25m

Centreline @ 50m

Centreline @ 50m

NW corner @ 50m

NE corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Nest box within rehabilitation zone

Dead planting requiring replacing

Bandicoot diggings common in plot

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses present although not dominant.

What species?

Andropogon virginicus

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 0.25-1.5m
- ground covers: <0.75m

What are the dominant species within each layer?

- Tree: N/A
- Shrub: Melaleuca quinquenervia
- ground covers: Baloskion tetraphylla

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches, grassbird and wrens)

Mammals (i.e. swamp wallaby)

Reptiles (i.e. skinks)

Amphibians (i.e. eastern sedge-frog)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Protection fencing required at the interface of the rehabilitation zone and development footprint.

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? Yes.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Natural regeneration and plantings establishing nicely, although exotic grass (primarily Whiskey Grass) is present and requires treatment. May require watering if drought conditions persist. Protection fencing required. Evidence of wallaby grazing on plantings, monitor and install protection barriers if it persists.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 149. In east of paddock. @ 558101, 6831072		**Monitoring Site ID:** P8
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Swamp Sclerophyll Forest Habitat	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Regenerating freshwater wetland with pasture grasses present but not dominant. Revegetated swamp sclerophyll module on the fringe with tree species planting throughout. Dry.		
Has the condition of the site changed since last assessment? YES. Native shrubs and trees planted and naturally regenerating nicely, increasing in height and density. Dry conditions. Whiskey grass prominent in the south-eastern sections.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	70	Freshwater wetland flora establishing amongst the previous pasture grassland supplemented by native plantings. Rain without cattle spread of seed should assist native flora.	0	Dense establishing native aquatic flora species.	Pasture grasses	Regenerating and supplementary planting performed. Increasing in height and coverage.		Ongoing monitoring of pasture grasses for natural regeneration. May require some treatment in the southeastern sections where whiskey grass is prominent. Monitoring and routine follow up weed control where needed. Monitor mulch around tree bases and top up as needed.
B = Uncertain significant problems	30	30% estimate of pasture grasses or areas not containing regeneration or planted native species. Prolonged drought conditions may impact the natural regeneration progress of the wetland species. Protection fencing required at the interface of the rehabilitation zone and development footprint.	0	non-native grasses within wetland	Pasture grasses	Regenerating and supplementary planting performed. Some loss of planted trees including 'topped' specimens from wallaby graze. Performance criteria for weeds and survival rate of plantings not achieved.		Ongoing monitoring of pasture grasses for natural regeneration in low lying eastern area and interim no spray area per BSC. Replacement plantings required. May need to water plants if drought conditions persist. Protection fencing required at the interface of the rehabilitation zone and development footprint. Install protection barriers to restrict wallaby grazing.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								85 %

LOCATION

Site No.	P8						**Date:**	14-09-23			
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 149. In east of paddock. Rehabilitation Zone 4										
GPS coordinates centre plot:	**Zone**	5	6	**E**	558101		**N**	6831072	**Datum:**	MGA94256	

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	-	-
T2	-	-
S1	0.25-1.5	V-S
G	0.1-0.75	D

Structural formation: (including height)	Regenerating rushland/ sedgeland/ wetland flora with previous grassland becoming subdominant
Ecologically dominant layer:	G

Native flora becoming dominant. Some patches of pasture grasses present.

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		Melaleuca quinquenervia
S		Persoonia stradbrokensis
S		Lophostemon suaveolens
S		Casuarina glauca
S		Melastoma affine
S		Oxylobium robustum
S		Banskia integrifolia
S		Leptospermum spp.
S		Banksia robur
S		Eucalyptus robusta
S		Corymbia intermeida
S		Eucalyptus tereticornis

Str.	Scientific Name
G	Pasture Grasses
G	Baloskion tetraphylla
G	Baumea juncea, rubiginosa
G	Juncus usitatus
G	Cyperus spp.
G	Lepironia articulata
G	Selaginella uliginosa
G	Gonocarpus micranthus
G	Gahnia clarkei
G	Blechnum indicum
G	Drosera spatulata
G	Xyris complanata
G	Wahlenbergia gracilis
G	Lomandra hystrix
G	Dianella caerulea
G	Liparophyllum exaltatum
G	Centella asiatica

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Previously establish Pasture Grassland well managed and transforming to wetland vegetation under natural regeneration efforts. Dry at the time of inspection. Not currently sprayed for grasses in the east as per agreement with BSC with monitoring of supplementary plantings and natural regeneration ongoing. Generally in good condition and regenerating nicely, although there's some patches of Whiskey grass prominent which requires treatment.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 4: Swamp Sclerophyll Forest.

Centreline @ om

Centreline @ om

SE corner @ om

SE corner @ om

SW corner @ om

SW corner @ om

Centre east @ 50m

Centre west @ 50m

Centreline @ 25m

Centreline @ 25m

Centreline @ 50m

Centreline @ 50m

NW corner @ 50m

NW corner @ 50m

NE corner @ 50m

NE corner @ 50m

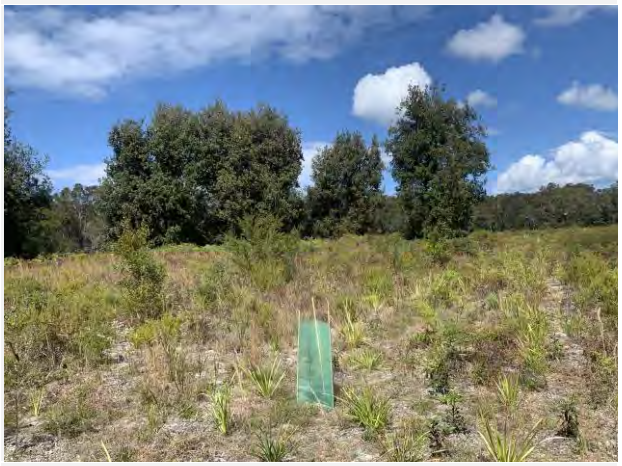
Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m



Some protection barriers installed for plantings

Top-up mulch required for several plantings

Excellent natural regeneration occurring within zone

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

Yes. Some minor rubbish noted within the rehabilitation zone which requires removal.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses present although not dominant and isolated Easter Cassia present.

What species?

Andropogon virginicus, Paspalum and Easter Cassia.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 8-12m
- Shrub species: 0.5-3m
- ground covers: <1m

What are the dominant species within each layer?

- Tree: Banskia integrifolia
- Shrub: Mixed (i.e. Paperbark, Acacia, Banskia etc.)
- ground covers: Pteridium esculentatum

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Stephania japonica

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches, grassbird and fairy wrens)

Omnivore birds (i.e. magpie and crow)

Nectivore/insectivore/frugivore birds (i.e. honeyeaters, noisy friarbird, rainbow lorikeets, crested pigeon)

Raptors (i.e. Whistling Kite [flying above])

Reptiles (i.e. skinks)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Protection fencing required at the interface of the rehabilitation zone and development footprint.

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Natural regeneration and plantings establishing nicely, although exotic grass (primarily Whiskey Grass and Paspalum) and some Easter Cassia are present and require treatment. May require watering if drought conditions persist. Monitoring wallaby grazing and install protection barriers if it persists. Protection fencing to be installed. Removal of rubbish required.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 149. In east of paddock within existing Banksia Woodland @ 558050, 6831124		**Monitoring Site ID:** P9
Type of on-grounds: approved for assisted natural regeneration to Coastal Banksia Woodland/ Open Forest Habitat	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Good beginnings of natural regeneration with a variety of native flora species encountered. Where canopy trees are grouped providing shade a good leaf litter layer is present. Previous pasture largely controlled and now revegetated, although there's still some pasture grass and easter cassia to be treated. Some minor rubbish debris present. Wallaby grazing evident on some saplings.		
Has the condition of the site changed since last assessment? YES. Native regeneration increasing in density and height. Minor increase in pasture grass since initial inspection/treatment.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	90	Fragmented Banksia Woodland/ Open Forest on sandy substrate. Good regeneration, particularly where canopy cover exists. Open areas still contain a variety of native forbs/groundcovers. Revegetation zone with some natural recruitment. Substantial replacement of previous pasture.	40-45%	Mid-dense establishing native flora species with revegetation also performed.	Pasture grasses	Native regeneration Increasing in height and coverage.		Ongoing routine management of pasture grasses. Monitor mulch around tree bases and top up as needed.
B = Uncertain significant problems	10	Nominal 10% representing pasture grasses and loss of plant stock due to wallabies. Isolated occurrence of Easter Cassia but monitoring and follow-up treatment required. Prolonged drought conditions may impact the natural regeneration progress of the wetland species. Protection fencing required at the interface of the rehabilitation zone and development footprint. Some rubbish noted within rehabilitation zone.	0 Juvenile phase	Dense non-native.	Pasture grasses, *Senna pendula*	Some loss of planted trees including 'topped' specimens from wallaby graze. Performance criteria for weeds not achieved.		Ongoing routine management of pasture grasses. Spot control of Easter Cassia. Removal of rubbish required. May need to water plants if drought conditions persist. Protection fencing required at the interface of the rehabilitation zone and development footprint. Install protection barriers to restrict wallaby grazing.

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								95 %

LOCATION

Site No.	P9							**Date:**	14-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 149. In east of paddock within existing Banksia Woodland. Rehabilitation Zone 6										
GPS coordinates centre plot:	**Zone**	5	6	**E**	558050		**N**	6831124	**Datum:**	MGA94z56	

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	8-12	M
T2	4-8	S-V
S1	0.5-4	S-M
G	0.1-0.8	S-D

Structural formation: (including height)	Coastal Banksia Woodland / Open Forest
Ecologically dominant layer:	T1

Planted natives + existing regeneration post cattle exclusion

Controlled pasture grass (browning off and acting as mulch) and planted natives with natural recruitment. Some exposed sand typical to vegetation type.

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1	D	*Banksia integrifolia*
T1	A	*Melaleuca quinquenervia*
T2		*Regenerating T1 species*
T2		*Acacia sophorae*
T2		*Persoonia stradbrokensis*
T2		*Glochidion sumatranum*
T2		*Duboisia myoporoides*
S		*Regenerating T1 and T2 species*
S		*Acacia ulicifolia*
S		*Leptospermum juniperinum, L. polygalifolium*
S		*Acrotriche aggregata*
S		*Notelaea longifolia*
S		*Austromyrtus dulcis*
S		*Monotoca elliptica*
S		*Elaeocarpus reticulatus*
S		*Melicope elleryana*
S		*Lophostemon suaveolens*
S		*Senna pendula**
S		*Banksia robor*
S		*Cupaniopsis anacardioides*
S		*Callistemon salignus*
S		*Syzygium oleosum*
S		*Acronychia imperforata*
S		*Eucalyptus robusta*

Str.	Scientific Name
G	Pasture Grasses
G	*Pomax umbellata*
G	*Hibbertia scandens*
G	*Baloskion tetraphylla*
G	*Cyperus spp.*
G	*Dianella caerulea*
G	*Geitonoplesium cymosum*
G	*Gonocarpus micranthus*
G	*Gahnia clarkei*
G	*Lomandra filiformis*
G	*Parsonsia straminae*
G	*Pteridium esculentum*
G	*Hatpins*
G	*Marsdenia rostrata*
G	*Smilax australis*
G	*Goodenia rotundifolia*
G	*Centella asiatica*
G	*Wahlenbergia gracilis*
G	*Drosera spatulata*
G	*Pomax umbellata*
G	*Imperata cylindrica*
G	*Lomandra hystrix*
G	*Stephania japonica*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Banksia woodland within former grazing paddock on sandy substrate. Good beginnings of natural regeneration with a variety of native flora species encountered and a large number of native saplings observed. Where canopy trees are grouped providing shade a good leaf litter layer is present. Previous pasture largely controlled, and site now revegetated, although there's a minor increase in Whiskey Grass and Paspalum presence since the previous inspection. Increase in density and height of regenerating native flora noticeable since the previous inspection. Some minor rubbish observed which requires removal. Weeds largely treated with some follow-up of Easter Cassia and exotic grasses required in next round. Some wallaby grazing evident.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6. Coastal Banksia Woodland/Open Forest to be managed by assisted natural regeneration.

Centreline @ om

Centreline @ om

SE corner @ om

SE corner @ om

NE corner @ om

NE corner @ om

Centre north @ 25m

Centre south @ 25m

Centreline @ 25m

Centreline @ 25m

Centreline @ 50m

Centreline @ 50m

NW corner @ 50m

NW corner @ 50m

SW corner @ 50m

SW corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Protective barriers present around several plantings

Evidence of wallaby grazing and mulch top-up requirement

Some rubbish recorded within zone

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<table>
<tr>
<td>
<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A
</td>
<td>
<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Exotic grasses re-establishing in some areas.

What species?

Mainly Andropogon virginicus and Paspalum. Some Thickhead too.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.
</td>
<td>
<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: N/A
- Shrub species: 0.5-1m
- ground covers: <0.5m

What are the dominant species within each layer?

- Tree: N/A

- Shrub: Eucalyptus spp +/- Melaleuca quinquenervia

- ground covers: Mixed wetland natives and some pasture grasses

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Leptospermum spp., Pultenea villosa, Pteridium esculentatum

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.
</td>
</tr>
<tr>
<td>
<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and wrens)
</td>
<td>
<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences
- Good
- Need minor repair
- Poor (need replacement)

Some sections of blue bunting tape have fallen. Requires repairing.
</td>
<td>
Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? Yes.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? Yes.

Tree, Small Tree & Shrub Diversity? N/A. Rehab Zone 1 is exempt from the diversity performance requirement.

Groundcover Coverage? N/A. Rehab Zone 1 is exempt from the groundcover coverage requirement.

General Coverage/Success? Yes.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

Weed removal to be undertaken. Replacement plantings to be undertaken. Repair protection fencing. Water plantings if drought conditions persist. Evidence of wallaby grazing on plantings, monitor and install protection barriers if it persists.
</td>
</tr>
</table>

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 146. South of Frog Pond. @ 556907, 6831745		**Monitoring Site ID:** P10
Type of on-grounds: approved for assisted natural regeneration with reconstruction to Freshwater Wetland habitat	**Years since site commenced:** 1	**When was this site last assessed?** 15-11-22
Current assessment conducted by: TR	**Date of current assessment:** 12-09-23	
Overall comments on site condition: Previous pasture grassland largely controlled and revegetated with freshwater wetland module, although there's an increase in exotic grass coverage since previous inspection.		
Has the condition of the site changed since last assessment? YES. Plantings and natural regeneration establishing and increasing in height, although exotic grasses are starting to re-establish, likely to due very dry conditions.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	60	Revegetation zone with some natural recruitment. Substantial replacement of previous pasture.	0 Juvenile phase	Planted species, mostly rushes and sedge.	Pasture grass	Several species mostly planted with some regeneration (refer preceding page) Increasing in height and coverage. Some loss of planted trees including 'topped' specimens from wallaby graze.		Ongoing routine management of pasture grasses. Monitoring and routine follow up weed control where needed. Supplementary/replacement plantings required. Monitor mulch around tree bases and top up as needed.
B = Uncertain significant problems	40	Nominal 40% representing pasture grasses re-establishing likely due to very dry conditions. Limited occurrence of waxweed, billygoat weed, thickhead, but monitoring and routine control required due to proficiency to spread within wetlands. Prolonged drought conditions may impact the natural regeneration progress of the wetland species.	0 Juvenile phase	Planted species, mostly rushes and sedge with minor pasture regeneration and sporadic waxweed, billygoat weed and thickhead.	Pasture grasses, Columbian waxweed, Billygoat weed, Thickhead	Several species mostly planted with some regeneration (refer preceding page) Some loss of planted trees including 'topped' specimens from wallaby graze. Performance criteria for weeds, coverage and tree survival rate not		Ongoing routine management of pasture grasses. Spot control of waxweed, billygoat weed, thickhead and pasture grasses Supplementary/replacement plantings required. Install protection barriers to restrict wallaby grazing. May need to water plants if drought

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
		Protection fencing requires repairs.				achieved.		conditions persist. Repair protection fencing.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								80 %

LOCATION

Site No.	P10						**Date:**	12-09-23			
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 146. South of Frog Pond. Rehabilitation Zone 1										
GPS coordinates centre plot:	**Zone**	5	6	**E**	556907	**N**	6831745	**Datum:**	MGA94256		

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)	
E	-	-	
T1	-	-	
T2	-	-	
S1	0.25-1	V-S	Mostly planted natives
G	0.1-0.75	S	Planted and recruited natives
G	0.05-0.5	S	Pasture grass and planted wetland natives

Structural formation: (including height)	Closed Pasture Grassland
Ecologically dominant layer:	G

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1		-
T1		-
T2		-
T2		-
S		*Persoonia stradbrokensis*
S		*Callistemon salignus*
S		*Eucalyptus robusta*
S		*Melaleuca quinquenervia*
S		*Casuarina glauca*
S		*Acacia sophorae*
S		*Lophostemon suaveolens*
S		*Eucalyptus tereticornis*
S		*Banksia robur*

Str.	Scientific Name
G	Pasture Grasses
G	*Baloskion tetraphylla*
G	*Centella asiatica*
G	*Cyperus* spp.
G	*Liparophyllum exaltatum*
G	*Blechnum indicum*
G	*Hibbertia scandens*
G	*Fimbristylis ferruginea*
G	*Cuphea carthagenensis**
G	*Juncus usitatus*
G	*Philydrum lanuginosum*
G	*Histiopteris incisa*
G	*Carex appressa*
G	*Baumea juncea/rubiginsoa*
G	*Crassocephalum crepidioides**
G	*Ageratum houstianum**
G	*Leptospermum spp.*
G	*Lobelia stenophylla*
G	*Pultenea villosa*
G	*Pteridium esculentum*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Previous low to mid-high, closed grassland now managed as a revegetation zone. Much improved from baseline with planted native species and retained regenerating species becoming established and grassland reduced in height to reduce competition. Exotic grasses re-establishing. Several plants exhibit wallaby grazing.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 1: Freshwater Wetland

Centreline @ om

Centreline @ om

SE corner @ om

SE corner @ om

NE corner @ om

NE corner @ om

Centreline @ 25m

Centreline@ 25m

Centreline @ 50m

Centreline @ 50m

SW corner @ 50m

SW corner @ 50m

NW corner @ 50m

NW corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Evidence of Wallaby grazing

Dead Planting Requiring Replacing

Protection Fencing Requiring Repairs

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Minor areas of Paspalum within northern areas of the plot.

What species?

Paspalum spp.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 14-20m
- Shrub species: 0.5-3m
- ground covers: <1m

Area already well established.

What are the dominant species within each layer?

- Tree: Lophostemon confertus
- Shrub: Melaleuca quinquenervia
- ground covers: Gahnia clarkei

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N.A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. rufous fantail, cisticola and fairy wrens)

Nectivore/insectivore/frugivore birds (i.e. honeyeaters, noisy friarbird, whipbird)

Omnivore birds (i.e. magpie, butcherbird)

Mammals (i.e. swamp wallaby)

Reptiles (i.e. skinks, red-bellied black snake)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? No.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

In excellent condition with minor areas of Paspalum present which requires routines weed control.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 147. Mapped Brushbox area. @ 557828, 6831140		**Monitoring Site ID:** P11
Type of on-grounds: Approved for assisted natural regeneration	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Established Brushbox Community. Fenced off and removed from construction zone. In excellent condition with minor weed regeneration (limited to Paspalum).		
Has the condition of the site changed since last assessment? YES. Remains in excellent condition. Initial weed treatment performed. Camphor Laurels have since died.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	99	In excellent condition with no weeds.	80	Dense	N/A	N/A	-	Nil. Monitoring only.
B = Uncertain significant problems	1	Weeds previously treated. Minor areas of Paspalum present.	80	Sparse	Paspalum	N/A	-	Routine follow up weed control of Paspalum. Monitor camphor laurel dieback.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								99.5 %

LOCATION

Site No.	P11							**Date:**	14-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 147. Within mapped Brushbox Foest. Rehabilitation Zone 6										
GPS coordinates centre plot:	**Zone**	5	6	**E**	557828		**N**	6831140	**Datum:**	MGA94z56	

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	14-20	D
T2	5-14	V
S1	0.5-3	M-S
G	0.1-0.5	M-D

Structural formation: (including height)	Tall to Very Tall Open Forest
Ecologically dominant layer:	T1

Dense growth of native ferns, sedges, rushes. Thick organic leaf layer and coarse woody debris present.

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1	D	*Lophostemon confertus*
T1	A	*Melaleuca quinquenervia*
T1	S	*Lophostemon suaveolens*
T1	S	*Melicope elleryana*
T2		*Elaeocarpus reticulatus*
T2		*Endiandra sieberi*
T2		*Syzygium oleosum*
T2		*Platycerium superbum*
S1		*Regenerating T1/T2*
S1		*Melastoma affine*
S1		*Leptospermum spp.*
S1		*Austromyrtus dulcis*
S1		*Homalanthus populifolius*
S1		*Banksia integrifolia*

Str.	Scientific Name
G	*Paspalum spp.*
G	*Gahnia clarkei*
G	*Banksia integrifolia*
G	*Blechnum indicum*
G	*Smilax australis*
G	*Selaginella uliginosa*
G	*Pterdium esculentum*
G	*Calochlaena dubia*
G	*Marsdenia rostrata*
G	*Hibbertia scandens*
G	*Lygodium microphyllum*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Brushbox forest. Fenced off from construction zone. In excellent condition with minor areas of Paspalum present, primarily within the northern section of the plot. Large Camphor Laurels previously treated and have since died.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6: Existing Vegetation

Centreline @ om

Centreline @ om

Northeast corner @ om

Northeast corner @ om

Northwest corner @ om

Northwest corner @ om

Centre north @ 25m

Centre south @ 25m

Centre west @ 25m

Centre east @ 25m

Southwest corner @ 50m

Southwest corner @ 50m

Centreline @ 50m

Centreline @ 50m

Southeast corner @ 50m

Southeast corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes.

What species?

Paspalum and Easter Cassia.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 8-14m
- Shrub species: 0.5-3m
- ground covers: <1m

Area already well established.

What are the dominant species within each layer?

- Tree: Casuarina gluaca
- Shrub: Melaleuca quinquenervia
- ground covers: Pteridium esculentatum +/- Gahnia

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Commelina cyanea

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and fairy wrens)

Nectivore/insectivore/frugivore birds (i.e. honeyeaters)

Omnivore birds (i.e. Kookaburra, butcherbird)

Reptiles (i.e. skinks, red-bellied black snake)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? No.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No*

*Whilst there are areas exceeding the groundcover coverage performance criteria, these occur as previously treated areas of paspalum which have since browned off, as well as Swamp Oak pine needles. Ongoing monitoring for natural regeneration will occur within these areas.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

In good condition with minor areas of Paspalum and isolated Easter Cassia present which requires routine weed control. Previously treated Camphor Laurel has died. Routine monitoring of native ground cover regeneration within treated areas of Paspalum.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

PROJECT DESCRIPTION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 147. Mapped Swamp Oak area proximate Belongil Creek. @ 557927, 6830883		**Monitoring Site ID:** P12
Type of on-grounds: Approved for assisted natural regeneration	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Established Swamp Oak Community. Fenced off from construction zone. Exotic grasses previously treated and browned off, although some remain within ground layer. Dry at the time of inspection.		
Has the condition of the site changed since last assessment? YES. Paspalum previously treated and browned off, although some areas remain/have since regenerated. Improvement since previous inspection.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	90	Mostly dense native ground cover. Treated camphor laurel trees have been treated and died.	70	Dense	individual camphor laurel trees	Treated camphor laurel dieback. Increase in native groundcover density noted.	-	Routine monitoring and weed control. Monitor treated camphor laurels for dieback.
B = Uncertain significant problems	10	Paspalum previous treated and left as mulch although some minor patches still remain and require treatment. Isolated Easter Cassia requiring treatment.	70	Dense	Pasture grasses, Easter Cassia	N/A	-	Treatment of pasture grasses and Easter Cassia required. Routine monitoring of native ground cover regeneration within treated areas.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								95 %

LOCATION

Site No.	P12							**Date:**	14-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 147. Within mapped Swamp Oak Forest proximate Belongil Creek. Rehabilitation Zone 6										
GPS coordinates centre plot:	**Zone**	5	6	**E**	557927		**N**	6830883	**Datum:**	MGA94z56	

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	12-16	D
T2	3-12	S
S1	0.75-3	S
G	0.1-1	D

Structural formation: (including height)	Mid-high to Tall Open Forest
Ecologically dominant layer:	T1 - G

Dense growth of native ferns, sedges, rushes. Thick organic leaf layer and coarse woody debris present including casuarina needles.

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1	D	*Casuarina glauca*
T1	A	*Melaleuca quinquenervia*
T1	S	*Melicope elleryana*
T1	S	*Cinnamomum camphora [treated/dead]*
T1		*Regenerating T1 species*
T2		*Acacia melanoxylon*
T2		*Cupaniopsis anacardioides*
T2		*Acacia melanoxylon*
T2		*Cupaniopsis anacardioides*
S1		*Breynia oblongifolia*
S1		*Regenerating T1/T2 species*

Str.	Scientific Name
G	*Pteridium esculentum*
G	*Calochlaena dubia*
G	Exotic Grasses (*Paspalum spp)**
G	*Dianella caerulea*
G	*Blechnum indicum*
G	*Marsdenia rostrata*
G	*Smilax australis*
G	*Stephania japonica*
G	*Gahnia clarkei*
G	*Gahnia clarkei*
G	*Asplenium australasicum*
G	*Parsonsia straminea*
G	*Platycerium superbum*
G	*Commelina cyanea*
G	*Baumea juncea*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary estuarine alluvium overlain by and/or mixed with Quaternary (Pleistocene) sands. The sands are generally aeolian, originating from the adjacent beach ridge systems.
Field observation and notes:	Swamp Oak forest. Fenced off from construction zones. Treatment has occurred to camphor laurels with follow-up treatment of exotic grass required. Groundcover height and density increasing since baseline survey. Previously treated exotic grass browned off and left as mulch. Dry at the time of inspection.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6: Existing Vegetation

Centreline @ om

Centreline @ om

NW corner @ om

NW corner @ om

NE corner @ om

NE corner @ om

Centreline south @ 25m

Centreline north @ 25m

Centreline east @ 25m

Centreline west @ 25m

Centreline @ 50m

Centreline @ 50m

SW Corner @ 50m

SW Corner @ 50m

SE Corner @ 50m

SE Corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Previously treated exotic grass used as natural mulch

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

Yes. Minor areas of Paspalum present.

What species?

Paspalum spp.

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 14-20m
- Shrub species: 0.5-4m
- ground covers: <1.5m

Area already well established.

What are the dominant species within each layer?

- Tree: Melaleuca quinquenervia
- Shrub: Melaleuca quinquenervia
- ground covers: Baumea rubignosa +/- Gahnia clarkei

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Commelina cyanea

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. fairy wrens, silvereye and spotted pardalote)

Nectivore/insectivore/frugivore birds (i.e. honeyeaters, eastern whipbird and emerald dove)

Omnivore birds (i.e. kookaburra and pheasant coucal)

Reptiles (i.e. skinks, yellow-faced whipsnake)

Mammals (i.e. swamp wallaby)

Amphibians (i.e. eastern sedge-frog)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? No.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

In good condition with minor areas of Paspalum present which requires routines weed control. Area dry at the time of inspection.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 147. Mapped Paperbark Forest area. @ 557731, 6831194		**Monitoring Site ID:** P13
Type of on-grounds: Approved for assisted natural regeneration	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Established Paperbark Swamp Community. Fenced off and removed from construction zone. In excellent condition with minor weed intrusion.		
Has the condition of the site changed since last assessment? NO. Area remains in excellent condition. Small area of paspalum remains. Dry at the time of survey.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	98	Undisturbed area well removed from construction zone.	70	Moderate - Dense	None	N/A	-	Nil. Monitoring only.
B = Uncertain significant problems	2	Very minor presence of exotic grass	70	Moderate - Dense	Paspalum	N/A	-	Routine weed control of very minor exotic grass presence.
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								99 %

LOCATION

Site No.	P13	**Date:**	14-09-23
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT		
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 147. Within mapped Paperbark Swamp Forest. Rehabilitation Zone 6		

GPS coordinates centre plot:	**Zone**	5	6	**E**	557731	**N**	6831194	**Datum:**	MGA94z56

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	14-20	D
T2	4-14	V
S1	0.5-4	V
G	0.1-1.5	M-D

Structural formation: (including height)	Mid-high to Tall Forest
Ecologically dominant layer:	T1

Dense growth of native ferns, sedges, rushes. Thick organic leaf layer and coarse woody debris present.

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1/T2	D	*Melaleuca quinquenervia*
T2	S	*Melicope elleryana*
S1		*Regenerating T1/T2 species*

Str.	Scientific Name
G	*Blechnum indicum*
G	*Baumea rubignosa*
G	*Juncus usitatus*
G	*Paspalum spp.**
G	*Lygodium microphyllum*
G	*Marsdenia rostrata*
G	*Pteridium esculentum*
G	*Calochlaena dubia*
G	*Gahnia clarkeri*
G	*Lepironia articulata*
G	*Phragmites australis*
G	*Parsonsia straminea*
G	*Commelina cyanea*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Paperbark swamp forest. Fenced off from cattle. In excellent condition with very minor weed presence (Paspalum). Dry at the time of survey.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6: Existing Vegetation

Centreline @ om

Centreline @ om

Northeast corner @ om

Northeast corner @ om

Southeast corner @ om

Southeast corner @ om

Centreline west @ 25m

Centreline east @ 25m

Centre north @ 25m

Centre south @ 25m

Centreline @ 50m

Centreline @ 50m

Northwest corner @ 50m

Northwest corner @ 50m

Southwest corner @ 50m

Southwest corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

No.

What species?

N.A

What management was undertaken to eradicate these weeds?

N.A

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 10-15m
- Shrub species: 1.5-4m
- ground covers: <1.5m

Area already well-established.

What are the dominant species within each layer?

- Tree: Melaleuca quinquenervia
- Shrub: Acacia spp.
- ground covers: Baloskion tetraphylla +/- Blechnum indicum

Have you noticed any new native plant species since the last inspection?

No.

If yes name the species or take a photograph

N.A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. finches and wrens)

Reptiles (i.e. skinks)

Nectivore birds (i.e. honeyeaters)

Amphibians (i.e. eastern sedge-frog)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? No.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

In excellent condition with no current corrective actions required.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 147. Mapped Paperbark Swamp Forest area off Melaleuca Drive. @ 557037, 6831497		**Monitoring Site ID:** P14
Type of on-grounds: Approved for assisted natural regeneration	**Years since site commenced:** 1	**When was this site last assessed?** 16-10-22
Current assessment conducted by: TR	**Date of current assessment:** 12-09-23	
Overall comments on site condition: Established Paperbark Swamp Forest Community. Fenced off and buffered from construction. Pristine condition. Dry at time of inspection.		
Has the condition of the site changed since last assessment? NO. Area remains in excellent condition.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	100	Undisturbed area well removed from construction zone.	70	Dense	None.	Some dead trees present in south east. No evidence of anything other than natural dieback.	-	Nil. Monitoring only.
B = Uncertain significant problems	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								100 %

LOCATION

Site No.	P14						**Date:**	12-09-23	
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT								
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 147. Within mapped Paperbark Swamp Forest off Melaleuca Drive. Rehabilitation Zone 6								
GPS coordinates centre plot:	**Zone**	5	6	**E**	557037	**N**	6831497	**Datum:**	MGA94256

VEGETATION STRUCTURE

Stratum	Est. Median Height	Est. cover density (D,M,S,V)
E	-	-
T1	12-15	M
T2	4-12	S
S1	0.5-4	V
G	0.1-1.5	D

Structural formation: (including height)	Mid-high to Tall Open Forest
Ecologically dominant layer:	T1

Dense growth of native ferns, sedges, rushes. Thick organic leaf layer and coarse woody debris present.

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
E		-
T1	D	*Melaleuca quinquenervia*
T1	S	*Parsonsia straminea*
T2	S	*Elaeocarpus reticulatus*
T2	S	*Melicope elleryana*
T2	S	*Acacia spp.*
S		*Regenerating T1/T2 species.*

Str.	Scientific Name
G	*Lobelia purpurascens*
G	*Baloskion tetraphylla*
G	*Gahnia clarkei*
G	*Blechnum indicum*
G	*Hibbertia scandens*
G	*Selaginella uliginosa*
G	*Marsdenia rostrata*
G	*Baumea spp*
G	*Parsonsia straminea*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary estuarine alluvium overlain by and/or mixed with Quaternary (Pleistocene) sands. The sands are generally aeolian, originating from the adjacent beach ridge systems.
Field observation and notes:	Paperbark Swamp forest. Fenced off and separated from construction footprint. Excellent condition. Dry at the time of survey.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6: Existing Vegetation

Centreline @ om

Centreline @ om

NW Corner @ om

NW Corner @ om

SW Corner @ om

SW Corner @ om

Centreline @ 25m

Centreline @ 25m

SE Corner @ 50m

SE Corner @ 50m

Centreline @ 50m

Centreline @ 50m

NE Corner @ 50m

NE Corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

FORM A: ROUTINE REHABILITATION MONITORING SHEET

<u>General Management</u>

Has there been a fire since the last inspection?

No.

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk?

No.

Is there evidence of rubbish dumping within the rehabilitation zone?

No.

Is there evidence of plant theft within the rehabilitation zone?

No.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic?

No.

If yes, acknowledge below what works were undertaken to rectify/restore and the date

N.A

<u>Weeds</u>

Have any areas of weeds re- established within the rehabilitation zones since the last inspection?

No.

What species?

N.A

What management was undertaken to eradicate these weeds?

To be removed.

If management was undertaken acknowledge that such was performed in accordance with the approved vegetation management plan.

<u>Vegetation regeneration</u> add additional page if necessary

Natural regeneration is occurring in (height range estimate):

- Tree species: 15-17m
- Shrub species: 1.5-3m
- ground covers: <1.5m

Area already well-established.

What are the dominant species within each layer?

- Tree: Melaleuca quinquenervia
- Shrub: Variety although regenerating M. quinquenervia most dominant.
- ground covers: Gahnia clarkei

Have you noticed any new native plant species since the last inspection?

Yes.

If yes name the species or take a photograph

Acacia sophorae, Syzygium luehmannii and Drosera spatulata

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes.

<u>Biodiversity</u>

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Small tree and ground birds (i.e. fairy wrens, finches, golden-headed cisticola, silvereye, buff-banded rail, willie wag-tail and spotted pardalote)

Nectivore/insectivore/frugivore birds (i.e. honeyeaters, friarbird and rainbow lorikeet)

Omnivore birds (i.e. kookaburra, crow and sacred kingfisher)

Reptiles (i.e. skinks, red-bellied black snake)

Mammals (i.e. swamp wallaby and koala)

<u>Modifications</u>

Have there been any structural additions (eg. new tracks, fences etc) to the rehabilitation zones since the last visit?

No.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 5.3 of approved VMP)?

Declared Weeds? No.

Extent of other Weeds? No.

Survival Rate of Plants? No.

Condition of Plants? No.

Canopy Coverage? No.

Tree, Small Tree & Shrub Diversity? No.

Groundcover Coverage? No.

General Coverage/Success? No.

If yes, what corrective action was performed (i.e. weed recolonization was evident so routine management was performed; garden waste dumping was noted and removed, assisted regeneration was deemed unsuccessful and revegetation of the relevant module was undertaken, plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

In excellent condition with no current corrective actions required.

MONITORING FORM B-ASSESSING REHABILITATION CONDITION

Project name: West Byron Harvest Estate		**Project ID:** 7036
Site location centrepoint (MGAz56): Future Lot 149. North of fenced of paddock with drainage channel @ 558057, 6831220		**Monitoring Site ID:** P15
Type of on-grounds: approved for assisted natural regeneration to maintain existing Mid-high to Tall Open Dry Heath/Paperbark Forest	**Years since site commenced:** 1	**When was this site last assessed?** 16-11-22
Current assessment conducted by: TR	**Date of current assessment:** 14-09-23	
Overall comments on site condition: Paperbark and heath open forest on sand. In excellent condition. Regeneration of T1 species evident with excellent ground cover and native diversity in the lower strata. Koala recorded on Swamp Mahogany nearby.		
Has the condition of the site changed since last assessment? NO. Remains in pristine condition.		

DESCRIPTION OF SITE CONDITION *Complete table as per monitoring schedule, or if conditions have changed since last assessment.*

Rating/ zone	% of monitoring plot	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance or action
A = OK on track towards target	100	Mid-high to Tall Open Dry Heath/Paperbark Forest in excellent condition. Currently fenced off from surrounding pasture	50-60%	Excellent. Dense native flora cover.	NIL	N/A		Nil. Monitoring only.
B = Uncertain significant problems	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C = Poor major problems, likely to fail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*								100 %

LOCATION

Site No.	P15							**Date:**	14-09-23		
Purpose	VEGETATION/REHABILITATION MONITORING 50m x 20m PLOT										
Location:	Retained Habitat and Rehabilitation Zones within Future Lot 149. North of fenced of paddock with drainage channel. Mid-high to Tall Paperbark Forest with Heath species. Rehabilitation Zone 6										
GPS coordinates centre plot:	**Zone**	5	6	**E**	558057		**N**	6831220	**Datum:**	MGA94z56	

VEGETATION STRUCTURE

Stratum	Est. Median Height (m)	Est. cover density (D,M,S,V)
E	15-17	V
T1	8-14	M-D
T2	3-7	M
S	1.5-3	M-S
G	0-2	D

Structural formation: (including height)	Forest-Open Forest
Ecologically dominant layer:	T1

PLANT SPECIES

Relative dominance for EDL *d* – dominant; *c* – codominant; *a* – associated; *s* – suppressed

Str.	Rel. dom	Scientific Name
T1	D	*Melaleuca quinquenervia*
E	S	*Eucalyptus robusta [1]*
T1	D	*Melaleuca quinquenervia*
T1	S	*Duboisia myoporoides*
T1	S	*Lophostemon suaveolens*
T1	S	*Lophostemon confertus*
T1	S	*Elaeacarpus reticulatus*
T2		*Regenerating T1 species [excluding brushbox]*
T2		*Cryptocarya microneura*
T2		*Melicope elleryana*
T2		*Nematolepis squamea*
S		*Regenerating T1 and T2 species*
S		*Acrotriche aggregata*
S		*Austromyrtus dulcis*
S		*Leptospermum polygalifolium*
S		*Syzygium oleosum*
S		*Melastoma affine*
S		*Archontophoenix cunninghamiana*
S		*Acmena smithii*
S		*Acacia melanoxylon (juvenile)*
S		*Myrsine howittiana*

Str.	Scientific Name
G	*Gahnia clarkei*
G	*Baloskion tetraphylla*
G	*Pomax umbellata*
G	*Blechnum indicum*
G	*Pomax umbellata*
G	*Lomandra longifolia*
G	*Lygodium microphyllum*
G	*Calochlaena dubia*
G	*Histiopteris incisa*
G	*Pteridium esculentum*
G	*Liparophyllum exaltatum*
G	*Hibbertia scandens*
G	*Smilax australis*
G	*Marsdenia rostrata*
G	*Parsonsia straminae*
G	*Smilax glyciphylla*
G	*Pandorea pandorana*
S	*Acacia sophorae*
G	*Drosera spatulata*
S	*Syzygium luehmannii*

OTHER NOTES

Geology/soil Landscape Mapping	Quaternary (Pleistocene) beach and dune sand.
Field observation and notes:	Paperbark and heath open forest on sand. In excellent condition. Regeneration of T1 species evident with excellent ground cover and native diversity in the lower strata. Koala recorded nearby in a Swamp Mahogany. Dry at the time of survey.
Vegetation Community Type (existing or proposed through rehabilitation) per Planit, 2020)	Approved Rehabilitation Zone 6. Existing Mid-high to Tall Open Dry Heath/Paperbark Forest to be managed by assisted natural regeneration.

Centreline @ om

Centreline @ om

SE corner @ om

SE corner @ om

NE corner @ om

NE corner @ om

Centreline east @ 25m

Centreline west @ 25m

Centreline north @ 25m

Centreline south @ 25m

Centreline @ 50m

Centreline @ 50m

NW Corner @ 50m

NW Corner @ 50m

SW Corner @ 50m

SW Corner @ 50m

Ground centre @ 5m

Ground centre @ 15m

Ground centre @ 25m

Ground centre @ 35m

Ground centre @ 45m

Koala recorded near the plot

Appendix 3 – Work Logs of All Monitoring / Maintenance (and Corrective Action Where Required) Activities Performed by the Appointed Landscape Contractor / Bush Regenerator (Boyds Bay Group) Between 14th December 2022 and 21st September 2023

Inspection: Maintenance Register #6

8/19	4	0	0	4
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	14 Dec, 2022	**Due Date**	14 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **2 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	Yes
1.9 Comments	Hand water selected trees in dryer areas

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Zone 1 plus 70% of zone 2 completed for weed control. Wallaby deterrent sprayed on trees and shrubs in zone 1 and 3 plus 10% of zone 2

Fertilize

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	Yes
3.3 Other	No Response
3.4 Comments	Blood n bone spread around to assist in deterring wallabies

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Good signs of melaleucas germinating in bare swamp areas in zone 2. Delicate and limited weed control to encourage these to perform.

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection: Maintenance Register #7

0/19	0	0	0	0
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	16 Dec, 2022	**Due Date**	16 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	No Response
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

0 Neutral 0 Conforming 0 Deficient 0 N/A

2.1 Weed	No Response
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	No Response

Fertilize

0 Neutral 0 Conforming 0 Deficient 0 N/A

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

0 Neutral 0 Conforming 0 Deficient 0 N/A

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral 0 Conforming 0 Deficient 0 N/A

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection: Maintenance Register #8

6/19	3	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	16 Dec, 2022	**Due Date**	16 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Again plenty of crab grass germinating.. treating only the larger ones in order to avoid blanket spraying to allow for natural revegatation. Some setaria, whiskey grass

Fertilize

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	Yes
3.3 Other	No Response
3.4 Comments	Treat plants to protect for wallaby damage.. zone 3,4,5

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Zone 2 still quite wet in areas, will look at replacing lost trees in the new year

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Scott Drager

Matthew Partridge

Jarrod Filippi

Hideya Fujiki

Inspection: Maintenance Register #9

4/19	2	0	0	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	15 Dec, 2022	**Due Date**	15 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Treating small trees to deter wallabies from eating

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Good signs of reveg still happening. A fair amount of crab grass germinating, treating larger ones to avoid blanket spraying and to allow for young melaleuca to come through

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Scott Drager

Hideya Fujiki

Jarrod Filippi

Matthew Partridge

Inspection: Maintenance Register #10

6/19	4	0	0	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	24 Jan, 2023	**Due Date**	24 Jan, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Spot spraying mostly crab grass, setaria, paspalum. Great signs of melaleuca germinating

Fertilize

1 Neutral **2 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	Yes
3.3 Other	Yes
3.4 Comments	Planting trees and shrubs through previously wet areas of zone 2. Hand watering due to access

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Tom Edwards

Matthew Partridge

Jarrod Filippi

Hideya Fujiki

Inspection: Maintenance Register #11

6/19	3	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	25 Jan, 2023	**Due Date**	25 Jan, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral | 2 Conforming | 0 Deficient | 0 N/A

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	Yes
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	A couple of 100lt trees in zone 5 have died. Possibly due to change in hydrology

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Zones, 1, 2 and 5

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	A closer inspection on dead 100lt trees shows signs of phytophthora. Treat trees with fongarid fungicide asap.

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Tom Edwards

Matthew Partridge

Jarrod Filippi

Hideya Fujiki

Inspection: Maintenance Register #12

6/19	4	0	0	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	7 Feb, 2023	**Due Date**	7 Feb, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **2 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	Yes
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

1 Neutral	1 Conforming	0 Deficient	0 N/A

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Great reveg germination. Continue chasing carpet grass, setaria, bahia, paspalum, whiskey grass

Fertilize

1 Neutral	1 Conforming	0 Deficient	0 N/A

3.1 Turf	No Response
3.2 Plants	Yes
3.3 Other	No Response
3.4 Comments	Handwater recently planted tubestock.

Observations

0 Neutral	0 Conforming	0 Deficient	0 N/A

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral	0 Conforming	0 Deficient	0 N/A

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 7 Feb, 2023 at 02:01 PM AEDT

Tom Edwards

Hideya Fujiki

Inspection: Maintenance Register #13

6/19	1	0	3	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	14 Mar, 2023	**Due Date**	14 Mar, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Hideya Fujiki, Matthew Partridge		

General Tasks

0 Neutral **0 Conforming** **0 Deficient** **2 N/A**

1.1 Mowing	N/A
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	No Response
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	N/A

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Whiskey and Bahia grass sprayed

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	N/A

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	All areas maintained except for wet areas zone 2 mostly under water . Part of zone 5 under water due to civil drainage

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Hideya Fujiki signed on 14 Mar, 2023 at 02:36 PM AEDT

Inspection: Maintenance Register #14

4/19	1	0	1	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	13 Mar, 2023	**Due Date**	13 Mar, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Hideya Fujiki, Matthew Partridge		

General Tasks

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	No Response
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	N/A

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Mostly whiskey and bahia grass sprayed

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Zone 1,5,4 completed

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Hideya Fujiki signed on 14 Mar, 2023 at 02:41 PM AEDT

Inspection: Maintenance Register #15

6/19	3	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	3 Apr, 2023	**Due Date**	4 Apr, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral | 2 Conforming | 0 Deficient | 0 N/A

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	Yes
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Hand weeding Winter senna across canal

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Cut, scrape, paint

Fertilize

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	All looking great

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 4 Apr, 2023 at 05:51 PM AEST

Jordan Mountain

Tom Edwards

Jarrod Filippi

Bo Walton

Inspection: Maintenance Register #16

6/19	3	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	6 Apr, 2023	**Due Date**	13 Apr, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

	1 Neutral	2 Conforming	0 Deficient	0 N/A
1.1 Mowing			No Response	
1.2 Snipping			No Response	
1.3 Pruning			Yes	
1.4 Rubbish Removal			No Response	
1.5 Hand Weeding			Yes	
1.6 Irrigation Check / Service			No Response	
1.7 Water Truck			No Response	
1.8 Other			No Response	
1.9 Comments			Chasing senna, lantana etc through natural areas, zone 4, 3, 2	

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Cut, scrape, paint

Fertilize

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	Natural areas looking good. Some senna handweeding and cut, scrape, paint

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 11 Apr, 2023 at 12:16 PM AEST

Jordan Mountain

Tom Edwards

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #17

4/19	2	0	0	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	20 Apr, 2023	**Due Date**	27 Apr, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Chasing broadleaved paspalum in zone 4 natural area. Mostly whiskey, bahia grass and crab grass in planted areas. Zone 4 and 3 completed

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Leptospermum in flower. Lots of banksia germinating.

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 20 Apr, 2023 at 01:04 PM AEST

Tom Edwards

Jordan Mountain

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #18

5/19	2	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	2 May, 2023	**Due Date**	9 May, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Hand treat senna across the creek in zone 4

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Zones 1, 5 spot spray

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	Zone 1 has been slashed by someone. Approx 30 % of the northern end

Inspection Signatures

Matthew Partridge

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #19

7/19	3	0	0	4
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	23 May, 2023	**Due Date**	30 May, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **2 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	Yes
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Brushcutting worst areas of whisky grass in an effort to drop seed and reduce anemochory. All previously sprayed and dead.

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Concentrating on any remaining whiskey grass

Fertilize

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	Brushcut some buffer areas in zone 3 for whiskey grass

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Looking great

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 23 May, 2023 at 12:53 PM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #20

5/19	2	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Open
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	24 May, 2023	**Due Date**	31 May, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Zones 3, 2 and 1. Spot sprayed plus handweeding through assisted reveg areas

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Chasing whiskey grass in an effort to reduce

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Whiskey grass dying for the winter. Some main areas brushcut to drop seed to reduce wind dispersal. Recommend in future years strategic slashing of open paddocks to reduce infestation inton reveg zones. Shading out will also reduce the grass in coming years

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Inspection: Maintenance Register #21

2/19	1	0	0	1
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	31 May, 2023	**Due Date**	7 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	No Response
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Spray turf edges, jute edges, gardens for plant prep for landscape.

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 1 Jun, 2023 at 02:36 PM AEST

Hideya Fujiki

Inspection: Maintenance Register #22

1/19	0	0	0	1
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	5 Jun, 2023	**Due Date**	12 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	No Response
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Install flagging fence in zone 1

Spraying

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	No Response
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	No Response

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 6 Jun, 2023 at 11:04 AM AEST

Tom Edwards

Inspection: Maintenance Register #23

19/19	14	0	4	1
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	20 Jun, 2023	**Due Date**	27 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Hideya Fujiki, Matthew Partridge		

General Tasks

0 Neutral **8 Conforming** **0 Deficient** **1 N/A**

1.1 Mowing	No
1.2 Snipping	No
1.3 Pruning	No
1.4 Rubbish Removal	No
1.5 Hand Weeding	No
1.6 Irrigation Check / Service	No
1.7 Water Truck	No
1.8 Other	No
1.9 Comments	N/A

Spraying

1 Neutral **3 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No
2.3 Other	No
2.4 Comments	Area 4,3,2,1 sprayed and maintained

Fertilize

0 Neutral **3 Conforming** **0 Deficient** **1 N/A**

3.1 Turf	No
3.2 Plants	No
3.3 Other	No
3.4 Comments	N/A

Observations

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

4.1 Observations, Comments, Problems, Additional Works	N/A

Damage

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	N/A

Inspection Signatures

Hideya Fujiki signed on 20 Jun, 2023 at 01:47 PM AEST

Inspection: Maintenance Register #24

2/19	1	0	0	1
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	23 Jun, 2023	**Due Date**	30 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Bo Walton, Tom Edwards		

General Tasks

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	No Response
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	No Response

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Access vier back road is not advised for far bushland

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Tom Edwards signed on 23 Jun, 2023 at 12:59 PM AEST

Scott Backler

Bo Walton

Inspection: Maintenance Register #25

3/19	2	0	0	1
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	Open
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	17 Jul, 2023	**Due Date**	24 Jul, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	No Response

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Cut and paint camphor

Fertilize

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	No Response

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Tom Edwards

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #26

19/19	14	0	3	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	21 Jul, 2023	**Due Date**	28 Jul, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Bo Walton, Hideya Fujiki, Matthew Partridge		

General Tasks

1 Neutral **8 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No
1.2 Snipping	No
1.3 Pruning	No
1.4 Rubbish Removal	No
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No
1.7 Water Truck	No
1.8 Other	No
1.9 Comments	Handweed long tall weeds amongst plants

Spraying

1 Neutral **3 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No
2.3 Other	No
2.4 Comments	Weeds sprayed in zone 1,5 and 4

Fertilize

0 Neutral **3 Conforming** **0 Deficient** **1 N/A**

3.1 Turf	No
3.2 Plants	No
3.3 Other	No
3.4 Comments	N/A

Observations

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

4.1 Observations, Comments, Problems, Additional Works	N/A

Damage

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	N/A

Inspection Signatures

Hideya Fujiki signed on 25 Jul, 2023 at 01:55 PM AEST

Inspection: Maintenance Register #27

6/19	3	0	0	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	31 Jul, 2023	**Due Date**	5 Aug, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **2 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	Yes
1.3 Pruning	No Response
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Brushcut more of the dead whiskey grass

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Zones, 2,3 and finish off 4. Some works next to melaleuca drive entrance

Fertilize

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	No Response
3.3 Other	No Response
3.4 Comments	Some plants to be replaced in odd areas in zone 4, 3, 2

Observations

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	No Response

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 1 Aug, 2023 at 08:24 AM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #28

8/19	4	0	0	4
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	9 Aug, 2023	**Due Date**	16 Aug, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Matthew Partridge		

General Tasks

1 Neutral **2 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No Response
1.2 Snipping	No Response
1.3 Pruning	Yes
1.4 Rubbish Removal	No Response
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No Response
1.7 Water Truck	No Response
1.8 Other	No Response
1.9 Comments	Cut, paint and drill some senna and camphor in assisted zone 4

Spraying

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No Response
2.3 Other	No Response
2.4 Comments	Spray broad leaved paspalum in assisted zone 4

Fertilize

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Turf	No Response
3.2 Plants	Yes
3.3 Other	No Response
3.4 Comments	Stake numerous trees in zones 3 and 2 to assist for locating missing trees. Add tree bags to approx 40 eucalyptus and casurinas to help recover and prevent more wallaby damage.

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Areas looking great. Lots of natural reveg

Damage

0 Neutral **0 Conforming** **0 Deficient** **0 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	No Response

Inspection Signatures

Matthew Partridge signed on 10 Aug, 2023 at 07:59 AM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #29

17/19	2	0	12	3
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	17 Aug, 2023	**Due Date**	17 Aug, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Matthew Partridge		

General Tasks

1 Neutral **1 Conforming** **0 Deficient** **6 N/A**

1.1 Mowing	N/A
1.2 Snipping	N/A
1.3 Pruning	N/A
1.4 Rubbish Removal	N/A
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	N/A
1.7 Water Truck	N/A
1.8 Other	No Response
1.9 Comments	Cut and paint + drill + handweed

Spraying

0 Neutral **1 Conforming** **0 Deficient** **2 N/A**

2.1 Weed	Yes
2.2 Grub	N/A
2.3 Other	N/A
2.4 Comments	No Response

Fertilize

1 Neutral **0 Conforming** **0 Deficient** **3 N/A**

3.1 Turf	N/A
3.2 Plants	N/A
3.3 Other	N/A
3.4 Comments	Chasing Senna, camphor, ochna through zone 4 assisted reveg area

Observations

1 Neutral **0 Conforming** **0 Deficient** **0 N/A**

4.1 Observations, Comments, Problems, Additional Works	Great signs of reveg particularly around where broadleaved paspalum used to cover all the ground

Damage

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	N/A

Inspection Signatures

Matthew Partridge signed on 18 Aug, 2023 at 11:23 AM AEST

Tom Edwards

Jordan Mountain

Hideya Fujiki

Bo Walton

Inspection: Maintenance Register #30

19/19	14	0	3	2
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Quality	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	Maintenance Visit Diary - Fill once pre visit.		
Attachments			

Inspection Details

Inspection Date	21 Sep, 2023	**Due Date**	21 Sep, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Hideya Fujiki		

General Tasks

1 Neutral **8 Conforming** **0 Deficient** **0 N/A**

1.1 Mowing	No
1.2 Snipping	No
1.3 Pruning	No
1.4 Rubbish Removal	No
1.5 Hand Weeding	Yes
1.6 Irrigation Check / Service	No
1.7 Water Truck	No
1.8 Other	No
1.9 Comments	Hand weed amongst plantings

Spraying

1 Neutral **3 Conforming** **0 Deficient** **0 N/A**

2.1 Weed	Yes
2.2 Grub	No
2.3 Other	No
2.4 Comments	Glyph mix used for maintenance

Fertilize

0 Neutral **3 Conforming** **0 Deficient** **1 N/A**

3.1 Turf	No
3.2 Plants	No
3.3 Other	No
3.4 Comments	N/A

Observations

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

4.1 Observations, Comments, Problems, Additional Works	N/A

Damage

0 Neutral **0 Conforming** **0 Deficient** **1 N/A**

5.1 Dead, Damaged, Vandalised or Stolen Planting	N/A

Inspection Signatures

Hideya Fujiki signed on 21 Sep, 2023 at 01:47 PM AEST

Appendix 4 – Chemical Application Register from Boyds Bay Group Between 14th December 2022 and 21st September 2023

Inspection: Chemical Application Register #3

10/15	1	0	0	9
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Scott Backler on 15/3/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	14 Dec, 2022	**Due Date**	14 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	28ºc Wind 15km N Humidity 60% Cloud cover 70%
1.2 Works Completed (Zone)	Zone 1 and half of 2
1.3 Comments on Previous Work	Looking good, small section of setaria missed from previous treatment. Followed up
1.4 Comments, Follow up Reminders	No Response

Application

6 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	600
2.4 Metsulfuron Used (Grams)(1g:10lt)	6

2.5 Dye Used (ML)(60ml:10lt)	360
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	60

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Scott Drager

Hideya Fujiki

Matthew Nosworthy

Jarrod Filippi

Inspection: Chemical Application Register #2

11/15	1	0	0	10
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	15 Dec, 2022	**Due Date**	15 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	27.6º c Wind 14km N Humidity 68% Cloud cover 20%
1.2 Works Completed (Zone)	Finish zone 2 and half zone 3
1.3 Comments on Previous Work	All looking good. Plenty of crab games germinating and selective treating
1.4 Comments, Follow up Reminders	No Response

Application

6 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	400
2.4 Metsulfuron Used (Grams)(1g:10lt)	4

2.5 Dye Used (ML)(60ml:10lt)	240
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	40

Comment

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	Good reveg happening			
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A	
3.3 OHS Comment	No Response			

Inspection Signatures

Scott Backler

Matthew Partridge

Hideya Fujiki

Jarrod Filippi

Inspection: Chemical Application Register #1

10/15	1	0	0	9
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	16 Dec, 2022	**Due Date**	16 Dec, 2022
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	25.5ºc Wind 15km E Humidity 60% Cloud cover 80%
1.2 Works Completed (Zone)	2,3,5
1.3 Comments on Previous Work	All looking good. Good signs of melaleuca. Plenty crab grass germinating. Selectively spraying
1.4 Comments, Follow up Reminders	No Response

Application

6 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	800
2.4 Metsulfuron Used (Grams)(1g:10lt)	8

2.5 Dye Used (ML)(60ml:10lt)	480
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	80

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Jarrod Filippi

Hideya Fujiki

Scott Drager

Matthew Partridge

Inspection: Chemical Application Register #4

10/15	1	0	0	9
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	24 Jan, 2023	**Due Date**	24 Jan, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	28º C Wind N 15km Humidity 62% Cloud cover 50%
1.2 Works Completed (Zone)	Zone 2
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

6 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	800
2.4 Metsulfuron Used (Grams)(1g:10lt)	8

2.5 Dye Used (ML)(60ml:10lt)	400
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	80

Comment

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	Lots of reveg germination.. spot spraying crab grass, setaria, paspalum
3.2 OHS Compliance	☑ Pass ☐ Fail ☐ N/A
3.3 OHS Comment	No Response

Inspection Signatures

Tom Edwards

Matthew Partridge

Jarrod Filippi

Hideya Fujiki

Inspection: Chemical Application Register #5

9/15	1	0	0	8
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	25 Jan, 2023	**Due Date**	25 Jan, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	28º C Wind N10km Humidity 62% Cloud cover 50%
1.2 Works Completed (Zone)	1,2 and 5
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

6 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	1000
2.4 Metsulfuron Used (Grams)(1g:10lt)	10

2.5 Dye Used (ML)(60ml:10lt)	600
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	100

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Tom Edwards

Jarrod Filippi

Hideya Fujiki

Matthew Partridge

Inspection: Chemical Application Register #6

10/15	1	0	0	9
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	7 Feb, 2023	**Due Date**	7 Feb, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	25º c Wind 15km SE Humidity 57% Cloud cover 40%
1.2 Works Completed (Zone)	3 and 4
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	Great reveg happening. Continue chasing carpet grass, setaria, bahia grass, and some paspalum

Application

6 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	1200
2.4 Metsulfuron Used (Grams)(1g:10lt)	12

2.5 Dye Used (ML)(60ml:10lt)	720
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	120

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response	
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A	
3.3 OHS Comment			No Response	

Inspection Signatures

Matthew Partridge signed on 7 Feb, 2023 at 01:58 PM AEDT

Tom Edwards

Hideya Fujiki

Inspection: Chemical Application Register #7

6/15	1	0	0	5
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	13 Mar, 2023	**Due Date**	13 Mar, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Hideya Fujiki		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	24 degrees Celsius S 33km/h 86%humidity
1.2 Works Completed (Zone)	Zone 5,1,4
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Spray
2.2 Methods Used: Grasses	Spray
2.3 Glyphosate Used (ML) (1:100)	1400
2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response

2.5 Dye Used (ML)(60ml:10lt)	No Response
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Hideya Fujiki signed on 14 Mar, 2023 at 02:18 PM AEDT

Tom Edwards

Jarrod Filippi

Inspection: Chemical Application Register #8

7/15	1	0	0	6
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	14 Mar, 2023	**Due Date**	14 Mar, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Hideya Fujiki, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	24.3 degrees S 32km/h 85% humidity
1.2 Works Completed (Zone)	Zone 3,2
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Spray
2.2 Methods Used: Grasses	Spray
2.3 Glyphosate Used (ML) (1:100)	1400
2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response

2.5 Dye Used (ML)(60ml:10lt)	840
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			No Response

Inspection Signatures

Hideya Fujiki signed on 14 Mar, 2023 at 02:24 PM AEDT

Tom Edwards

Jarrod Filippi

Matthew Partridge

Inspection: Chemical Application Register #9

8/15	1	0	0	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	3 Apr, 2023	**Due Date**	10 Apr, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	22º c Wind S 9.4km Humidity 50% Cloud cover 90%
1.2 Works Completed (Zone)	Zone 4 across canal
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	Hand weeding and scrape + paint

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Cut and paint senna
2.2 Methods Used: Grasses	No Response
2.3 Glyphosate Used (ML) (1:100)	1000
2.4 Metsulfuron Used (Grams)(1g:10lt)	15

2.5 Dye Used (ML)(60ml:10lt)	60
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			No Response

Inspection Signatures

Bo Walton signed on 6 Apr, 2023 at 12:22 PM AEST

Matthew Partridge signed on 4 Apr, 2023 at 05:48 PM AEST

Tom Edwards

Jarrod Filippi

Jordan Mountain

Hideya Fujiki

Inspection: Chemical Application Register #10

8/15	1	0	0	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	6 Apr, 2023	**Due Date**	13 Apr, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	20 º c Wind 7km E Humidity 48% Cloud cover 50%
1.2 Works Completed (Zone)	4,2,3 natural areas
1.3 Comments on Previous Work	Some follow up treatment being carried out on senna. Mostly looking great
1.4 Comments, Follow up Reminders	No Response

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Cut, scrape, paint
2.2 Methods Used: Grasses	No Response
2.3 Glyphosate Used (ML) (1:100)	4000
2.4 Metsulfuron Used (Grams)(1g:10lt)	10

2.5 Dye Used (ML)(60ml:10lt)	100
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response	
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A	
3.3 OHS Comment			No Response	

Inspection Signatures

Matthew Partridge signed on 11 Apr, 2023 at 12:34 PM AEST

Tom Edwards

Jarrod Filippi

Jordan Mountain

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #11

9/15	1	0	0	8
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Scott Backler on 26/4/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	20 Apr, 2023	**Due Date**	27 Apr, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	24ºc Wind SE 15km Humidity 49% Cloud cover 95%
1.2 Works Completed (Zone)	Zone 4 including natural areas. Plus zone 3
1.3 Comments on Previous Work	Looking good. Chasing broadleaved paspalum through natural areas. Whiskey, setaria, bahia grass, through planted zones. Lots of good reveg.
1.4 Comments, Follow up Reminders	No Response

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	900

2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response
2.5 Dye Used (ML)(60ml:10lt)	540
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	Leptospermum full of flower. Lots of banksia germinating

3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Matthew Partridge signed on 20 Apr, 2023 at 01:01 PM AEST

Tom Edwards

Hideya Fujiki

Jordan Mountain

Bo Walton

Inspection: Chemical Application Register #12

10/15	1	0	0	9
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Closed by Thom Durey on 4/5/23
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	2 May, 2023	**Due Date**	9 May, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	20º c Wind SW 4km Humidity 42% Cloud cover 70%
1.2 Works Completed (Zone)	Zones 1,5 and 4 across the creek
1.3 Comments on Previous Work	Looking great
1.4 Comments, Follow up Reminders	Following up hand treatment of senna in natural areas

Application

5 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	1000
2.4 Metsulfuron Used (Grams)(1g:10lt)	6

2.5 Dye Used (ML)(60ml:10lt)	360
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response	
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A	
3.3 OHS Comment			No Response	

Inspection Signatures

Matthew Partridge signed on 2 May, 2023 at 01:31 PM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #13

8/15	1	0	0	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	23 May, 2023	**Due Date**	30 May, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	20º c Wind S 5km Humidity 55% Cloud cover 0%
1.2 Works Completed (Zone)	Zone 5, zone 4 and partial zone 3
1.3 Comments on Previous Work	A bit weedy in zone 5 due to access issues on previous visit being under water. All treated
1.4 Comments, Follow up Reminders	No Response

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	No Response
2.4 Metsulfuron Used (Grams)(1g:10lt)	8

2.5 Dye Used (ML)(60ml:10lt)	480
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Matthew Partridge signed on 23 May, 2023 at 12:53 PM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #14

11/15	1	0	2	8
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	31 May, 2023	**Due Date**	
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Hideya Fujiki, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	20.6 degrees Celsius,E 7km/h, 59% humidity
1.2 Works Completed (Zone)	Zone 1 , 2, 3
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

6 Neutral **0 Conforming** **0 Deficient** **2 N/A**

2.1 Methods Used: Annuals	Spray
2.2 Methods Used: Grasses	Spray
2.3 Glyphosate Used (ML) (1:100)	1200
2.4 Metsulfuron Used (Grams)(1g:10lt)	12

2.5 Dye Used (ML)(60ml:10lt)	720
2.6 Sempra Used (Grams)(1g:10lt)	N/A
2.7 Storane Used (ML)	N/A
2.8 Surfactant Used (ML)(10ml:10lt)	120

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response	
3.2 OHS Compliance	☑ Pass	☐ Fail		☐ N/A
3.3 OHS Comment			No Response	

Inspection Signatures

Hideya Fujiki signed on 24 May, 2023 at 02:39 PM AEST

Inspection: Chemical Application Register #15

6/15	1	0	0	5
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	1 Jun, 2023	**Due Date**	7 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	20º c Wind N 5km Humidity 43% Cloud cover 0%
1.2 Works Completed (Zone)	Turf side and gardens at site entrance
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	400
2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response

2.5 Dye Used (ML)(60ml:10lt)	No Response
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response

	Pass	Fail	N/A
3.2 OHS Compliance	☑	☐	☐

3.3 OHS Comment	No Response

Inspection Signatures

Matthew Partridge signed on 1 Jun, 2023 at 02:34 PM AEST

Hideya Fujiki

Inspection: Chemical Application Register #16

15/15	1	0	6	8
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	20 Jun, 2023	**Due Date**	27 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Hideya Fujiki, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **2 N/A**

1.1 Weather Conditions	16.1 degrees Celsius 40% humidity S 20km/h
1.2 Works Completed (Zone)	Zones 4 3 2 1
1.3 Comments on Previous Work	N/A
1.4 Comments, Follow up Reminders	N/A

Application

6 Neutral **0 Conforming** **0 Deficient** **2 N/A**

2.1 Methods Used: Annuals	Spray
2.2 Methods Used: Grasses	Spray
2.3 Glyphosate Used (ML) (1:100)	800
2.4 Metsulfuron Used (Grams)(1g:10lt)	8

2.5 Dye Used (ML)(60ml:10lt)	480
2.6 Sempra Used (Grams)(1g:10lt)	N/A
2.7 Storane Used (ML)	N/A
2.8 Surfactant Used (ML)(10ml:10lt)	80

Comment

	0 Neutral	1 Conforming	0 Deficient	2 N/A
3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			N/A	
3.2 OHS Compliance		☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			N/A	

Inspection Signatures

Hideya Fujiki signed on 20 Jun, 2023 at 01:44 PM AEST

Inspection: Chemical Application Register #17

14/15	1	0	6	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	23 Jun, 2023	**Due Date**	30 Jun, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Bo Walton, Jarrod Filippi		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **2 N/A**

1.1 Weather Conditions	sunny light north/eastern winds 10kmph humidity 30%
1.2 Works Completed (Zone)	follow up primary work
1.3 Comments on Previous Work	N/A
1.4 Comments, Follow up Reminders	N/A

Application

5 Neutral **0 Conforming** **0 Deficient** **3 N/A**

2.1 Methods Used: Annuals	N/A
2.2 Methods Used: Grasses	napsack overspray
2.3 Glyphosate Used (ML) (1:100)	1080
2.4 Metsulfuron Used (Grams)(1g:10lt)	9

2.5 Dye Used (ML)(60ml:10lt)	54
2.6 Sempra Used (Grams)(1g:10lt)	N/A
2.7 Storane Used (ML)	N/A
2.8 Surfactant Used (ML)(10ml:10lt)	90

Comment

	0 Neutral	1 Conforming	0 Deficient	1 N/A
3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			N/A	
3.2 OHS Compliance		☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			No Response	

Inspection Signatures

Jarrod Filippi signed on 23 Jun, 2023 at 12:58 PM AEST

Inspection: Chemical Application Register #18

8/15	1	0	0	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	Open
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	17 Jul, 2023	**Due Date**	24 Jul, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	17º c Wind SE 10km Humidity 79% Cloud cover 98%
1.2 Works Completed (Zone)	Zone 4
1.3 Comments on Previous Work	Looking great
1.4 Comments, Follow up Reminders	No Response

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	400
2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response

2.5 Dye Used (ML)(60ml:10lt)	240
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Tom Edwards

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #19

15/15	1	0	6	8
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	21 Jul, 2023	**Due Date**	28 Jul, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Gregory Fraser, Bo Walton, Hideya Fujiki, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **2 N/A**

1.1 Weather Conditions	20.8 degrees celcius SE 26 km/h 45% humidity
1.2 Works Completed (Zone)	Zone 5,1,4
1.3 Comments on Previous Work	N/A
1.4 Comments, Follow up Reminders	N/A

Application

6 Neutral **0 Conforming** **0 Deficient** **2 N/A**

2.1 Methods Used: Annuals	Spray
2.2 Methods Used: Grasses	Spray
2.3 Glyphosate Used (ML) (1:100)	600
2.4 Metsulfuron Used (Grams)(1g:10lt)	6

2.5 Dye Used (ML)(60ml:10lt)	360
2.6 Sempra Used (Grams)(1g:10lt)	N/A
2.7 Storane Used (ML)	N/A
2.8 Surfactant Used (ML)(10ml:10lt)	60

Comment

	0 Neutral	1 Conforming	0 Deficient	2 N/A
3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			N/A	
3.2 OHS Compliance		☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			N/A	

Inspection Signatures

Hideya Fujiki signed on 25 Jul, 2023 at 01:50 PM AEST

Inspection: Chemical Application Register #20

8/15	1	0	0	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	31 Jul, 2023	**Due Date**	5 Aug, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	20º c Wind 7km SE Humidity 70% Cloud cover 70%
1.2 Works Completed (Zone)	Zone 3, 2 and finish off 4
1.3 Comments on Previous Work	Looking good. Reducing crab grass, remaining whiskey
1.4 Comments, Follow up Reminders	No Response

Application

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	800
2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response

2.5 Dye Used (ML)(60ml:10lt)	480
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	No Response		
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment	No Response		

Inspection Signatures

Matthew Partridge signed on 1 Aug, 2023 at 08:21 AM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #21

10/15	1	0	0	9
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	9 Aug, 2023	**Due Date**	17 Aug, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

4 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	18.3º c Wind SE 15km Humidity 51% Cloud cover 50%
1.2 Works Completed (Zone)	Zone 4, 3
1.3 Comments on Previous Work	Good kill on broadleaved paspalum in assisted reveg area.
1.4 Comments, Follow up Reminders	Drill, cut and paint in zone 4 assisted reveg

Application

5 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Knapsack
2.2 Methods Used: Grasses	Knapsack
2.3 Glyphosate Used (ML) (1:100)	5000
2.4 Metsulfuron Used (Grams)(1g:10lt)	10

2.5 Dye Used (ML)(60ml:10lt)	240
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

0 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			No Response
3.2 OHS Compliance	☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			No Response

Inspection Signatures

Matthew Partridge signed on 10 Aug, 2023 at 07:53 AM AEST

Tom Edwards

Jordan Mountain

Jarrod Filippi

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #22

8/15	1	0	0	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	17 Aug, 2023	**Due Date**	17 Aug, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Scott Backler, Matthew Partridge		

Conditions

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	25.5º c Wind NW 8km Humidity 53% Cloud cover 90%
1.2 Works Completed (Zone)	Zone 4 assisted reveg
1.3 Comments on Previous Work	Good kill on broadleaved paspalum. Great signs of casurinas germinating in its place.
1.4 Comments, Follow up Reminders	No Response

Application

3 Neutral **0 Conforming** **0 Deficient** **0 N/A**

2.1 Methods Used: Annuals	Cut and paint Senna, drill camphor, ochna
2.2 Methods Used: Grasses	No Response
2.3 Glyphosate Used (ML) (1:100)	2000
2.4 Metsulfuron Used (Grams)(1g:10lt)	No Response

2.5 Dye Used (ML)(60ml:10lt)	100
2.6 Sempra Used (Grams)(1g:10lt)	No Response
2.7 Storane Used (ML)	No Response
2.8 Surfactant Used (ML)(10ml:10lt)	No Response

Comment

1 Neutral **1 Conforming** **0 Deficient** **0 N/A**

3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)	Some acacias in flower

	Pass	Fail	N/A
3.2 OHS Compliance	☑	☐	☐

3.3 OHS Comment	No Response

Inspection Signatures

Matthew Partridge signed on 18 Aug, 2023 at 11:19 AM AEST

Tom Edwards

Jordan Mountain

Hideya Fujiki

Bo Walton

Inspection: Chemical Application Register #23

12/15	1	0	4	7
Items Inspected	Conforming	Deficient	N/A	Neutral

Type	Environmental	**Status**	In Review
Trade	Environmental	**Location**	
Spec Section		**Linked Drawings**	
Description	to be completed when undertaking chemical application works. Application Rates Glyphosate: 1:100 Metsulfuron: 1gram: 10Lt Dye: 60ml:10Lt Sempra: 1gram:10Lt Surfactant		
Attachments			

Inspection Details

Inspection Date	21 Sep, 2023	**Due Date**	21 Sep, 2023
Point of Contact		**Responsible Contractor**	
Assignee(s)	Gregory Fraser, Bo Walton, Hideya Fujiki, Matthew Partridge		

Conditions

2 Neutral **0 Conforming** **0 Deficient** **0 N/A**

1.1 Weather Conditions	26 degrees celcius 63% humidity Northerly 28 km/h
1.2 Works Completed (Zone)	Zone 2 ,3 ,5
1.3 Comments on Previous Work	No Response
1.4 Comments, Follow up Reminders	No Response

Application

5 Neutral **0 Conforming** **0 Deficient** **2 N/A**

2.1 Methods Used: Annuals	Spray
2.2 Methods Used: Grasses	Spray
2.3 Glyphosate Used (ML) (1:100)	No Response
2.4 Metsulfuron Used (Grams)(1g:10lt)	6

2.5 Dye Used (ML)(60ml:10lt)	360
2.6 Sempra Used (Grams)(1g:10lt)	N/A
2.7 Storane Used (ML)	N/A
2.8 Surfactant Used (ML)(10ml:10lt)	120

Comment

	0 Neutral	1 Conforming	0 Deficient	2 N/A
3.1 Observations (Flora, Fauna, Fruiting, Flowering ECT.)			N/A	
3.2 OHS Compliance		☑ Pass	☐ Fail	☐ N/A
3.3 OHS Comment			N/A	

Inspection Signatures

Hideya Fujiki signed on 21 Sep, 2023 at 01:44 PM AEST

Appendix 5 – Notification to Byron Shire Council of a Non-compliant Activity Within Rehabilitation Zone 1 (Dated 31st May 2023)

Suite 9A, 80-84 Ballina Street, Lennox Head NSW 2478
PO Box 161, Lennox Head NSW 2478
02 6687 4666
admin@planitconsulting.com.au
www.planitconsulting.com.au

Our Reference: 7036/6681
Council File Reference: Development Application No. 10.2017.201.2

31th May 2023

Gray Blunden
Development Engineer
Byron Shire Council
PO Box 219, Mullumbimby NSW 2482

Via email
gblunden@byron.nsw.gov.au

Dear Gray,

NOTIFICATION OF NON-COMPLIANCE APPROVED VEGETATION MANAGEMENT PLAN
HARVEST ESTATE @ 22B MELALEUCA DRIVE, BYRON BAY
DEVELOPMENT APPLICATION NO. 10.2017.201.2

I refer to the development consent issued over the above-mentioned site which, by way of approval conditions, require implementation of the Harvest Estate Vegetation Management Plan (stamped approved Byron Shire Council 10.2.22).

Sections 5.3 and 5.4 of the approved VMP requires that Council be notified if access related damage occurs to any approved rehabilitation areas which is constitutes a breach of the nominated rehabilitation zone performance criteria.

In May 2023, sections of an area approximately 3000m^2 in size in the northeast of the site which has been previously revegetated and maintained as Rehabilitation Zone 1 was discovered by the site superintendent to have been mown, allegedly by a slashing contractor as part of maintenance occuring on an adjoining allotment. The mangers of the Harvest Estate are in the process of investigating the various legal implications of the damage that has occurred and avenues for associated remedy.

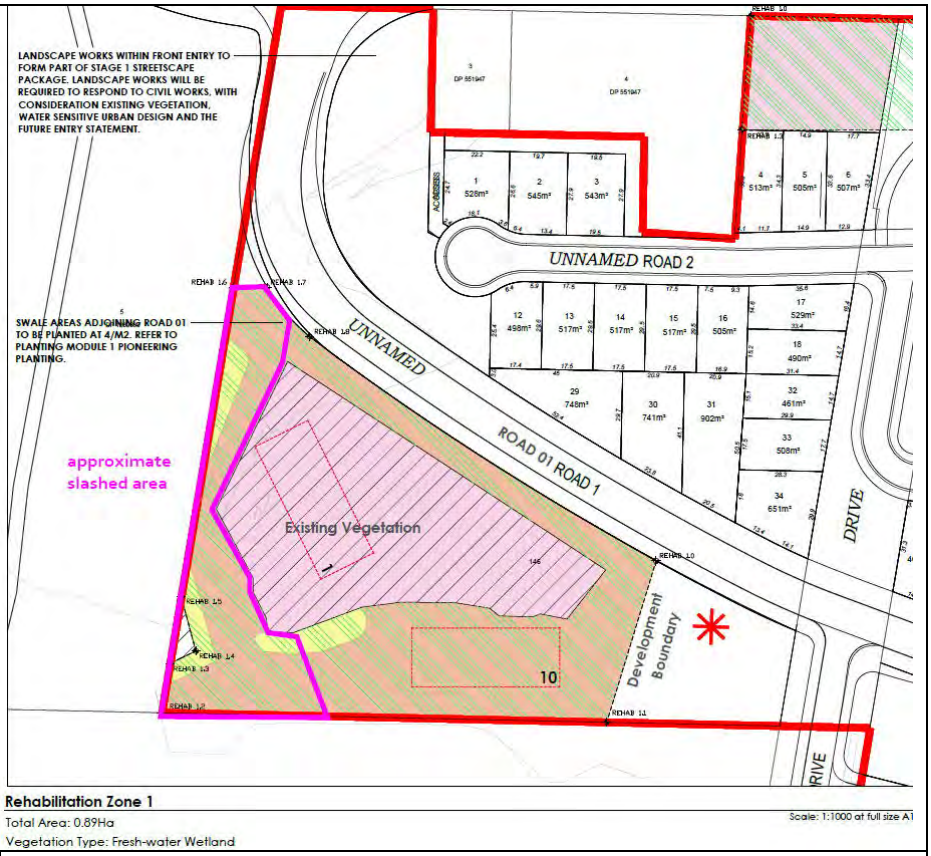
Regardless of the outcomes of the legal pursuits and investigations indicated above the following works are proposed in accordance with the corrective action provisions of the Vegetation Management Plan:

1. Notify council of the non-compliance incident (via this letter)
2. Installation of an additional star picket and wire strand protective fence along the shared boundary marked with high visibility bunting and rehabilitation zone warning signs as an added measure of protection to the proponents assets.
3. Instructing the landscaping contractor to revegetate the affected area in accordance with the approved modules, species and densities stipulated by the Vegetation Management Plan and associated Landscaping Plans
4. Instructing the landscaping contractor at the time of planting to set markers at the boundaries of the revegetation area (both as a reference for Council and potential separate legal avunues against third parties which may occur)

Suite 9A, 80-84 Ballina Street, Lennox Head NSW 2478
PO Box 161, Lennox Head NSW 2478
02 6687 4666
admin@planitconsulting.com.au
www.planitconsulting.com.au

5. Instructing the landscaping contractor to thereafter monitor and maintain the area in accordance with the approved Vegetation Management Plan as occurs to the balance of the rehabilitation area
6. Provide council with notice, photographs and certifications that the revegetation has ocurred in accordance with the approved Vegetation Management Plan upon its completion.

Image of mown revegetation zone



Approximate location of mown area

Should you have any regarding the below, please do not hesitate to contact me here at the office on (02) 6687 466.

Yours sincerely

Ben Gohl
Director

Appendix D – Monthly Water Quality Monitoring Reports

MONTHLY WATER QUALITY MONITORING REPORT

Harvest Estate Urban Development

Monitoring Event: 21st August 2023

Ewingsdale Road, Byron Bay, NSW, 2481

Job Number: 217140

For:

Planit Consulting

By:

ENV Services

Date:

12/09/2023

ENV Services Pty Ltd

313 River Street, Ballina NSW 2478

T: 1300 861 325

E: admin@envsolutions.com.au

www.envsolutions.com.au

DOCUMENT CONTROL

Job No:	Job Number: 217140
Client:	Planit Consulting
Filename:	217140_Harvest Estate_WQ_August 2023

	Name:	**Date:**	**Signature:**
Prepared By:	Kingsley Baldwin	5/09/2023	
Reviewed By:	Ben Pieterse	5/09/2023	
Approved By:	Ben Pieterse	12/09/2023	

Revision:	**Date:**	**Details:**

SCOPE OF ENGAGEMENT AND LIMITATIONS

This report has been prepared by ENV Services at the request of Planit Consulting for the purpose of consolidating and assessing water quality monitoring (surface water and ground water) data to determine impact associated with the development of the Harvest Estate. No other parties may rely on the contents of this report for any purposes except those stated.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

1 INTRODUCTION

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in the Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Establishment of internal roads and structures with the progressive construction of Stage 1 of the development.
- Stabilization of the site is progressively being carried out.
- Works associated with the realignment of the northern main drain, upstream of monitoring location SW03 have been completed.

Potential extraneous impacts were reported by the Principal Contractor whereby Byron Shire Council (BSC) were reported to have undertaken desilting and vegetation removal upstream of the site during the reporting period.

2 MONITORING RESULTS & OBSERVATIONS

2.1 Monthly Groundwater Monitoring

Monthly groundwater monitoring at five (5) groundwater wells (MW2 – MW5 & MW7) was carried out to assess for impact within the underlying aquifer. This monitoring was conducted in accordance with the site's Conditions of Consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1.

An assessment of the monthly analytical results presented in Attachment 2, Table 1, identified the following observations:

Site	Observation	Comments
MW2	All parameters were within baseline ranges	No site related impacts identified at this monitoring location.
MW3	pH marginally outside historic ranges.	No site related impacts identified at this location. Assessment of ASS indicators such as elevated NH_3, SO_4, TDS and EC along with a Cl/SO_4 ratio below (4) four indicate that the low pH is likely attributed to the lowering of the water table due to seasonal fluctuations exposing AASS with exhausted potential to generate acid.
MW4	pH marginally outside historic ranges.	No site related impacts identified at this location. Assessment of ASS indicators such as elevated NH_3, SO_4, TDS and EC along with a Cl/SO_4 ratio below (4) four indicate that the low pH is likely attributed to the lowering of the water table due to seasonal fluctuations exposing AASS with exhausted potential to generate acid.
MW5	pH, EC, TDS, SO_4 and several cations (Ca, Mg, K & Na) concentrations outside baseline ranges.	Low pH and elevated analytes (EC, TDS, and cations/anions) along with a Cl/SO_4 ratio less than four recorded at this site indicate the presence of exposed acid sulfate soils proximal to the monitoring well.
MW7	All parameters with the exception of SO_4 were within baseline ranges.	No site related impacts identified.

2.2 Monthly Surface Water Monitoring

Monthly surface water sampling (SW01 – SW06) was carried out to assess for impact from site activities on the receiving environment. Monitoring was carried out in accordance to the site's Conditions of Consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP), which require the assessment of the following analytes; physiochemical, nutrient, metals, cation/anion and total recoverable hydrocarbon (TRH).

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 1. Tabulated analytical results are presented in Attachment 3. Select photos of the surface water sampling programme are presented in Attachment 4.

Table 1: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

2.2.1 Assessment of Analytical Results

An assessment of the monthly analytical results presented in Attachment 3, identified the following observations:

Site	Observation	Comments
SW01	All parameters were within baseline ranges with the exception of aluminium	This site is located at an upstream location receiving water from off-site. Aluminium concentrations are marginally outside the baseline range recorded for the site.
SW02	pH, TDS, EC, SO_4, NH_3 along with several cations/anions (Ca & Mg) and nickel were recorded outside baseline values.	This site is located at an upstream location receiving water from off-site. Deterioration in water quality at this site is likely attributed to drainage works carried out by Byron Shire Council.
SW03	TDS, EC, SO_4, NH_3 along with several cations/anions (Na, K & Mg) and nickel were recorded outside baseline values. TRH concentrations are within historic baseline ranges.	This site is located downstream of Stage 1 works within the Northern Main Drain. Water quality at this site has improved with the application of lime within the drainage outlets and invert of the northern main drain. Water quality appears to be influenced from extraneous sources upstream of the site as the concentration of the majority

		of elements exceeding baseline values are less than the values recorded at SW02.

Site	Observation	Comments
SW04	pH, EC, TDS, NH_3, SO_4 and several cations/anions (Na, Ca, K, Cl, & Mg) and metals concentrations (Fe, Cu, Al, Ni, & Zn) outside baseline ranges. TRH concentrations within historic baseline ranges.	This site is located downstream of Stage 1 works within the Southern Swale Drain. Water quality remains poor at this location when compared to 'upstream' (SW01) and baseline values. Chemical indicators indicate origins derived from exposure of acid sulfate soils.
SW05	Parameters within baseline ranges with the exception of Cl and SO_4.	No site related impacts observed. Elevated chloride and sulfate concentrations at this site are likely attributed to the estuarine environment where high chloride and sulfate values are typically observed.
SW06	EC, TP, TN, Al and Fe outside of ANZG (2018) guideline values.	No site related impacts observed. All analytes listed as outside of ANZG (2018) criteria are within baseline values observed in the Union Drain at SW05, located upstream of this monitoring site.

3 RAINFALL

During this monitoring period (24/07/2023 – 21/08/2023), 15.6 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

4 CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

Monitoring results indicate that impacts associated with exposure of acid sulfate soils continue to influence on-site surface water downstream (SW03 and SW04) of the Stage 1 works package, however these impacts are contained within the site as water quality within the receiving environment (SW05 & SW06) largely remains within baseline ranges or ANZG (2018) criteria (where relevant).

Subtle improvements in water quality were reported at surface water monitoring site SW03 for the second consecutive month which is likely attributed to the implementation of mitigation measures including recharging lime bag at stormwater drain outlets and lime dusting the invert of the recently constructed segment of the northern main drain. The degree of observed improvements in water quality at this site are likely to have been masked by poor water quality flowing onto the site (SW02) whereby several analytes including pH, TDS, EC, NH_3, SO_4 and Mg were recorded at concentration higher than the downstream site (SW03). Ongoing monitoring and subsequent management of onsite acid sulfate soils is required to ensure water quality continues to improve.

Water quality within the southern swale drain downstream (SW04) of the Stage 1 works package continue to indicate impact from acid sulfate soils. A comprehensive assessment of water quality at 50m intervals within the drainage network across the site observed iron rich seepage and staining on the batters of the southern swale drain and swale drain 4 & 5 which is indicative of metal mobilisation associated with low pH waters. Further management measures including the lime dusting of the drainage lines are required to buffer acidic waters recorded within the southern swale drain.

Water quality within the groundwater monitoring network indicate localised impact from acid sulfate soils adjacent to MW05. It is postulated that the application of 1.5m of fill over the existing surface has subsequently generated a localised zone of influence within the underlying aquifer. Consequently, the effect of lowering the watertable proximal to the area of fill emplacement has exposed localised acid sulfate soils (PASS) within the underlying stratum facilitating low pH through acid generation and elevated indicators analogous to acid sulfate soils.

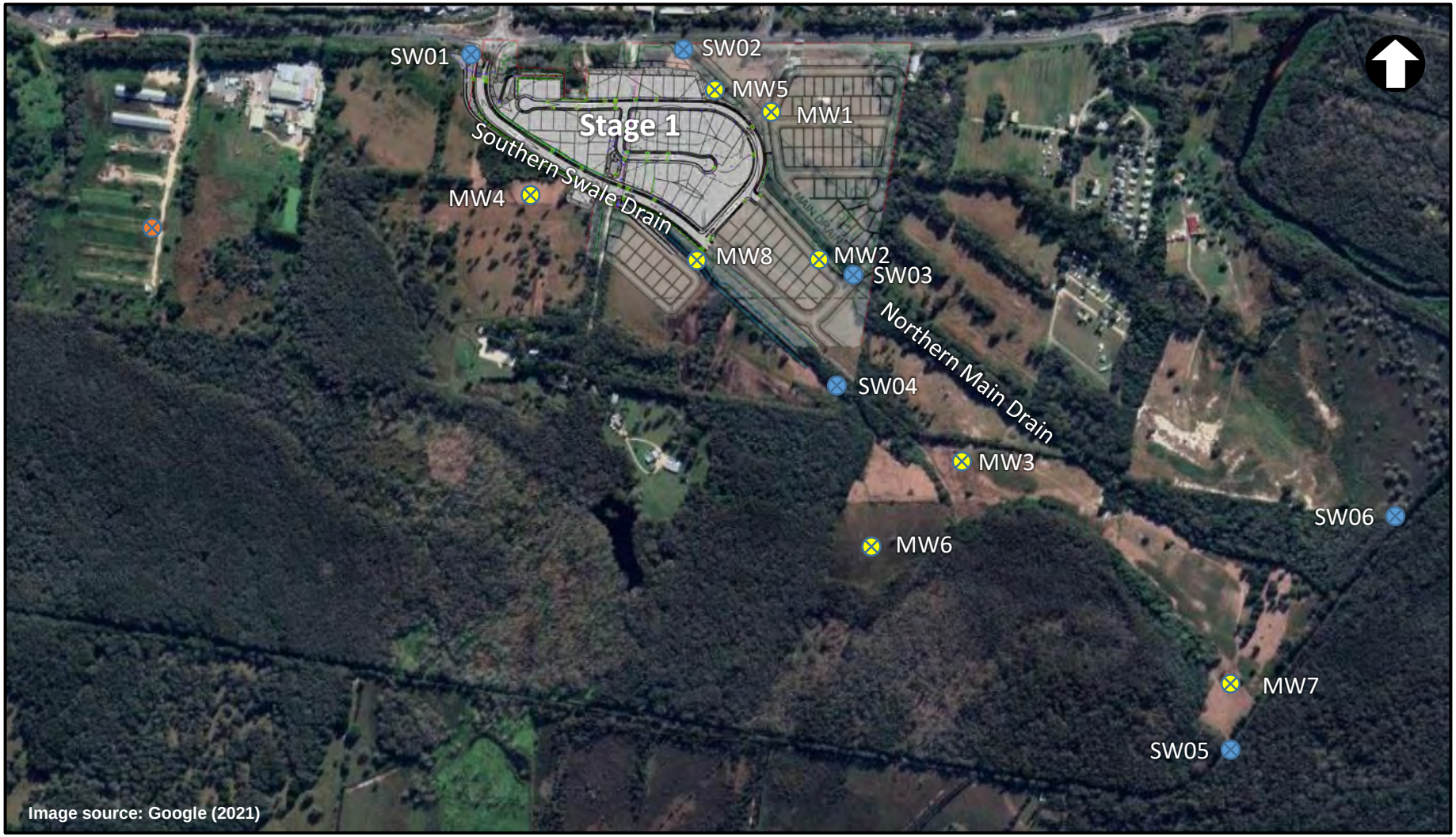
4.2 Recommendations

Based on the above conclusions of this monitoring report, the following recommendations are to be implemented with respect to improving water quality throughout the site.

- Continue campaign dusting of all drainage lines and outlets with ag-lime.
- Investigate medium to long term mitigation measures to alleviate impact within the receiving environment.
- Carry out an audit of all drainage systems to ensure dusting of drainage lines is being carried out as per the recommendations.

ATTACHMENT 1

Figures



Site Location (Stage 1)

Surface Water Sampling Locations

Ground Water Sampling Locations

0 0.1 0.2km

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

Figure 1: Water Quality Sampling Locations
Harvest Estate – Stage 1

ATTACHMENT 2

Groundwater Quality Analytical Results

Monthly Groundwater Analytical Results

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	NH_3 mg/L	Cl mg/L	Nitrite mg/L	TN mg/L	Na mg/L	SO_4 (as S) mg/L	Ca mg/L	Mg mg/L	K mg/L
MW2	29/09/2022	5.8	54	92	<5	0.12	0.51	14	0.02	0.5	30	< 2	< 0.5	0.8	2.4
	20/10/2022	5.6	100	110	<5	0.09	0.24	13	0.02	2	28	< 2	<0.5	0.8	2.2
	14/11/2022	6.0	100	240	<5	0.07	0.24	19	<0.10	<0.2	30	< 2	1.3	1.4	2.4
	14/12/2022	5.6	110	170	<5	0.02	<0.05	15	<0.10	3.1	29	5	<5	<5	<5
	18/01/2023	4.6	130	76	9.2	0.12	0.09	17	<0.05	2.5	29	7	<5	<5	<5
	20/02/2023	6.0	100	160	5.3	0.09	0.1	27	<0.25	0.25	27	3.7	<0.5	0.7	3.1
	28/03/2023	5.9	140	92	17	0.02	0.12	15	<0.02	<0.2	21	7.2	<5	<5	<5
	18/04/2023	6.2	170	88	<5	0.08	1.2	15	<0.02	7.7	18	5.2	<5	<5	<5
	18/05/2023	5.9	130	76	10	0.09	0.1	13	<0.02	9	28	2.1	0.6	0.9	2.6
	25/06/2023	3.3	4500	3000	250	0.26	1.6	45	<0.02	8.1	86	3800	440	82	7.9
	24/07/2023	6.2	220	150	<5	0.03	0.16	12	<0.2	1	24	12	<0.5	0.8	2.5
	21/08/2023	5.7	120	84	<5	0.08	0.14	15	<0.02	1.7	30	2.3	<5	<5	<5
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0.45**	**0.338**	**189**	**0.07**	**2.03**	**29.7**	**9.8**	**0.7**	**1.4**	**4.2**
MW3	29/09/2022	4.2	53	40	370	0.09	0.05	8.8	0.02	0.5	7	<2	< 0.5	1	0.6
	20/10/2022	4.1	64	62	130	0.01	0.2	8	0.02	0.5	7	<2	0.5	0.9	<0.5
	14/11/2022	4.6	57	84	170	0.03	0.27	7.4	<0.02	<0.2	7.1	<2	0.8	0.6	<0.5
	14/12/2022	4.3	43	32	280	<0.01	<0.01	5.2	<0.02	1.1	6	<2	<5	<5	<5
	18/01/2023	4.25	54	28	670	0.03	<0.01	4.1	<0.05	1.4	<5	4.1	<5	<5	<5
	20/02/2023	4.2	36	40	76	0.02	<0.10	6.8	0.06	7.26	7.6	<2	<0.5	1	<0.5
	28/03/2023	4.1	70	44	<5	<0.01	<0.01	7.9	<0.02	0.22	4.8	2.2	<0.5	1	0.6
	18/04/2023	4.6	89	54	110	0.02	0.1	9.6	<0.02	5.7	4.3	4.3	<0.5	0.6	<0.5
	18/05/2023	4.5	60	40	450	0.02	0.04	5.8	<0.02	1	4.8	2.1	0.6	0.8	<0.5
	15/06/2023	4.0	84	48	22	0.27	0.4	5.5	<0.02	1.96	5	63	<0.5	0.8	<0.5
	24/07/2023	4.5	85	59	160	0.04	<0.01	9.5	<0.02	<0.2	5.6	12	<0.5	0.8	<0.5
	21/08/2023	3.9	110	52	100	0.01	<0.01	6.3	<0.02	<0.2	6.6	3.0	<0.5	1.1	<0.5
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**0.294**	**121**	**0.167**	**4.14**	**26.4**	**13.4**	**3.8**	**5.3**	**3.1**
MW4	29/09/2022	4.5	100	88	350	0.03	0.16	22	0.1	1.5	19	<2	3.6	3.7	0.9
	20/10/2022	4.5	110	100	69	0.02	0.78	20	0.04	1	14	<2	3.9	2.1	<0.5
	14/11/2022	4.2	130	340	16	0.01	0.13	30	<0.10	7	22	5	2.6	4.8	1.1
	14/12/2022	4.2	140	140	60	<0.01	<0.05	23	<0.10	3	21	7.8	<5	<5	<5
	18/01/2023	5.73	170	110	170	0.02	0.16	26	<0.50	2.4	20	6.6	<5	<5	<5
	20/02/2023	3.9	87	110	31	0.04	<0.05	15	0.28	3.88	15	5.8	3.5	5.4	0.9
	28/03/2023	4.7	180	120	190	0.04	0.08	28	<0.02	22	18	6	8.8	5.1	<5
	18/04/2023	3.7	500	280	340	0.11	0.07	27	<0.02	0.9	19	130	3.4	5	<0.5
	18/05/2023	5.4	110	72	70	0.03	<0.01	14	<0.02	2.89	11	10	5.7	3.7	<0.5
	15/06/2023	3.8	200	150	130	1.4	0.29	29	<0.02	0.9	21	12	<5	6	<5
	24/07/2023	4.1	170	94	58	0.03	<0.1	24	<0.2	1	20	17	2.8	6.2	0.6
	21/08/2023	3.8	200	120	75	0.03	0.07	18	0.65	1.76	15	3.6	2.0	5.0	<0.5
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**1.392**	**199**	**0.185**	**4.36**	**146.3**	**19.2**	**11.3**	**15.6**	**5.4**
MW5	29/09/2022	4.5	59	68	630	0.13	0.41	18	0.02	6.33	14	<2	2.3	2.6	0.6
	20/10/2022	4.4	75	82	92	0.02	0.1	15	0.02	0.5	12	<2	2	2.3	0.5
	14/11/2022	4.6	120	270	150	0.08	0.52	29	<0.10	7.8	26	<2	5.2	5.7	1.4
	14/12/2022	4.5	150	150	230	0.02	<0.060	29	<0.05	11	24	9.7	<5	<5	<5
	18/01/2023	2.8	1600	1100	480	0.05	1.7	43	<0.05	5.7	49	6.6	90	72	<5
	20/02/2023	2.6	2700	3200	310	0.03	4.2	27	<0.05	3.2	47	750	390	76	7.8
	28/03/2023	3	5200	3700	130	0.02	5.9	28	<0.02	11	34	1100	440	57	7.1
	18/04/2023	2.9	3800	5100	300	0.01	4	44	<0.02	4	49	3800	380	120	4.7
	18/05/2023	3.4	3100	3400	150	<0.01	<0.01	15	<0.02	4.9	23	2200	240	31	4.2
	15/06/2023	2.9	3000	1800	640	0.3	2.9	28	<0.02	2.66	64	2100	410	130	6.5
	24/07/2023	5.5	2,800	1,600	6.0	0.07	0.19	1,400	<0.2	0.5	450	380	23	54	25
	21/08/2023	3.3	5,200	3,400	13	0.03	4.6	67	<0.02	5	89	2,200	420	200	9.9
MW5 Baseline		**4.31 - 5.53**	**191**	**130**	**3003**	**0.97**	**13.4**	**82**	**0.117**	**13.4**	**27.2**	**8.3**	**6**	**8.4**	**5.4**
MW7	29/09/2022	4.6	26	40	190	0.1	0.3	8.5	0.02	2.5	8.5	<2	1	0.9	0.6
	20/10/2022	4.5	86	70	120	0.01	0.4	12	0.04	2.9	8.5	<2	1.7	1.7	0.5
	14/11/2022	4.5	44	170	<100	0.03	0.01	9.7	<0.10	<2.00	9.7	<2	1.9	1.4	1.4
	14/12/2022	4.6	56	92	23	0.04	<0.10	7.5	<0.20	11	8.7	2.5	<5	<5	<5
	18/01/2023	4.38	63	32	390	0.09	<0.05	7.5	<0.025	2	11	31	<5	<5	<5
	20/02/2023	4.1	87	60	30	0.02	<0.05	9.1	0.42	4.9	5.8	5.7	1.4	1.9	1.1
	28/03/2023	4.5	160	94	18	0.02	0.02	21	<0.02	4.4	12	66	2	2	0.6
	18/04/2023	4.9	150	58	7.4	<0.01	0.11	11	<0.02	<0.20	9.8	120	1.9	0.8	<0.5
	18/05/2023	4.9	78	56	130	0.03	<0.01	11	<0.02	0.89	9.3	9.3	1.4	0.9	<0.5
	15/06/2023	4.6	77	50	30	0.28	0.25	11	<0.02	<0.20	9.2	62	<5	<5	<5
	24/07/2023	5.1	140	100	90	0.12	<0.1	10	<0.2	0.7	8.5	14	1.9	1.4	0.9
	21/08/2023	5.3	67	34	29	0.08	0.06	8.4	<0.02	0.8	9.0	45	1.8	1.7	0.8
MW7 Baseline		**4.65 - 5.62**	**147**	**100**	**3140**	**0.71**	**0.471**	**172**	**0.048**	**4.15**	**31**	**7.3**	**3.4**	**2.2**	**3.1**
ANZG (2018): SE Aust 95% Undisturbed Lowland River		**6.50 – 8.00**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**			**-**

ATTACHMENT 3

Surface Water Quality Analytical Results

Site	Date	pH	TDS	TSS	DO	EC	TP	NH_3	Cl	Nitrite	TN	Na	SO_4 as S	Chlorophyll a	Al (total)	As	Cd	Ca	Cr	Cu	Fe (total)	Pb	Mg	Hg	Ni	K	Zn	Total Recoverable Hydrocarbons (TRH)/Total Petroleum Hydrocarbons (TPH) (µg/L)								BTEXN (µg/L)
			(mg/L)	(mg/L)	(mg/L)	(µS/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(µg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	C10 – C16	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C36 Sum	Naphthalene
SW01	29/09/2022	6.9	180	11	3.1	140	0.47	<0.01	14	<0.02	5.2	30	3.4	450	1.5	0.003	<0.0002	22	0.002	0.32	2.7	0.005	14	<0.0001	0.015	3	0.071	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	6.6	320	30	4.7	400	0.03	0.03	22	<0.02	<0.02	31	33	43	0.66	2	<0.0002	24	0.002	0.16	2.4	0.003	9.1	<0.0001	0.009	2.9	0.042	<50	<50	<100	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	6.0	780	4900	0.2	920	3.1	6.9	25	<0.02	14	200	3.7	67	130	1.3	<0.02	280	<0.10	1	130	0.1	73	<0.001	0.3	<50	4.7	220	220	<100	<100	<20	250	<100	<100	250	<100
	14/12/2022	4.5	800	210	3.6	1100	0.15	0.05	24	<0.10	23.27	54	560	88	22	0.0016	<0.002	180	0.014	0.2	1.6	0.015	43	<0.001	0.077	6.8	0.68	<50	<50	<100	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	6.3	380	120	4.7	25	0.047	0.087	24	<0.02	5.2	40	180	25	0.7	<0.010	<0.002	<2	<0.010	<0.01	3.2	<0.01	13	<0.01	<0.01	<5	<0.05	<50	<50	20	-	<20	<50	100	100	-	<100
	20/02/2023	3.4	1100	32	1.8	1300	0.42	0.37	28	<0.02	8.9	57	350	<5	37	0.027	0.0004	170	0.019	0.07	0.049	0.049	57	0.002	0.16	6.3	0.35	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	3.0	2000	100	7.7	3000	<0.01	2.1	29	<0.02	1.29	47	880	<5	150	0.002	0.0008	290	0.002	0.003	36	0.003	38	0.0001	0.46	5.1	0.97	<50	<50	<100	<100	<20	<50	<100	<100	<20	<100
	18/04/2023	7.7	130	33	8.6	320	0.06	0.01	24	<0.02	8.4	16	14	8.8	0.53	0.002	<0.0002	13	0.005	0.005	0.002	0.002	2.7	<0.0001	0.002	0.8	0.15	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	7.4	130	6	4.4	250	0.21	0.14	11	<0.02	0.9	14	10	<5	0.16	0.002	<0.0002	23	<0.001	0.002	0.24	<0.001	7.5	<0.0001	0.002	2.3	0.02	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	3.2	1900	6.8	7.6	2700	0.03	1.6	59	<0.02	2.1	61	1500	<5	120	0.002	0.0003	350	<0.001	0.004	15	0.003	42	<0.0001	0.24	8.1	0.35	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	7.9	84	<5	8.4	140	0.11	<0.01	6.4	<0.02	0.3	13	4.0	<0.005	0.08	0.003	<0.0002	13	<0.001	0.003	0.38	0.002	4.1	<0.0001	0.002	0.8	0.037	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	21/08/2023	6.9	120	25	3.0	190	0.34	0.01	5.6	<0.02	0.4	18	<2	<0.005	0.52	0.001	<0.0002	17	0.001	0.002	1.2	0.001	6.3	<0.0001	0.003	<0.5	0.014	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	SW01 Baseline	**6.20 – 7.00**	**291**	**73**	-	**428**	**3.52**	**0.164**	**118**	**0.039**	**3.5**	**51**	**9**	**768**	**0.5**	**0.003**	**0.001**	**22**	**0.002**	**0.041**	**1.2**	**0.001**	**16**	**0.0005**	**0.006**	**6**	**0.058**	**60**	-	**24**	**100**	-	**50**	**130**	**90**	**170**	-
SW02	29/09/2022	6.9	170	8.8	8	160	0.04	0.03	29	<0.02	1.3	27	2.8	22	0.42	0.003	<0.0002	19	0.002	0.004	1.5	0.001	5.8	<0.0001	0.002	1.9	0.057	<50	<50	<100	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	6.5	120	6.2	8.7	140	0.02	0.01	17	<0.02	<0.20	16	2.9	<5	0.22	0.001	<0.0002	12	0.001	0.003	0.62	<0.001	3.4	<0.0001	0.001	1.7	0.032	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	14/11/2022	6.4	150	210	0.1	190	0.18	<0.01	54	<0.02	13	62	18	24	1.8	0.037	<0.002	47	<0.001	0.015	53	<0.01	11	<0.001	<0.01	<5	0.096	<50	<50	90	<100	<20	<50	60	30	90	<100
	14/12/2022	6.3	110	870	0.1	200	0.27	0.05	26	<0.10	2.7	25	29	14	13	0.066	<0.002	38	0.034	0.094	9.7	0.071	5.9	<0.001	0.013	5.1	1	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/01/2023	6.6	220	190	0.1	61	0.79	0.049	31	<0.20	21	27	6.2	61	3.3	0.023	<0.002	<2	<0.01	0.015	45	0.014	5.8	<0.001	<0.010	<5	0.15	180	180	30	-	<20	170	30	100	-	<100
	20/02/2023	6.5	240	29	4.4	1300	0.023	0.31	26	<0.10	1.9	29	24	<5	12	0.033	0.0002	38	0.009	0.09	0.013	0.013	11	<0.001	0.018	4.1	0.28	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	4.8	310	370	5.7	370	1.5	0.19	22	<0.02	<0.20	17	92	<10	3.4	0.002	0.0003	43	0.002	0.003	2.5	0.001	8.4	<0.0001	0.024	4.1	0.63	<50	<50	<50	<100	-	<50	<100	<100	<100	<100
	18/04/2023	6.2	300	60	7.3	410	0.05	0.16	32	<0.02	1.38	25	120	<5	0.86	<0.001	<0.0002	20	0.002	0.002	<0.001	<0.001	4	<0.0001	0.006	2.7	0.089	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	6.5	130	39	6	270	0.06	0.09	25	<0.02	<0.2	18	29	<5	0.72	0.002	<0.0002	17	0.002	0.006	1	0.002	4.3	<0.0001	0.003	2.4	0.081	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	6.4	190	25	8.9	280	0.37	0.23	34	<0.02	1.2	25	38	<5	1.7	0.001	<0.0002	22	0.001	0.004	2.1	0.001	5.5	<0.0001	0.005	1.9	0.037	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	21/08/2023	6.1	430	20	5.7	690	0.02	0.50	36	<0.02	1.2	38	75	<0.005	1.1	<0.001	<0.0002	71	<0.001	<0.001	8.0	<0.001	16	<0.0001	0.024	5.7	0.057	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	SW02 Baseline	**6.30 – 7.00**	**199**	**495**	-	**292**	**1.88**	**0.261**	**161**	**0.06**	**8.6**	**32**	**10**	**182**	**3.8**	**0.045**	**0.001**	**17**	**0.007**	**0.012**	**71.9**	**0.02**	**5**	**0.0005**	**0.005**	**6**	**0.09**	**60**	-	**22**	**100**	-	**50**	**100**	**50**	**140**	-
SW03	29/09/2022	6.8	120	<5	9.3	100	0.02	<0.01	24	<0.02	1.1	23	2.4	<5	0.42	0.002	<0.0002	13	0.002	0.003	0.8	<0.001	4.4	<0.0001	0.002	1	0.034	<50	<50	<100	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	5.9	650	26	7.5	870	0.03	<0.01	270	<0.02	<0.20	12	13	<5	0.49	0.002	<0.0002	7.6	0.002	0.003	0.86	0.002	2.3	<0.0001	0.001	1	0.03	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	6.5	140	260	2.6	160	0.13	<0.05	27	<0.01	7.4	36	9	<5	1.1	<0.001	<0.002	18	<0.001	0.004	1.9	<0.010	5.7	<0.001	<0.01	<5	0.24	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/12/2022	6.5	110	11	4.4	160	0.01	0.05	23	<0.01	3.69	18	11	<5	0.63	<0.001	<0.002	13	<0.01	<0.010	1.3	<0.010	<5	<0.001	<0.01	<5	0.53	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	6.5	160	8.5	5.1	<5	0.02	<0.010	31	<0.02	1.3	26	17	<5	0.5	0.01	<0.002	<2	<0.010	<0.01	0.5	<0.01	6.2	<0.001	<0.01	<5	<0.05	<50	<50	<50	<100	<20	<50	<100	100	-	<100
	20/02/2023	3.4	0.54	13	6	720	0.01	<0.010	22	<0.02	5.1	28	100	<5	17	0.001	<0.0002	63	0.002	0.02	0.001	0.001	14	<0.001	0.065	3	0.12	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	3.3	400	7.4	9.9	750	0.02	0.07	14	<0.02	<0.20	16	110	<5	15	<0.001	<0.0002	63	0.001	0.001	4.5	<0.001	11	<0.0001	0.065	2.3	0.15	<50	<50	<50	<100	-	<50	<100	<100	<100	<100
	18/04/2023	4.2	280	<5	7.4	450	<0.01	0.04	29	<0.02	<0.2	22	140	<5	3.8	<0.001	<0.0002	30	0.001	0.001	<0.001	<0.001	5	<0.0001	0.023	2.1	0.048	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	4.3	310	37	5.5	580	0.02	0.32	22	<0.02	12.33	21	230	<5	5.8	<0.001	<0.0002	48	<0.001	0.002	14	<0.001	10	<0.0001	0.033	2.8	0.16	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	3.3	580	17	8.9	870	0.04	0.68	32	<0.02	1.4	31	300	<5	11	<0.001	<0.0002	74	<0.001	0.002	12	<0.001	15	<0.0001	0.058	2.7	0.15	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	3.9	290	36	9.0	510	0.03	0.40	17	<0.02	1	20	250	<0.005	7.1	<0.001	<0.0002	39	<0.001	0.002	8.9	0.001	9.7	<0.0001	0.030	2.5	0.10	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	21/08/2023	6.8	270	5.8	7.2	350	0.04	0.04	45	<0.02	0.5	43	8.3	<0.005	0.72	0.001	<0.0002	18	0.001	0.003	1.1	<0.001	6.3	<0.0001	0.002	6.8	0.026	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	SW03 Baseline	**6.10 - 6.70**	**191**	**1005**	-	**281**	**2.14**	**0.155**	**111**	**0.041**	**4.3**	**30**	**6**	**86**	**7.9**	**0.058**	**0.001**	**21**	**0.008**	**0.028**	**85.5**	**0.028**	**5**	**0.0005**	**0.006**	**4**	**0.26**	**60**	-	**200**	**100**	-	**50**	**100**	**60**	**120**	-
SW04	29/09/2022	4.5	68	<5	4.8	52	0.01	0.18	20	<0.02	5.1	17	<2	<5	1.3	0.001	<0.0002	1.6	0.005	0.001	2.7	0.001	2.6	<0.0001	0.002	1	0.027	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	4.2	90	<5	7.5	110	0.01	<0.10	20	<0.02	0.3	16	<2	<5	1.1	<0.001	<0.0002	1.3	0.004	0.001	2.4	0.001	2.3	<0.0001	0.002	1	0.024	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	No surface water located at monitoring site – no sample collected													No surface water located at monitoring site – no sample collected																						
	14/12/2022	3.2	190	<5	2	280	0.01	0.05	42	<0.10	3.2	20	<2	<5	1.2	<0.001	<0.002	<5	<0.001	<0.01	3.2	<0.01	<5	<0.001	<0.01	<5	0.084	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	No surface water located at monitoring site – no sample collected													No surface water located at monitoring site – no sample collected																						
	20/02/2023	4.1	0.2	<5	5.9	160	0.02	0.09	22	<0.10	7.4	23	15	<5	1.6	0.002	<0.0002	2.7	0.005	0.05	0.002	0.002	3.9	<0.001	0.003	1.6	0.039	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	28/03/2023	4.2	68	<5	8	130	<0.01	<0.01	17	<0.10	<0.25	14	25	<5	1.1	<0.01	<0.002	<5	0.002	<0.01	2.7	<0.01	<5	<0.0001	0.01	<5	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/04/2023	4.6	130	16	9.1	190	0.01	0.03	32	<0.02	0.5	21	8.7	<5	0.85	<0.001	<0.0002	1.8	<0.001	<0.001	<0.001	<0.001	2.7	<0.0001	0.001	0.8	0.034	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/05/2023	3.6	1200	42	8	1800	0.03	1.2	26	<0.02	1.15	53	1000	<5	41	<0.001	0.0005	200	<0.001	0.003	16	0.003	31	<0.0001	0.11	5.7	0.4	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	15/06/2023	4.2	140	160	7.7	200	1.5	0.44	44	<0.02	12	24	<2	8	3.1	0.002	<0.0002	2.2	0.007	0.007	6.3	0.005	4.5	<0.0001	0.003	1.4	0.075	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	24/07/2023	3.6	1,600	21	9.0	2,400	0.02	1.5	180	<0.02	3.4	78	5,700	<0.005	50	<0.001	0.0002	330	<0.001	0.003	3.9	0.002	51	<0.0001	0.13	9.0	0.18	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	21/08/2023	3.3	2,400	5.7	7.5	3,700	<0.01	2.8	33	<0.02	3.4	97	850	0.0053	72	0.002	0.0004	560	<0.001	0.003	3.4	0.002	83	<0.0001	0.23	13	0.34	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	SW04 Baseline	**4.20 – 4.50**	**112**	**293**	-	**165**	**0.5**	**0.693**	**90**	**0.052**	**4.5**	**20**	**3**	**86**	**1.4**	**0.002**	**0.001**	**3.2**	**0.007**	**0.002**	**2.8**	**0.002**	**2.3**	**0.0005**	**0.005**	**2.9**	**0.028**	**60**	-	**200**	**100**	-	**50**	**100**	**60**	**100**	-
SW05	29/09/2022	5.9	480	5.2	7.7	510	0.12	0.17	220	<0.20	3	140	11	<5	0.83	<0.001	<0.0002	9.4	0.002	<0.001	4.6	<0.001	17	<0.0001	0.002	7.7	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	6.2	650	7.2	8.9	690	0.06	0.24	180	<0.20	0.5	160	8.6	<5	0.66	<0.001	<0.0002	11	0.001	<0.001	3.5	0.001	19	<0.0001	0.002	7.9	0.007	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	6.2	820	13	4.7	1000	0.06	<0.05	310	<0.10	8.1	260	100	<5	0.75	<0.001	<0.002	18	<0.001	0.002	5.4	<0.01	27	<0.001	<0.001	11	0.12	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/12/2022	6.2	830	16	7.5	1100	0.05	0.05	330	<0.10	3.1	240	40	<5	0.93	<0.001	<0.002	16	<0.01	<0.01	6.1	<0.01	21	<0.001	<0.01	13	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	6.3	2800	33	7	<5	0.09	0.09	1300	<0.02	1.38	820	160	<5	0.73	<0.01	<0.002	<2	<0.01	<0.01	6.2	<0.01	96	<0.01	<0.01	41	<0.05	70	70	-	-	<20	60	100	-	-	<100
	20/02/2023	6.7	18	18	5.4	2300	0.1	0.07	2000	<0.10	3.4	4700	890	<5	0.22	0.002	<0.0002	190	0.001	0.01	<0.001	<0.001	550	<0.001	0.001	170	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	5.6	470	<5	9.4	760	0.02	0.08	200	<0.10	<0.02	110	23	6.7	0.77	<0.01	<0.002	9.4	<0.01	<0.01	3.8	<0.01	14	<0.001	<0.01	6.4	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	18/04/2023	6.4	4000	16	8.5	5300	0.1	0.12	2000	<0.02	80	1100	230	<5	1	<0.001	<0.0002	42	0.001	<0.001	<0.001	<0.001	110	<0.0001	0.003	37	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	5.8	260	17	5.7	460	0.08	<0.01	110	<0.02	<0.2	64	25	<5	0.6	<0.001	<0.0002	5.2	<0.001	<0.001	2.4	<0.001	9.1	<0.0001	0.002	4.9	0.009	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	6.2	1100	<5	8.8	1400	0.58	0.14	450	<0.02	1.1	250	40	<5	0.87	<0.001	<0.0002	14	0.001	2	2	<0.001	27	<0.0001	0.001	14	0.01	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	6.5	1,600	<5	9.3	2,800	0.05	0.17	1,500	<0.5	1.1	440	1,200	<0.005	0.33	<0.001	<0.0002	22	<0.001	<0.001	1.9	<0.001	52	<0.0001	0.002	25	0.006	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	21/08/2023	6.6	1,600	<5	6.3	2,900	0.06	0.15	1,500	<0.02	1.28	480	190	<0.005	0.41	<0.001	<0.0002	23	<0.001	0.002	2.2	<0.001	54	<0.0001	0.002	29	0.005	<50	<50	<50	<100	<20	<50	<100	<100	<100	<100
	SW05 Baseline	**5.10 – 7.20**	**4710**	**136**	-	**6927**	**0.21**	**0.592**	**980**	**0.052**	**2.2**	**1667**	**115**	**63**	**2.1**	**0.002**	**0.001**	**57**	**0.002**	**0.003**	**12.3**	0.001	**130**	**0.0005**	**0.011**	**58**	**0.026**	**60**	-	**200**	**100**	-	**50**	**100**	**60**	**100**	-
SW06	29/09/2022	6.0	480	<5	7.8	580	0.13	0.16	220	<0.02	8.6	140	11	5.1	0.78	<0.001	<0.0002	9.4	0.002	<0.001	4.5	<0.001	18	<0.0001	0.002	7.7	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	6.3	580	16	8.7	730	0.05	0.19	330	<0.02	0.5	110	7.5	6.2	0.54	<0.001	<0.0002	9.1	0.001	<0.001	2.7	0.001	13	<0.0001	0.002	5.8	0.012	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	6.2	840	13	<5	1000	0.04	0.36	310	<0.10	1.1	270	100	<5	0.68	<0.001	<0.002	18	<0.001	0.012	5.3	<0.01	29	<0.001	<0.01	12	0.11	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/12/2022	6.3	840	16	8.3	1200	0.1	0.05	340	<0.10	5.8	240	44	<5	0.75	<0.001	<0.002	16	<0.01	<0.01	5.4	<0.01	21	<0.001	<0.01	13	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	6.4	3700	31.47	6.8	5400	0.07	0.04	1800	<0.02	2.5	1000	200	<5	0.63	<0.010	<0.001	<2	<0.01	<0.01	0.01	<0.01	120	<0.001	<0.01	47	<0.05	<50	<50	-	-	<20	<50	<100	<100	-	<100
	20/02/2023	6.8	19	89	5.1	14000	0.09	0.11	22	<0.10	4.1	4000	1200	<5	0.34	0.002	<0.0002	170	0.001	0.01	<0.001	<0.001	480	<0.001	0.002	160	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	28/03/2023	5.6	400	6.2	8.3	730	0.03	0.07	180	<0.20	<0.20	110	18	9.7	1.1	<0.01	<0.002	11	<0.01	<0.01	3.8	<0.01	14	<0.001	<0.01	6.3	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/04/2023	6.7	6400	18	7.4	6700	0.07	1.2	3200	<0.02	1.26	1700	360	<10	0.54	<0.001	<0.0002	68	0.001	<0.001	<0.001	<0.001	200	<0.0001	0.002	63	0.009	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/05/2023	5.9	280	17	6.3	470	0.08	0.06	120	<0.02	0.4	370	21	<5	0.44	0.003	<0.0002	14	<0.001	<0.001	0.13	<0.001	4.8	<0.0001	0.008	3.3	<0.005	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	15/06/2023	6.4	1100	<5	7.4	1400	0.55	0.18	440	<0.02	0.7	250	38	<5	0.36	<0.001	<0.0002	15	<0.001	2.1	2.1	<0.001	28	28	0.001	14	<0.005	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	24/07/2023	6.7	2,100	5.8	6.6	3,500	0.07	0.23	1,800	<0.2	0.6	540	620	<0.005	0.36	<0.001	<0.0002	26	<0.001	<0.001	1.9	0.001	65	<0.0001	0.002	29	0.007	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	21/08/2023	6.6	2,800	<5	6.1	5,400	0.19	0.16	1,300	<0.02	0.78	870	59	<0.005	0.41	<0.001	<0.0002	39	0.001	<0.001	1.9	<0.001	100	<0.0001	0.002	46	<0.005	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	SW06 Baseline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	-	**<50**	-	**<2200**	**<0.05**	-	-	-	**<0.50**	-	-	**5**	**0.05**	**0.013**	**0.0002**	-	**0.0033**	**0.0018**	**0.3**	**0.0034**	-	**0.0006**	**0.011**	-	**0.008**	-	-	-	-	-	-	-	-	-	-

ATTACHMENT 4

Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit Consulting	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	21/08/2023

Description

Monitoring location SW01. Evidence of earthworks within drainage line

Photo No.	Date
2	21/08/2023

Description

Monitoring location SW02. Iron staining evident in water column derived from offsite source.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit Consulting	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	21/08/2023

Description

Northern main drain rain re-alignment works completed adjacent to monitoring location SW03.

Photo No.	Date
4	21/08/2023

Description

Surface water monitoring location SW04.

Iron staining evident.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit Consulting	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	21/08/2023

Description

Surface water monitoring location SW05

Photo No.	Date
6	21/08/2023

Description

Surface water monitoring location SW06

MONTHLY WATER QUALITY MONITORING REPORT

Harvest Estate Urban Development

Monitoring Event: 24th July 2023

Ewingsdale Road, Byron Bay, NSW, 2481

Job Number: 217140

For:

Planit Consulting

By:

ENV Services

Date:

09/08/2023

ENV Services Pty Ltd

313 River Street, Ballina NSW 2478

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E: admin@envsolutions.com.au

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DOCUMENT CONTROL

Job No:	Job Number: 217140
Client:	Planit Consulting
Filename:	217140_Harvest Estate_WQ_July 2023

	Name:	**Date:**	**Signature:**
Prepared By:	Robert Todhunter	03/08/2023	
Reviewed By:	Kingsley Baldwin	9/08/2023	
Approved By:	Kingsley Baldwin	9/08/2023	

Revision:	**Date:**	**Details:**

SCOPE OF ENGAGEMENT AND LIMITATIONS

This report has been prepared by ENV Services at the request of Planit Consulting for the purpose of consolidating and assessing water quality monitoring (surface water and ground water) data to determine impact associated with the development of the Harvest Estate. No other parties may rely on the contents of this report for any purposes except those stated.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

1 INTRODUCTION

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Establishment of internal roads and structures with the progressive construction of Stage 1 of the development.
- Stabilization of the site is progressively being carried out.
- Works have commenced on the re-alignment of the northern main drain, upstream of monitoring location SW03. Initial works involve the forming of the drain re-alignment, prior to establishing connection with the existing drain. No works had been undertaken within the waterway at the time of sampling.

Potential extraneous impacts were reported by the Principal Contractor whereby Byron Shire Council (BSC) were reported to have undertaken desilting and vegetation removal within the northern main drain. An excavator was used within/or directly adjacent to the waterway in order to carry out the works.

2 MONITORING RESULTS & OBSERVATIONS

2.1 Fortnightly Acid Frog Habitat Groundwater Quality Monitoring

Fortnightly water quality monitoring for a period of 6 months from the commencement of Standing Water Level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP). This monitoring requirement is required for the first 6 months from the commencement of construction activities.

Monitoring for this component of the monitoring programme was completed in April 2023.

2.2 Monthly Groundwater Monitoring

Monthly groundwater monitoring at five (5) groundwater wells (MW2 – MW5 & MW7) was carried out to assess for impact within the underlying aquifer. This monitoring was conducted in accordance with the site's Conditions of Consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1.

An assessment of the monthly analytical results presented in Attachment 2, Table 1, identified the following observations:

Site	Observation	Comments
MW2	pH, EC and TDS outside of baseline ranges	pH was observed to be slightly elevated above historic baseline range values. Elevated EC and TDS at this location are largely improved when compared to elevated levels observed during June monitoring, indicating improvements in water quality at this monitoring well.
MW3	Water quality within historic ranges.	No site related impacts identified at this monitoring location.
MW4	Water quality within historic ranges.	No site related impacts identified at this location.
MW5	EC, TDS, Cl, SO_4 and several cations (Ca, Mg, K & Na) concentrations outside baseline ranges.	pH has improved at this location to within historic baseline range values, indicating improvement in water quality with respect to impacts from acid sulfate soils. Elevated analytes (EC, TDS, and cations/anions) recorded at this site indicate the presence of exposed acid sulfate soils proximal to the monitoring well.
MW7	Water quality within historic ranges with the exception for SO_4.	No site related impacts identified. Elevated SO_4 concentrations attributed to the presence of acid sulfate soils exposed through natural variation in the water table.

2.3 Monthly Surface Water Monitoring

Monthly surface water sampling (SW01 – SW06) was carried out to assess for impact from site activities on the receiving environment. Monitoring was carried out in accordance to the site's Conditions of Consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP), which require the assessment of the following analytes; physiochemical, nutrient, metals, cation/anion and total recoverable hydrocarbon (TRH).

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 1. Tabulated analytical results are presented in Attachment 3. Select photos of the surface water sampling programme are presented in Attachment 4.

Table 1: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

2.3.1 Assessment of Analytical Results

An assessment of the monthly analytical results presented in Attachment 3, identified the following observations:

Site	Observation	Comments
SW01	pH was elevated above historic baseline range values. Metals and TRH concentrations within historic range values.	This site is located at an upstream location receiving water from off-site. As such elevated pH is likely from extraneous sources. Water quality has improved at this monitoring location since the previous round of monitoring conducted on 15 June 2023.
SW02	pH and SO_4 elevated above baseline ranges. Metals and TRH concentrations within historic range values.	Elevated pH and SO_4 at this location are likely attributed to extraneous sources as the location is a receptor of off-site water flow. Drainage works carried out by Byron Shire Council are likely to have contributed to the elevated pH through the application of lime to the works area.
SW03	pH, TDS, EC, SO_4, NH_3 along with several cations/anions (Ca & Mg) and nickel were recorded outside baseline values. TRH concentrations are within historic baseline ranges.	This site is located downstream of Stage 1 works within the Northern Main Drain. Water quality remains poor at this location when compared to the 'upstream' (SW02) monitoring sites and recorded baseline values for the site. Chemical indicators indicative of exposure of acid sulfate soils.

Site	Observation	Comments
SW04	pH, EC, TDS, NH_3, SO_4 and several cations/anions (Na, Ca, K, Cl, & Mg) and metals concentrations (Fe, Cu, Al, Ni, & Zn) outside baseline ranges. TRH concentrations within historic baseline ranges.	This site is located downstream of Stage 1 works within the Southern Swale Drain. Water quality remains poor at this location when compared to 'upstream' (SW01) and baseline values. Chemical indicators indicative of exposure of acid sulfate soils.
SW05	Parameters within baseline ranges with the exception of Cl and SO_4.	No site related impacts observed. Elevated chloride and sulfate concentrations at this site are likely attributed to the estuarine environment where high chloride and sulfate values are typically observed.
SW06	EC, TP, TN, Al and Fe outside of ANZG (2018) guideline values.	No site related impacts observed. All analytes listed as outside of ANZG (2018) criteria are within baseline values observed in the Union Drain at SW05, located upstream of this monitoring site.

3 RAINFALL

During this monitoring period (15/06/2023 – 24/07/2023), 40.0 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

4 CONCLUSION & RECCOMENDATIONS

4.1 Conclusion

Monitoring results indicate that impacts associated with exposure of acid sulfate soils continue to influence on-site surface water downstream (SW03 and SW04) of the Stage 1 works package, however these impacts are contained within the site as water quality within the receiving environment (SW05 & SW06) largely remains within baseline ranges or ANZG (2018) criteria (where relevant).

Subtle improvements in reported values at surface water monitoring site SW03 along with improvements in groundwater quality at monitoring locations MW02 and MW05 indicate that mitigation measures adopted on the northern side of the site are likely to be alleviating impact from exposure of acid sulfate soils. Subsequent proposed monthly monitoring events will confirm this hypothesis.

Water quality within the southern swale drain downstream of the Stage 1 works package indicate impact from acid sulfate soils. An assessment of water quality at 50m intervals along the southern swale drain commissioned by Planit indicate that pH values in the upper portion of the site proximal to the outlet of swale drain 4 & 5 are likely to be contributing to the poor water quality. This investigation did not include an assessment of water quality within swale drain 4 & 5 and therefore further investigations are required to identify whether water quality outside of the site boundary adjacent to Ewingsdale Road is influencing the deterioration in water quality observed within the confines of the site.

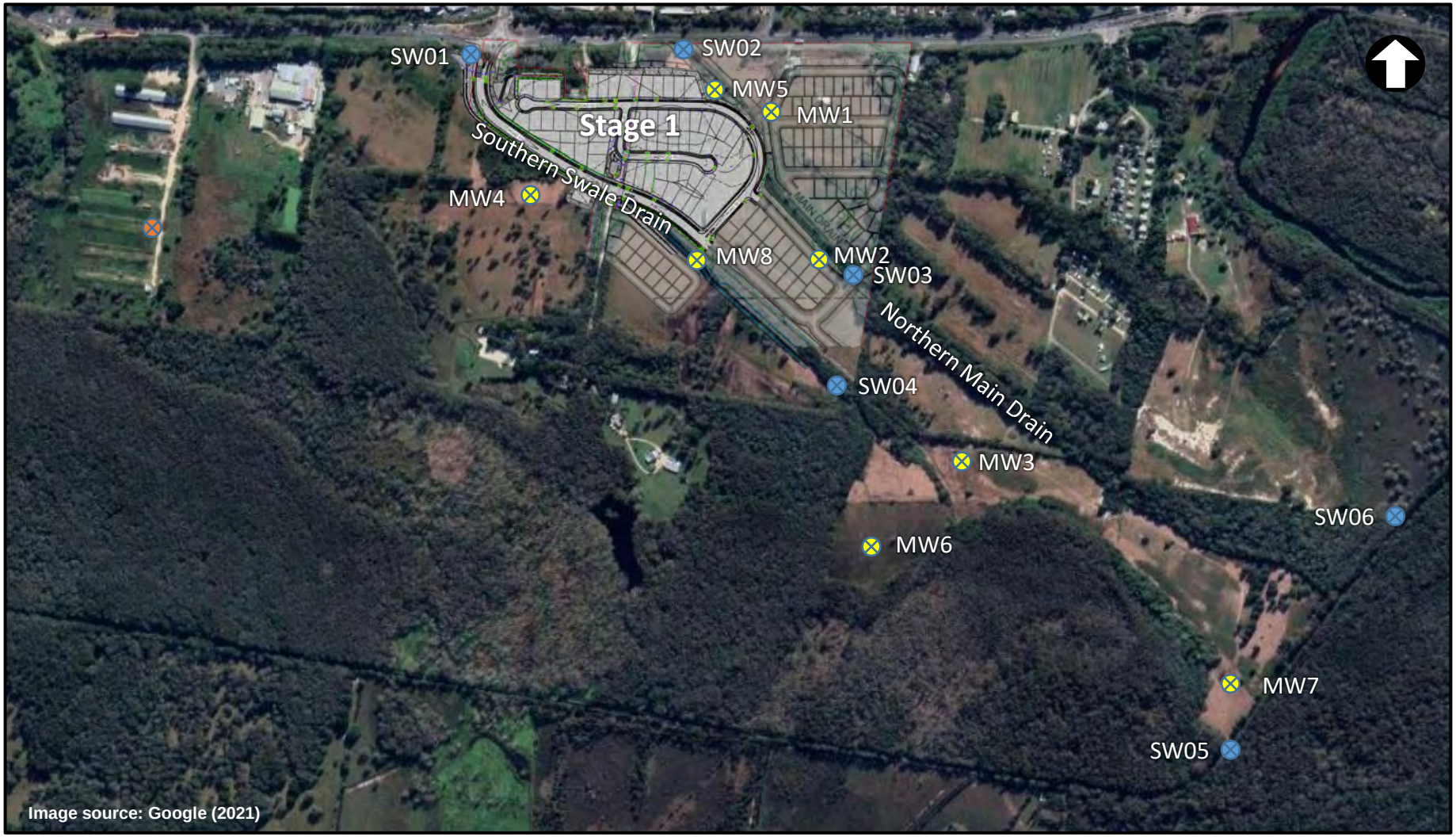
4.2 Recommendations

Based on the above conclusions of this monitoring report, the following recommendations are to be implemented with respect to improving water quality throughout the site.

- Ensure ag-lime check bags are installed at 40m intervals within the southern swale drain and within swale drains 4 and 5. These checks need to extend the width of the drain and are required to act as a barrier to assist in pooling water behind the barrier to curb the generation of acid from the exposure of acid sulfate soils within the invert of the swale.
- Carry out an investigation into the water quality within swale drains 4 & 5 to determine whether water quality impacts are site related or derived from an offsite source.
- Ensure all longitudinal drains and surface drain outlets have ag-lime bag checks.
- Carry out an audit of all drainage systems to ensure ag-lime bags have been installed as per the recommendations.

ATTACHMENT 1

Figures



Site Location (Stage 1)

Surface Water Sampling Locations

Ground Water Sampling Locations

0 0.1 0.2km

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

Figure 1: Water Quality Sampling Locations
Harvest Estate – Stage 1

ATTACHMENT 2

Groundwater Quality Analytical Results

Monthly Groundwater Analytical Results

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	NH_3 mg/L	Cl mg/L	Nitrite mg/L	TN mg/L	Na mg/L	SO_4 (as S) mg/L	Ca mg/L	Mg mg/L	K mg/L
MW2	29/09/2022	5.80	54	92	<5	0.12	0.51	14	0.02	0.5	30	< 2	< 0.5	0.8	2.4
	20/10/2022	5.60	100	110	<5	0.09	0.24	13	0.02	2	28	< 2	<0.5	0.8	2.2
	14/11/2022	6.00	100	240	<5	0.07	0.24	19	<0.10	<0.2	30	< 2	1.3	1.4	2.4
	14/12/2022	5.60	110	170	<5	0.02	<0.05	15	<0.10	3.1	29	5	<5	<5	<5
	18/01/2023	4.60	130	76	9.2	0.12	0.09	17	<0.05	2.5	29	7	<5	<5	<5
	20/02/2023	6.00	100	160	5.3	0.09	0.1	27	<0.25	0.25	27	3.7	<0.5	0.7	3.1
	28/03/2023	5.90	140	92	17	0.02	0.12	15	<0.02	<0.2	21	7.2	<5	<5	<5
	18/04/2023	6.20	170	88	<5	0.08	1.2	15	<0.02	7.7	18	5.2	<5	<5	<5
	18/05/2023	5.90	130	76	10	0.09	0.1	13	<0.02	9	28	2.1	0.6	0.9	2.6
	25/06/2023	3.30	4500	3000	250	0.26	1.6	45	<0.02	8.1	86	3800	440	82	7.9
	24/07/2023	6.20	220	150	<5	0.03	0.16	12	<0.2	1	24	12	<0.5	0.8	2.5
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0.45**	**0.338**	**189**	**0.07**	**2.03**	**29.7**	**9.8**	**0.7**	**1.4**	**4.2**
MW3	29/09/2022	4.20	53	40	370	0.09	0.05	8.8	0.02	0.5	7	<2	< 0.5	1	0.6
	20/10/2022	4.10	64	62	130	0.01	0.2	8	0.02	0.5	7	<2	0.5	0.9	<0.5
	14/11/2022	4.60	57	84	170	0.03	0.27	7.4	<0.02	<0.2	7.1	<2	0.8	0.6	<0.5
	14/12/2022	4.30	43	32	280	<0.01	<0.01	5.2	<0.02	1.1	6	<2	<5	<5	<5
	18/01/2023	4.25	54	28	670	0.03	<0.01	4.1	<0.05	1.4	<5	4.1	<5	<5	<5
	20/02/2023	4.20	36	40	76	0.02	<0.10	6.8	0.06	7.26	7.6	<2	<0.5	1	<0.5
	28/03/2023	4.10	70	44	<5	<0.01	<0.01	7.9	<0.02	0.22	4.8	2.2	<0.5	1	0.6
	18/04/2023	4.60	89	54	110	0.02	0.1	9.6	<0.02	5.7	4.3	4.3	<0.5	0.6	<0.5
	18/05/2023	4.50	60	40	450	0.02	0.04	5.8	<0.02	1	4.8	2.1	0.6	0.8	<0.5
	15/06/2023	4.00	84	48	22	0.27	0.4	5.5	<0.02	1.96	5	63	<0.5	0.8	<0.5
	24/07/2023	4.50	85	59	160	0.04	<0.01	9.5	<0.02	<0.2	5.6	12	<0.5	0.8	<0.5
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**0.294**	**121**	**0.167**	**4.14**	**26.4**	**13.4**	**3.8**	**5.3**	**3.1**
MW4	29/09/2022	4.50	100	88	350	0.03	0.16	22	0.1	1.5	19	<2	3.6	3.7	0.9
	20/10/2022	4.50	110	100	69	0.02	0.78	20	0.04	1	14	<2	3.9	2.1	<0.5
	14/11/2022	4.20	130	340	16	0.01	0.13	30	<0.10	7	22	5	2.6	4.8	1.1
	14/12/2022	4.20	140	140	60	<0.01	<0.05	23	<0.10	3	21	7.8	<5	<5	<5
	18/01/2023	5.73	170	110	170	0.02	0.16	26	<0.50	2.4	20	6.6	<5	<5	<5
	20/02/2023	3.90	87	110	31	0.04	<0.05	15	0.28	3.88	15	5.8	3.5	5.4	0.9
	28/03/2023	4.70	180	120	190	0.04	0.08	28	<0.02	22	18	6	8.8	5.1	<5
	18/04/2023	3.70	500	280	340	0.11	0.07	27	<0.02	0.9	19	130	3.4	5	<0.5
	18/05/2023	5.40	110	72	70	0.03	<0.01	14	<0.02	2.89	11	10	5.7	3.7	<0.5
	15/06/2023	3.80	200	150	130	1.4	0.29	29	<0.02	0.9	21	12	<5	6	<5
	24/07/2023	4.10	170	94	58	0.03	<0.1	24	<0.2	1	20	17	2.8	6.2	0.6
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**1.392**	**199**	**0.185**	**4.36**	**146.3**	**19.2**	**11.3**	**15.6**	**5.4**
MW5	29/09/2022	4.50	59	68	630	0.13	0.41	18	0.02	6.33	14	<2	2.3	2.6	0.6
	20/10/2022	4.40	75	82	92	0.02	0.1	15	0.02	0.5	12	<2	2	2.3	0.5
	14/11/2022	4.60	120	270	150	0.08	0.52	29	<0.10	7.8	26	<2	5.2	5.7	1.4
	14/12/2022	4.50	150	150	230	0.02	<0.060	29	<0.05	11	24	9.7	<5	<5	<5
	18/01/2023	2.80	1600	1100	480	0.05	1.7	43	<0.05	5.7	49	6.6	90	72	<5
	20/02/2023	2.60	2700	3200	310	0.03	4.2	27	<0.05	3.2	47	750	390	76	7.8
	28/03/2023	3.00	5200	3700	130	0.02	5.9	28	<0.02	11	34	1100	440	57	7.1
	18/04/2023	2.90	3800	5100	300	0.01	4	44	<0.02	4	49	3800	380	120	4.7
	18/05/2023	3.40	3100	3400	150	<0.01	<0.01	15	<0.02	4.9	23	2200	240	31	4.2
	15/06/2023	2.90	3000	1800	640	0.3	2.9	28	<0.02	2.66	64	2100	410	130	6.5
	24/07/2023	5.50	2,800	1,600	6.0	0.07	0.19	1,400	<0.2	0.5	450	380	23	54	25
MW5 Baseline		**4.31 - 5.53**	**191**	**130**	**3003**	**0.97**	**13.4**	**82**	**0.117**	**13.4**	**27.2**	**8.3**	**6**	**8.4**	**5.4**
MW7	29/09/2022	4.60	26	40	190	0.1	0.3	8.5	0.02	2.5	8.5	<2	1	0.9	0.6
	20/10/2022	4.50	86	70	120	0.01	0.4	12	0.04	2.9	8.5	<2	1.7	1.7	0.5
	14/11/2022	4.50	44	170	<100	0.03	0.01	9.7	<0.10	<2.00	9.7	<2	1.9	1.4	1.4
	14/12/2022	4.60	56	92	23	0.04	<0.10	7.5	<0.20	11	8.7	2.5	<5	<5	<5
	18/01/2023	4.38	63	32	390	0.09	<0.05	7.5	<0.025	2	11	31	<5	<5	<5
	20/02/2023	4.10	87	60	30	0.02	<0.05	9.1	0.42	4.9	5.8	5.7	1.4	1.9	1.1
	28/03/2023	4.50	160	94	18	0.02	0.02	21	<0.02	4.4	12	66	2	2	0.6
	18/04/2023	4.90	150	58	7.4	<0.01	0.11	11	<0.02	<0.20	9.8	120	1.9	0.8	<0.5
	18/05/2023	4.90	78	56	130	0.03	<0.01	11	<0.02	0.89	9.3	9.3	1.4	0.9	<0.5
	15/06/2023	4.60	77	50	30	0.28	0.25	11	<0.02	<0.20	9.2	62	<5	<5	<5
	24/07/2023	5.10	140	100	90	0.12	<0.1	10	<0.2	0.7	8.5	14	1.9	1.4	0.9
MW7 Baseline		**4.65 - 5.62**	**147**	**100**	**3140**	**0.71**	**0.471**	**172**	**0.048**	**4.15**	**31**	**7.3**	**3.4**	**2.2**	**3.1**
ANZG (2018): SE Aust 95% Undisturbed Lowland River		**6.50 – 8.00**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ATTACHMENT 3

Surface Water Quality Analytical Results

Site	Date	pH	TDS (mg/L)	TSS (mg/L)	DO (mg/L)	EC (µδ/cm)	TP (mg/L)	NH_3 (mg/L)	Cl (mg/L)	Nitrite (mg/L)	TN (mg/L)	Na (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	Al (total) (mg/L)	As (mg/L)	Cd (mg/L)	Ca (mg/L)	Cr (mg/L)	Cu (mg/L)
SW01	29/09/2022	6.90	180	11	3.1	140	0.47	<0.01	14	<0.02	5.2	30	3.4	450	1.5	0.003	<0.0002	22	0.002	0.32
	20/10/2022	6.60	320	30	4.7	400	0.03	0.03	22	<0.02	<0.02	31	33	43	0.66	2	<0.0002	24	0.002	0.16
	14/11/2022	6.00	780	4900	0.2	920	3.1	6.9	25	<0.02	14	200	3.7	67	130	1.3	<0.02	280	<0.10	1
	14/12/2022	4.50	800	210	3.6	1100	0.15	0.05	24	<0.10	23.27	54	560	88	22	0.0016	<0.002	180	0.014	0.2
	18/01/2023	6.30	380	120	4.7	25	0.047	0.087	24	<0.02	5.2	40	180	25	0.7	<0.010	<0.002	<2	<0.010	<0.01
	20/02/2023	3.40	1100	32	3.8	1300	0.42	0.37	28	<0.02	8.9	57	350	<5	37	0.027	0.0004	170	0.019	0.07
	28/03/2023	3.00	2000	100	7.7	3000	<0.01	2.1	29	<0.02	1.29	47	880	<5	150	0.002	0.0008	290	0.002	0.003
	18/04/2023	7.70	130	33	8.6	320	0.06	0.01	24	<0.02	8.4	16	14	8.8	0.53	0.002	<0.0002	13	0.005	0.005
	18/05/2023	7.40	130	6	4.4	250	0.21	0.14	11	<0.02	0.9	14	10	<5	0.16	0.002	<0.0002	23	<0.001	0.002
	15/06/2023	3.20	1900	6.8	7.6	2700	0.03	1.6	59	<0.02	2.1	61	1500	<5	120	0.002	0.0003	350	<0.001	0.004
	24/07/2023	7.90	84	<5	8.4	140	0.11	<0.01	6.4	<0.02	0.3	13	4.0	<0.005	0.08	0.003	<0.0002	13	<0.001	0.003
SW01 Baseline		**6.20 – 7.00**	**291**	**73**	-	**428**	**3.52**	**0.164**	**118**	**0.039**	**3.52**	**51**	**9**	**768**	**0.496**	**0.003**	**0.001**	**22**	**0.002**	**0.041**
SW02	29/09/2022	6.90	170	8.8	8	160	0.04	0.03	29	<0.02	1.3	27	2.8	22	0.42	0.003	<0.0002	19	0.002	0.004
	20/10/2022	6.50	120	6.2	8.7	140	0.02	0.01	17	<0.02	<0.20	16	2.9	<5	0.22	0.001	<0.0002	12	0.001	0.003
	14/11/2022	6.40	150	210	0.1	190	0.18	<0.01	54	<0.02	13	62	18	24	1.8	0.037	<0.002	47	<0.001	0.015
	14/12/2022	6.30	110	870	0.1	200	0.27	0.05	26	<0.10	2.7	25	29	14	13	0.066	<0.002	38	0.034	0.094
	18/01/2023	6.60	220	190	0.1	61	0.79	0.049	31	<0.20	21	27	6.2	61	3.3	0.023	<0.002	<2	<0.01	0.015
	20/02/2023	6.50	240	29	4.4	1300	0.023	0.31	26	<0.10	1.9	29	24	<5	12	0.033	0.0002	38	0.009	0.09
	28/03/2023	4.80	310	370	5.7	370	1.5	0.19	22	<0.02	<0.20	17	92	<10	3.4	0.002	0.0003	43	0.002	0.003
	18/04/2023	6.20	300	60	7.3	410	0.05	0.16	32	<0.02	1.38	25	120	<5	0.86	<0.001	<0.0002	20	0.002	0.002
	18/05/2023	6.50	130	39	6	270	0.06	0.09	25	<0.02	<0.2	18	29	<5	0.72	0.002	<0.0002	17	0.002	0.006
	15/06/2023	6.40	190	25	8.9	280	0.37	0.23	34	<0.02	1.2	25	38	<5	1.7	0.001	<0.0002	22	0.001	0.004
	24/07/2023	7.50	130	14	9.4	190	0.04	0.14	17	<0.02	<0.2	18	31	<0.005	1.9	0.002	<0.0002	16	0.001	0.003
SW02 Baseline		**6.30 – 7.00**	**199**	**495**	-	**292**	**1.88**	**0.261**	**161**	**0.06**	**8.55**	**32**	**10**	**182**	**3.821**	**0.045**	**0.001**	**17**	**0.007**	**0.012**
SW03	29/09/2022	6.80	120	<5	9.3	100	0.02	<0.01	24	<0.02	1.1	23	2.4	<5	0.42	0.002	<0.0002	13	0.002	0.003
	20/10/2022	5.90	650	26	7.5	870	0.03	<0.01	270	<0.02	<0.20	12	13	<5	0.49	0.002	<0.0002	7.6	0.002	0.003
	14/11/2022	6.50	140	260	2.6	160	0.13	<0.05	27	<0.01	7.4	36	9	<5	1.1	<0.001	<0.002	18	<0.001	0.004
	14/12/2022	6.50	110	11	4.4	160	0.01	0.05	23	<0.01	3.9	18	11	<5	0.63	<0.001	<0.002	13	<0.01	<0.010
	18/01/2023	6.50	160	8.5	5.1	<5	0.02	<0.010	31	<0.02	1.3	26	17	<5	0.5	0.01	<0.002	<2	<0.010	<0.01
	20/02/2023	3.40	0.54	13	6	720	0.01	<0.010	22	<0.02	5.1	28	100	<5	17	0.001	<0.0002	63	0.002	0.02
	28/03/2023	3.30	400	7.4	9.9	750	0.02	0.07	14	<0.02	<0.20	16	110	<5	15	<0.001	<0.0002	63	0.001	0.001
	18/04/2023	4.20	280	<5	7.4	450	<0.01	0.04	29	<0.02	<0.2	22	140	<5	3.8	<0.001	<0.0002	30	0.001	0.001
	18/05/2023	4.30	310	37	5.5	580	0.02	0.32	22	<0.02	12.33	21	230	<5	5.8	<0.001	<0.0002	48	<0.001	0.002
	15/06/2023	3.30	580	17	8.9	870	0.04	0.68	32	<0.02	1.4	31	300	<5	11	<0.001	<0.0002	74	<0.001	0.002
	24/07/2023	3.90	290	36	9.0	510	0.03	0.40	17	<0.02	1	20	250	<0.005	7.1	<0.001	<0.0002	39	<0.001	0.002
SW03 Baseline		**6.10 - 6.70**	**191**	**1005**	-	**281**	**2.14**	**0.155**	**111**	**0.041**	**4.31**	**30**	**6**	**86**	**7.949**	**0.058**	**0.001**	**21**	**0.008**	**0.028**
SW04	29/09/2022	4.50	68	<5	4.8	52	0.01	0.18	20	<0.02	5.1	17	<2	<5	1.3	0.001	<0.0002	1.6	0.005	0.001
	20/10/2022	4.20	90	<5	7.5	110	0.01	<0.10	20	<0.02	0.3	16	<2	<5	1.1	<0.001	<0.0002	1.3	0.004	0.001
	14/11/2022	No surface water located at monitoring site – no sample collected																		
	14/12/2022	3.20	190	<5	2	280	0.01	0.05	42	<0.10	3.2	20	<2	<5	1.2	<0.001	<0.002	<5	<0.001	<0.01
	18/01/2023	No surface water located at monitoring site – no sample collected																		
	20/02/2023	4.10	0.2	<5	5.9	160	0.02	0.09	22	<0.10	7.4	23	15	<5	1.6	0.002	<0.0002	2.7	0.005	0.05
	28/03/2023	4.20	68	<5	8	130	<0.01	<0.01	17	<0.10	<0.25	14	25	<5	1.1	<0.01	<0.002	<5	0.002	<0.01
	18/04/2023	4.60	130	16	9.1	190	0.01	0.03	32	<0.02	0.5	21	8.7	<5	0.85	<0.001	<0.0002	1.8	<0.01	<0.001
	18/05/2023	3.60	1200	42	8	1800	0.03	1.2	26	<0.02	1.15	53	1000	<5	41	<0.001	0.0005	200	<0.001	0.003
	15/06/2023	4.20	140	160	7.7	200	1.5	0.44	44	<0.02	12	24	<2	8	3.1	0.002	<0.0002	2.2	0.007	0.007
	24/07/2023	3.60	1,600	21	9.0	2,400	0.02	1.5	180	<0.02	3.4	78	5,700	<0.005	50	<0.001	0.0002	330	<0.001	0.003
SW04 Baseline		**4.20 – 4.50**	**112**	**293**	-	**165**	**0.5**	**0.693**	**90**	**0.052**	**4.47**	**20**	**3**	**86**	**1.402**	**0.002**	**0.001**	**3.2**	**0.007**	**0.002**
SW05	29/09/2022	5.90	480	5.2	7.7	510	0.12	0.17	220	<0.20	3	140	11	<5	0.83	<0.001	<0.0002	9.4	0.002	<0.001
	20/10/2022	6.20	650	7.2	8.9	690	0.06	0.24	180	<0.20	0.5	160	8.6	<5	0.66	<0.001	<0.0002	11	0.001	<0.001
	14/11/2022	6.20	820	13	4.7	1000	0.06	<0.05	310	<0.10	8.1	260	100	<5	0.75	<0.001	<0.002	18	<0.001	0.002
	14/12/2022	6.20	830	16	7.5	1100	0.05	0.05	330	<0.10	3.1	240	40	<5	0.93	<0.001	<0.002	16	<0.01	<0.01
	18/01/2023	6.30	2800	33	7	<5	0.09	0.09	1300	<0.02	3.38	820	160	<5	0.73	<0.01	<0.002	<2	<0.01	<0.01
	20/02/2023	6.70	18	18	5.4	2300	0.1	0.07	2000	<0.10	3.4	4700	890	<5	0.22	0.002	<0.0002	190	0.001	0.01
	28/03/2023	5.60	470	<5	9.4	760	0.02	0.08	200	<0.10	<0.02	110	23	6.7	0.77	<0.01	<0.002	9.4	<0.01	<0.01
	18/04/2023	6.40	4000	16	8.5	5300	0.1	0.12	2000	<0.02	80	1100	230	<5	1	<0.001	<0.0002	42	0.001	<0.001
	18/05/2023	5.80	260	17	5.7	460	0.08	<0.01	110	<0.02	<0.2	64	25	<5	0.6	<0.001	<0.0002	5.2	<0.001	<0.001
	15/06/2023	6.20	1100	<5	8.8	1400	0.58	0.14	450	<0.02	1.1	250	40	<5	0.32	<0.001	<0.0002	14	0.001	2
	24/07/2023	6.50	1,600	<5	9.3	2,800	0.05	0.17	1,500	<0.5	1.1	440	1,200	<0.005	0.33	<0.001	<0.0002	22	<0.001	<0.001
SW05 Baseline		**5.10 – 7.20**	**4710**	**136**	-	**6927**	**0.21**	**0.592**	**980**	**0.052**	**2.227**	**1667**	**115**	**63**	**2.073**	**0.002**	**0.001**	**57**	**0.002**	**0.003**
SW06	29/09/2022	6.00	480	<5	7.8	580	0.13	0.16	220	<0.02	8.6	140	11	5.1	0.78	<0.001	<0.0002	9.4	0.002	<0.001
	20/10/2022	6.30	580	16	8.7	730	0.05	0.19	330	<0.02	0.5	110	7.5	6.2	0.54	<0.001	<0.0002	9.1	0.001	<0.001
	14/11/2022	6.20	840	13	<5	1000	0.04	0.36	310	<0.10	1.1	270	100	<5	0.68	<0.001	<0.002	18	<0.001	0.012
	14/12/2022	6.30	840	16	8.3	1200	0.1	0.05	340	<0.10	5.8	240	44	<5	0.75	<0.001	<0.002	16	<0.01	<0.01
	18/01/2023	6.40	3700	31.47	6.8	5400	0.07	0.04	1800	<0.02	2.5	1000	200	<5	0.63	<0.010	<0.001	<2	<0.01	<0.01
	20/02/2023	6.80	19	89	5.1	14000	0.09	0.11	22	<0.10	4.1	4000	1200	<5	0.34	0.002	<0.0002	170	0.001	0.01
	28/03/2023	5.60	400	6.2	8.3	730	0.03	0.07	180	<0.20	<0.20	110	18	9.7	1.1	<0.01	<0.002	11	<0.01	<0.01
	18/04/2023	6.70	6400	18	7.4	6700	0.07	1.2	3200	<0.02	1.26	1700	360	<10	0.54	<0.001	<0.0002	68	0.001	<0.001
	18/05/2023	5.90	280	17	6.3	470	0.08	0.06	120	<0.02	0.4	370	21	<5	0.44	0.003	<0.0002	14	<0.001	<0.001
	15/06/2023	6.40	1100	<5	7.4	1400	0.55	0.18	440	<0.02	0.7	250	38	<5	0.36	<0.001	<0.0002	15	<0.001	2.1
	24/07/2023	6.70	2,100	5.8	6.6	3,500	0.07	0.23	1,800	<0.2	0.6	540	620	<0.005	0.36	<0.001	<0.0002	26	<0.001	<0.001
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	**-**	**<50**	**-**	**<2200**	**<0.05**	**-**	**-**	**-**	**<0.50**	**-**	**-**	**5**	**0.05**	**0.013**	**0.0002**	**-**	**0.0033**	**0.0018**

Site	Date	Fe (total)	Pb	Mg	Hg	Ni	K	Zn	Total Recoverable Hydrocarbons (TRH) / Total Petroleum Hydrocarbons (TPH) (µg/L)									BTEXN (µg/L)
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	C10 – C16	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C36 Sum	Naphthalene
SW01	29/09/2022	2.7	0.005	14	<0.0001	0.015	3	0.071	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	2.4	0.003	9.1	<0.0001	0.009	2.9	0.042	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	14/11/2022	130	0.1	73	<0.001	0.3	<50	4.7	220	220	<100	<100	<20	250	<100	<100	250	<100
	14/12/2022	1.6	0.015	43	<0.001	0.077	6.8	0.68	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/01/2023	3.2	<0.01	13	<0.01	<0.01	<5	<0.05	<50	<50	20	-	<20	<50	100	100	-	<100
	20/02/2023	0.049	0.049	57	0.002	0.16	6.3	0.35	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	36	0.003	38	0.0001	0.46	5.1	0.97	<50	<50	<100	<100	<20	<50	<100	<100	<20	<100
	18/04/2023	0.002	0.002	2.7	<0.0001	0.002	0.8	0.15	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	0.24	<0.001	7.5	<0.0001	0.002	2.3	0.02	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	15	0.003	42	<0.0001	0.24	8.1	0.35	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	0.38	0.002	4.1	<0.0001	0.002	0.8	0.037	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
SW01 Baseline		**1.223**	**0.001**	**16**	**0.0005**	**0.006**	**6**	**0.058**	**60**	**-**	**24**	**100**	**-**	**50**	**130**	**90**	**170**	**-**
SW02	29/09/2022	1.5	0.001	5.8	<0.0001	0.002	1.9	0.057	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	0.62	<0.001	3.4	<0.0001	0.001	1.7	0.032	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	14/11/2022	53	<0.01	11	<0.001	<0.01	<5	0.096	<50	<50	90	<100	<20	<50	60	30	90	<100
	14/12/2022	9.7	0.071	5.9	<0.001	0.013	5.1	1	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/01/2023	45	0.014	5.8	<0.001	<0.010	<5	0.15	180	180	30	-	<20	170	30	100	-	<100
	20/02/2023	0.013	0.013	11	<0.001	0.018	4.1	0.28	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	2.5	0.001	8.4	<0.0001	0.024	4.1	0.63	<50	<50	<50	<100	-	<50	<100	<100	<100	<100
	18/04/2023	<0.001	<0.001	4	<0.0001	0.006	2.7	0.089	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	1	0.002	4.3	<0.0001	0.003	2.4	0.081	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	2.1	0.001	5.5	<0.0001	0.005	1.9	0.037	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	1.5	0.001	4.9	<0.0001	0.005	2.4	0.049	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
SW02 Baseline		**71.893**	**0.02**	**5**	**0.0005**	**0.005**	**6**	**0.09**	**60**	**-**	**22**	**100**	**-**	**50**	**100**	**50**	**140**	**-**
SW03	29/09/2022	0.8	<0.001	4.4	<0.0001	0.002	1	0.034	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	0.86	0.002	2.3	<0.0001	0.001	1	0.03	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	1.9	<0.010	5.7	<0.001	<0.01	<5	0.24	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/12/2022	1.3	<0.010	<5	<0.001	<0.01	<5	0.53	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	0.5	<0.01	6.2	<0.001	<0.01	<5	<0.05	<50	<50	<50	<100	<20	<50	<100	100	-	<100
	20/02/2023	0.001	0.001	14	<0.001	0.065	3	0.12	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	4.5	<0.001	11	<0.0001	0.065	2.3	0.15	<50	<50	<50	<100	-	<50	<100	<100	<100	<100
	18/04/2023	<0.001	<0.001	5	<0.0001	0.023	2.1	0.048	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	14	<0.001	10	<0.0001	0.033	2.8	0.16	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	12	<0.001	15	<0.0001	0.058	2.7	0.15	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	8.9	0.001	9.7	<0.0001	0.030	2.5	0.10	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
SW03 Baseline		**85.52**	**0.028**	**5**	**0.0005**	**0.006**	**4**	**0.26**	**60**	**-**	**200**	**100**	**-**	**50**	**100**	**60**	**120**	**-**
SW04	29/09/2022	2.7	0.001	2.6	<0.0001	0.002	1	0.027	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	2.4	0.001	2.3	<0.0001	0.002	1	0.024	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	No surface water located at monitoring site – no sample collected																
	14/12/2022	3.2	<0.01	<5	<0.001	<0.01	<5	0.084	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	No surface water located at monitoring site – no sample collected																
	20/02/2023	0.002	0.002	3.9	<0.001	0.003	1.6	0.039	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	28/03/2023	2.7	<0.01	<5	<0.0001	0.01	<5	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/04/2023	<0.001	<0.001	2.7	<0.0001	0.001	0.8	0.034	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/05/2023	16	0.003	31	<0.0001	0.11	5.7	0.4	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	15/06/2023	6.3	0.005	4.5	<0.0001	0.003	1.4	0.075	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	24/07/2023	3.9	0.002	51	<0.0001	0.13	9.0	0.18	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
SW04 Baseline		**2.827**	**0.002**	**2.3**	**0.0005**	**0.005**	**2.9**	**0.028**	**0.06**	**-**	**200**	**100**	**-**	**50**	**100**	**60**	**100**	**-**
SW05	29/09/2022	4.6	<0.001	17	<0.0001	0.002	7.7	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	3.5	0.001	19	<0.0001	0.002	7.9	0.007	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	14/11/2022	5.4	<0.01	27	<0.001	<0.001	11	0.12	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	14/12/2022	6.1	<0.01	21	<0.001	<0.01	13	<0.05	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/01/2023	6.2	<0.01	96	<0.001	<0.01	41	<0.05	70	70	-	-	<20	60	100	-	-	<100
	20/02/2023	<0.001	<0.001	550	<0.001	0.001	170	0.008	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	28/03/2023	3.8	<0.01	14	<0.001	<0.01	6.4	<0.05	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/04/2023	<0.001	<0.001	110	<0.0001	0.003	37	0.008	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	18/05/2023	2.4	<0.001	9.1	<0.0001	0.002	4.9	0.009	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	15/06/2023	2	<0.001	27	<0.0001	0.001	14	0.01	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
	24/07/2023	1.9	<0.001	52	<0.0001	0.002	25	0.006	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
SW05 Baseline		**12.306**	0.001	**130**	**0.0005**	**0.011**	**58**	**0.026**	**0.06**	**-**	**200**	**100**	**-**	**50**	**100**	**60**	**100**	**-**
SW06	29/09/2022	4.5	<0.001	18	<0.0001	0.002	7.7	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	20/10/2022	2.7	0.001	13	<0.0001	0.002	5.8	0.012	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/11/2022	5.3	<0.01	29	<0.001	<0.01	12	0.11	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	14/12/2022	5.4	<0.01	21	<0.001	<0.01	13	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/01/2023	0.01	<0.01	120	<0.001	<0.01	47	<0.05	<50	<50	-	-	<20	<50	<100	<100	-	<100
	20/02/2023	<0.001	<0.001	480	<0.001	0.002	160	0.008	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	28/03/2023	3.8	<0.01	14	<0.001	<0.01	6.3	<0.05	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/04/2023	<0.001	<0.001	200	<0.0001	0.002	63	0.009	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	18/05/2023	0.13	<0.001	4.8	<0.0001	0.008	3.3	<0.005	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	15/06/2023	2.1	<0.001	28	28	0.001	14	<0.005	<50	<50	<50	<100	<20	<50	<100	<100	<20	<100
	24/07/2023	1.9	0.001	65	<0.0001	0.002	29	0.007	<50	<50	<100	<100	<20	<50	<100	<100	<100	<100
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**0.3**	**0.0034**	**-**	**0.0006**	**0.011**	**-**	**0.008**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ATTACHMENT 4

Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	24/07/2023

Description

Monitoring location SW01.

Photo No.	Date
2	24/07/2023

Description

Monitoring location SW02.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	24/07/2023

Description

Northern main drain rain re-alignment works commencing adjacent to monitoring location SW03. No site related works had occurred within the waterway at the time of monitoring.

Photo No.	Date
4	24/07/2023

Description

Surface water monitoring location SW03.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	24/07/2023

Description

Surface water monitoring location SW04.

Photo No.	Date
6	24/07/2023

Description

Surface water monitoring location SW05

MONTHLY WATER QUALITY MONITORING REPORT

Harvest Estate Urban Development

Monitoring Period: 18th May to 15th June 2023

Ewingsdale Road, Byron Bay, NSW, 2481

Job Number: 217140

For:

Planit Consulting

By:

ENV Services

Date:

29/06/2023

ENV Services Pty Ltd

313 River Street, Ballina NSW 2478

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DOCUMENT CONTROL

Job No:	Job Number: 217140
Client:	Planit Consulting
Filename:	217140_Harvest Estate_WQ_June 2023

	Name:	**Date:**	**Signature:**
Prepared By:	Jemma Attkins	28/06/2023	
Reviewed By:	Kingsley Baldwin	29/06/2023	
Approved By:	Kingsley Baldwin	29/06/2023	

Revision:	**Date:**	**Details:**

SCOPE OF ENGAGEMENT AND LIMITATIONS

This report has been prepared by ENV Services at the request of Planit Consulting for the purpose of consolidating and assessing water quality monitoring (surface water and ground water) data to determine impact associated with the development of the Harvest Estate. No other parties may rely on the contents of this report for any purposes except those stated.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

No part of this report may be reproduced, stored, or transmitted in any form without the prior consent of ENV.

ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

1 INTRODUCTION

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Establishment of internal roads and structures with progressive construction of Stage 1 of the development.
- Fencing works along the perimeter of the site are continuing.
- Stabilization of the site is progressively being carried out.
- Progressive installation of stormwater drainage features is being carried out.

2 MONITORING RESULTS & OBSERVATIONS

2.1 Fortnightly Acid Frog Habitat Groundwater Quality Monitoring

Fortnightly water quality monitoring for a period of 6 months from the commencement of Standing Water Level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP). This monitoring requirement is required for the first 6 months from the commencement of construction activities.

Monitoring for this component of the monitoring programme was completed in April 2023.

2.2 Monthly Groundwater Monitoring

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2 – MW5 & MW7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. An assessment of the monthly analytical results presented in Attachment 2, Table 1, identified the following observations:

Site	Observation	Comments
MW2	pH, EC, TDS, NH_3 and SO_4 and several cations (Ca, Mg, K & Na) outside of baseline ranges	Low pH values along with elevated analytes recorded at this site indicate the presence of exposed acid sulfate soils proximal to the monitoring well. The presence of ASS indicators at this monitoring site have not been observed during previous monitoring events. Considering the site is located approximately 200m from any excavations into the watertable, it maybe likely that the source originates from the adjacent stockpile site. Further investigations are required to identify whether this is a contributing factor to acid generation onsite.
MW3	Water quality within historic ranges with the exception of NH_3 and S as SO_4	No site related impacts identified. Elevated Ammonia and Sulfate concentrations attributed to the presence of naturally occurring acid sulfate soils/acidic aquifer.
MW4	Water quality within historic ranges with the exception of pH and TP.	No site related impacts identified. Low pH and total phosphorus observed in underlying aquifer. Likely to be attributed to organic sources (humic acid).
MW5	pH, EC, TDS, S as SO_4 and several cations (NH_3, Ca, Mg, K & Na) concentrations outside baseline ranges.	Low pH values along with elevated analytes (EC, TDS & S as SO4) recorded at this site indicate the presence of exposed acid sulfate soils proximal to the monitoring well. Elevated cation concentrations are likely attributed to carbonate dissolution due to low pH concentrations at the monitoring site.
MW7	Water quality within historic ranges with the exception for pH and S as SO_4.	No site related impacts identified. Low pH and elevated sulfate concentrations attributed to the presence of humic acid (pH >4.5) contributing to the naturally acidic aquifer.

2.3 Monthly Surface Water Monitoring

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 1. Select photos of the surface water sampling programme are presented in Attachment 4.

Table 1: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

2.3.1 Physiochemical Parameters, Nutrients and Cation/Anions

Monthly surface water sampling of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Surface water monitoring locations are presented in Attachment 1. An assessment of the monthly analytical results presented in Attachment 3, identified the following observations:

Site	Observation	Comments
SW01	pH, EC, TDS, S as SO_4 and several other cations (Fe, Al, Hg, Mg, K & Ca) outside baseline ranges	This site is located at an upstream location receiving water from off-site. As such elevated values recorded are likely derived from exposed ASS within the broader catchment as the monitoring location is a receptor of off-site water flow. Water quality has deteriorated since the previous round of monitoring conducted on 28th May.
SW02	Ca, Hg, Mg and S as SO_4 outside baseline ranges	Elevated cations/anions and elevated SO_4 at this location are likely attributed to extraneous sources as the location is a receptor of off-site water flow.
SW03	pH, EC, TDS, S as SO_4 and cation concentrations Ca & Mg outside baseline ranges	This site is located downstream but proximal to the site within the Northern Main Drain. Water quality has deteriorated since the previous monitoring round. Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges. Due to the proximity of this site to MW2 it is likely that sources in derived from the adjacent stockpile site

SW04	EC, TDS, S as SO_4 and several cations' concentrations (Mg, TP, TN) outside baseline ranges	Water quality at this location has improved in comparison to the previous round, however several parameters is outside the baseline ranges. Further mitigation measures (application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.
SW05	Parameters within baseline ranges with the exception of TP.	TP concentrations likely residual from the upstream location (SW04), however concentration at this location is noted to be decreasing.
SW06	pH, TN, & TP, were outside ANZG guidelines.	The analytes listed outside of ANZG are likely resultant from natural sources within the estuarine environment. Total phosphorus values are similar to values reported at SW05. Total nitrogen values are in-line with baseline ranges recorded within the Union Drain (SW05).

2.3.2 Metals

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

Site	Observation	Comments
SW01	Metals concentrations within baseline values with the exception of Ni, Pb, Zn, Fe, & Al.	Analytes outside of baseline values are likely attributed to extraneous sources given the sites location. No site related impacts identified.
SW02	Metals concentrations within baseline values	No site related impacts identified.
SW03	Metals concentrations (Ni & Al) outside baseline values	Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.
SW04	Metals concentrations (Cu, Pb, Zn, Fe, & Al) outside baseline ranges	Elevated metals concentrations at this site are a result of metal mobilisation through exposure from acidic processes (i.e acid sulfate soil exposure). Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.

SW05	Metal concentrations Cu outside baseline ranges.	Cu & Hg concentrations are noted to be increasing from upstream location SW03. No site related impacts identified.
SW06	Water quality outside ANZG ranges for Al	Aluminium concentrations are slightly outside ANZG guidelines however values are within baseline values observed in the Union Drain at SW05 located downstream of this monitoring site. No site related impacts identified.

2.3.3 Hydrocarbons

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, Table 3, hydrocarbon parameters of all surface water sampling locations were within historic baseline values.

3 RAINFALL

During this monitoring period (18/05/2023 – 15/05/2023), 1 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

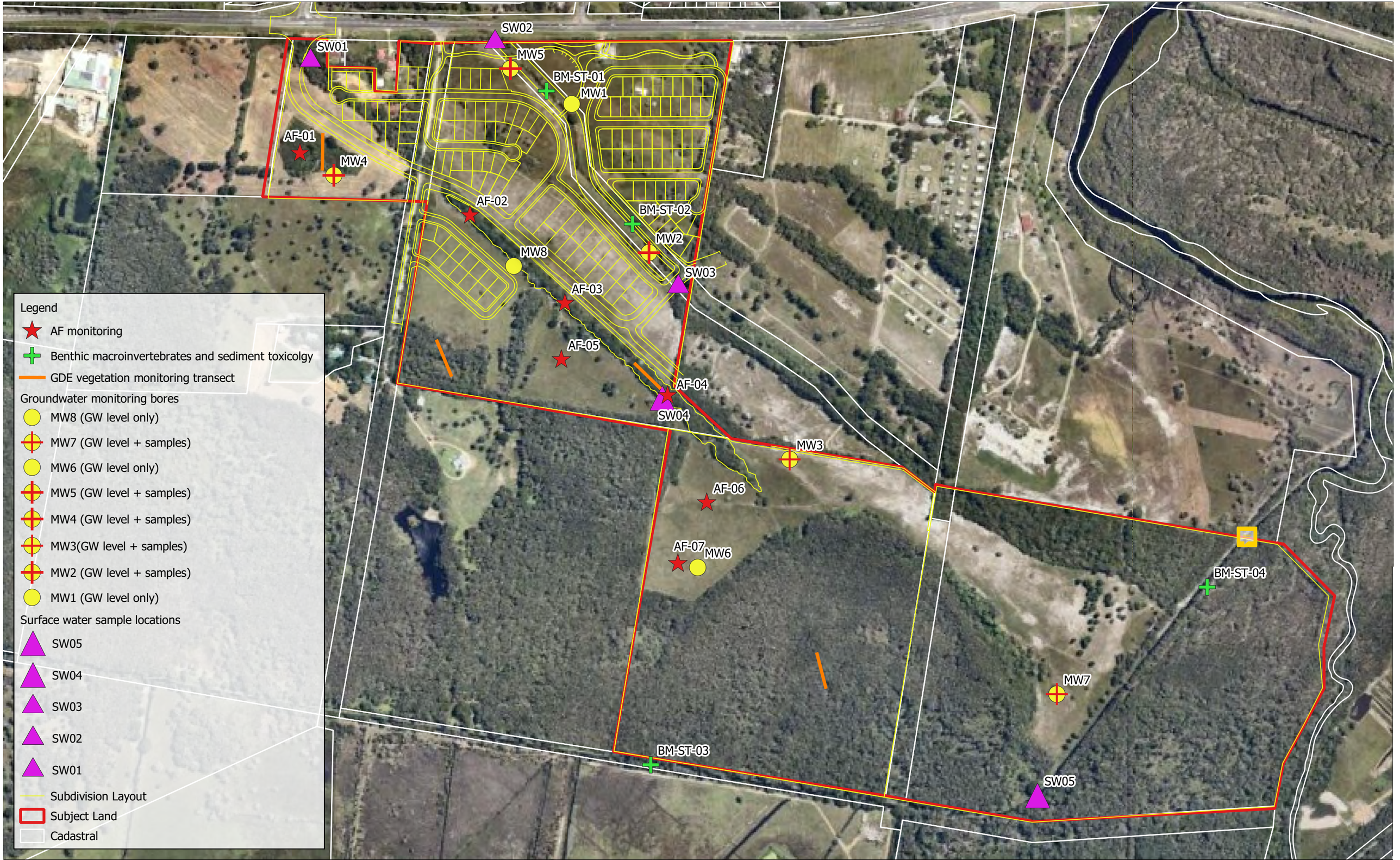
4 CONCLUSION

The results of this monitoring round continue to indicate impacts to surface water and groundwater from the exposure of acid sulfate soil within the site and the broader Belongil Creek catchment. Mitigation measures adopted onsite are buffering the generation of acid and mobilisation of metals into the receiving environment (SW05 and SW06) however further applications of lime bags at all longitudinal drains, stormwater outlets and at regular intervals within the Northern Main Drain and Southern Swale Drain are required. A detailed water quality (physiochemical) assessment of the localised catchment onsite is to be completed in July to attempt to pinpoint specific sources of acid generation.

Water quality within the aquifer underlying the site is naturally acidic, however water quality at MW5 and MW2 indicates impacts from exposure of acid sulfate soils. Further investigation into the deterioration of water quality at monitoring well (MW2) is required. This investigation should assess the stockpile site located adjacent to the well to determine whether stockpiled material has been adequately neutralised.

ATTACHMENT 1

Figures



AWC

Source:	Aerial - Nearmaps 2019 Cadastral - NSW Land & Property Information 2019 Subject Land - AWC 2020 AF monitoring - AWC 2020 Benthic MI and Sediment Toxicology - AWC 2020 Groundwater monitoring bores - AWC 2020 Surface water sample locations - AWC 2020
Disclaimer:	Care was taken in the creation of this map. AWC should be consulted as to the suitability of the information shown here in prior to the commencement of any works based on the information provided. AWC cannot accept any responsibility for errors, omissions or positional accuracy. There are no warranties expressed or implied as to the suitability of this map for a particular purpose. However, notification of any errors will be appreciated.
Date	29.05.2020

0 100 200 300 400 m

A3 Scale 1:5,000
Coordinate System: MGA 56 Projection: Transverse Mercator

Figure 3-1:

Locations of monitoring locations (groundwater bores, surface water sites and GDE vegetation transects)

ATTACHMENT 2

Groundwater Quality Analytical Results

Table 1 Groundwater Quality Analytical Results

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	TN mg/L	Nitrite mg/L	NH_3 mg/L	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Cl mg/L	SO_4 (as S) mg/L
MW2	29/09/2022	5.80	54	92	<5	0.12	0.50	0.02	0.51	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.60	100	110	<5	0.09	2.00	0.02	0.24	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.00	100	240	<5	0.07	<0.2	<0.10	0.24	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.60	110	170	<5	0.02	3.10	<0.10	<0.05	<5	<5	<5	29	15	5.0
	18/01/2023	4.60	130	76	9.2	0.12	2.50	<0.05	0.09	<5	<5	<5	29	17	7.0
	20/02/2023	6.00	100	160	5.3	0.09	0.25	<0.25	0.10	<0.5	0.7	3.1	27	27	3.7
	28/03/2023	5.90	140	92	17.0	0.02	<0.2	<0.02	0.12	<5	<5	<5	21	15	7.2
	18/04/2023	6.20	170	88	<5	0.08	7.70	<0.02	1.20	<5	<5	<5	18	15	5.2
	18/05/2023	5.90	130	76	10	0.09	9.00	<0.02	0.10	0.6	0.9	2.6	28	13	2.1
	25/06/2023	3.30	4500	3000	250	0.26	8.1	<0.02	1.60	440	82	7.9	86	45	3800
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0.45**	**2.03**	**0.07**	**0.338**	**0.7**	**1.4**	**4.2**	**29.7**	**189**	**9.8**
MW3	29/09/2022	4.20	53	40	370	0.09	0.50	0.02	0.05	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.10	64	62	130	0.01	0.50	0.02	0.20	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.60	57	84	170	0.03	<0.2	<0.02	0.27	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.30	43	32	280	<0.01	1.10	<0.02	<0.01	<5	<5	<5	6.0	5.2	<2
	18/01/2023	4.25	54	28	670	0.03	1.40	<0.05	<0.01	<5	<5	<5	<5	4.1	4.1
	20/02/2023	4.20	36	40	76	0.02	7.26	0.06	<0.10	<0.5	1	<0.5	7.6	6.8	<2
	28/03/2023	4.10	70	44	<5	<0.01	0.22	<0.02	<0.01	<0.5	1	0.6	4.8	7.9	2.2
	18/04/2023	4.60	89	54	110	0.02	5.70	<0.02	0.10	<0.5	0.6	<0.5	4.3	9.6	4.3
	18/05/2023	4.50	60	40	450	0.02	1.00	<0.02	0.04	0.6	0.8	<0.5	4.8	5.8	2.1
	15/06/2023	4.00	84	48	22	0.27	1.96	<0.02	0.40	<0.5	0.8	<0.5	5.0	5.5	63
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**4.14**	**0.167**	**0.294**	**3.8**	**5.3**	**3.1**	**26.4**	**121**	**13.4**
MW4	29/09/2022	4.50	100	88	350	0.03	1.50	0.10	0.16	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.50	110	100	69	0.02	1.00	0.04	0.78	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.20	130	340	16	0.01	7.00	<0.10	0.13	2.6	4.8	1.1	22	30	5
	14/12/2022	4.20	140	140	60	<0.01	3.00	<0.10	<0.05	<5	<5	<5	21	23	7.8
	18/01/2023	5.73	170	110	170	0.02	2.40	<0.50	0.16	<5	<5	<5	20	26	6.6
	20/02/2023	3.90	87	110	31	0.04	3.88	0.28	<0.05	3.5	5.4	0.9	15	15	5.8
	28/03/2023	4.70	180	120	190	0.04	22.00	<0.02	0.08	8.8	5.1	<5	18	28	6.0
	18/04/2023	3.70	500	280	340	0.11	0.90	<0.02	0.07	3.4	5.0	<0.5	19	27	130
	18/05/2023	5.40	110	72	70	0.03	2.89	<0.02	<0.01	5.7	3.7	<0.5	11	14	10
	15/06/2023	3.80	200	150	130	1.4	0.90	<0.02	0.29	<5	6.0	<5	21	29	12
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**4.36**	**0.185**	**1.392**	**11.3**	**15.6**	**5.4**	**146.3**	**199**	**19.2**
MW5	29/09/2022	4.50	59	68	630	0.13	6.33	0.02	0.41	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.40	75	82	92	0.02	0.50	0.02	0.10	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.60	120	270	150	0.08	7.80	<0.10	0.52	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.50	150	150	230	0.02	11.0	<0.05	<0.060	<5	<5	<5	24	29	9.7
	18/01/2023	2.80	1600	1100	480	0.05	5.70	<0.05	1.70	90	72	<5	49	43	6.6
	20/02/2023	2.60	2700	3200	310	0.03	3.20	<0.05	4.20	390	76	7.8	47	27	750
	28/03/2023	3.00	5200	3700	130	0.02	11.0	<0.02	5.90	440	57	7.1	34	28	1100
	18/04/2023	2.90	3800	5100	300	0.01	4.00	<0.02	4.00	380	120	4.7	49	44	3800
	18/05/2023	3.40	3100	3400	150	<0.01	4.90	<0.02	<0.01	240	31	4.2	23	15	2200
	15/06/2023	2.90	3000	1800	640	0.30	2.66	<0.02	2.90	410	130	6.5	64	28	2100
MW5 Baseline		**4.31 - 5.53**	**191**	**130**	**3003**	**0.97**	**13.40**	**0.117**	**0. 863**	**6.0**	**8.4**	**5.4**	**27.2**	**82**	**8.3**

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	TN mg/L	Nitrite mg/L	NH_3 mg/L	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Cl mg/L	SO_4 (as S) mg/L
MW7	29/09/2022	4.60	26	40	190	0.10	2.50	0.020	0.30	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.50	86	70	120	0.01	2.90	0.040	0.40	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.50	44	170	<100	0.03	<2.00	<0.10	0.01	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.60	56	92	23	0.04	11.0	<0.20	<0.10	<5	<5	<5	8.7	7.5	2.5
	18/01/2023	4.38	63	32	390	0.09	2.00	<0.025	<0.05	<5	<5	<5	11.0	7.5	31.0
	20/02/2023	4.10	87	60	30	0.02	4.90	0.42	<0.05	1.4	1.9	1.1	5.8	9.1	5.7
	28/03/2023	4.50	160	94	18	0.02	4.40	<0.02	0.02	2.0	2.0	0.6	12.0	21.0	66.0
	18/04/2023	4.90	150	58	7.4	<0.01	<0.20	<0.02	0.11	1.9	0.8	<0.5	9.8	11	120
	18/05/2023	4.90	78	56	130	0.03	0.89	<0.02	<0.01	1.4	0.9	<0.5	9.3	11	9.3
	15/06/2023	4.60	77	50	30	0.28	<0.20	<0.02	0.25	<5	<5	<5	9.2	11	62
MW7 Baseline		**4.65 - 5.62**	**147**	**100**	**3140**	**0.71**	**4.15**	**0.048**	**0.471**	**3.4**	**2.2**	**3.1**	**31.0**	**172**	**7.3**
ANZG (2018): SE Aust 95% Undisturbed Lowland River		**6.50 – 8.00**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ATTACHMENT 3

Surface Water Quality Analytical Results

Table 1 Monthly Surface Water Quality Analytical Results (Physiochemical, Nutrients and Cation/Anions)

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW01	29/09/2022	6.90	140	180	11	0.47	5.2	<0.02	<0.01	22	14	3	30	14	3.4	450	3.1
	20/10/2022	6.60	400	320	30	0.03	<0.02	<0.02	0.03	24	9.1	2.9	31	22	33	43	4.7
	14/11/2022	6.00	920	780	4900	3.10	14.00	<0.02	6.90	280	73	<50	200	25	3.7	67	0.2
	14/12/2022	4.50	1100	800	210	0.150	23.27	<0.10	0.05	180	43	6.8	54	24	560	88	3.6
	18/01/2023	6.30	25	380	120	0.047	5.20	<0.02	0.087	<2	13	<5	40	24	180	25	4.7
	20/02/2023	3.40	1300	1100	32	0.42	8.90	<0.02	0.37	170	57	6.3	57	28	350	<5	3.8
	28/03/2023	3.00	3000	2000	100	<0.01	1.29	<0.02	2.10	290	38	5.1	47	29	880	<5	7.7
	18/04/2023	7.70	320	130	33	0.06	8.4	<0.02	0.01	13	2.7	0.8	16	24	14	8.8	8.6
	18/05/2023	7.40	250	130	6	0.21	0.9	<0.02	0.14	23	7.5	2.3	14	11	10	<5	4.4
	15/06/2023	3.20	2700	1900	6.8	0.03	2.10	<0.02	1.60	350	42	8.10	61	59	1500	<5	7.6
SW01 Baseline		**6.20 – 7.00**	**428**	**291**	**73**	**3.52**	**3.52**	**0.039**	**0.164**	**22**	**16**	**6**	**51**	**118**	**9**	**768**	**-**
SW02	29/09/2022	6.90	160	170	8.8	0.04	1.30	<0.02	0.03	19	5.8	1.9	27	29	2.8	22	8.0
	20/10/2022	6.50	140	120	6.2	0.02	<0.20	<0.02	0.01	12	3.4	1.7	16	17	2.9	<5	8.7
	14/11/2022	6.40	190	150	210	0.18	13.0	<0.02	<0.01	47	11	<5	62	54	18	24	0.1
	14/12/2022	6.30	200	110	870	0.27	2.70	<0.10	0.05	38	5.9	5.1	25	26	29	14	0.1
	18/01/2023	6.60	61	220	190	0.79	21.0	<0.20	0.049	<2	5.8	<5	27	31	6.2	61	0.1
	20/02/2023	6.50	1300	240	29	0.023	1.90	<0.10	0.31	38	11	4.1	29	26	24	<5	4.4
	28/03/2023	4.80	370	310	370	1.50	<0.20	<0.02	0.19	43	8.4	4.1	17	22	92	<10	5.7
	18/04/2023	6.20	410	300	60	0.05	1.38	<0.02	0.16	20	4.0	2.7	25	32	120	<5	7.3
	18/05/2023	6.50	270	130	39	0.06	<0.2	<0.02	0.09	17	4.3	2.4	18	25	29	<5	6.0
	15/06/2023	6.40	280	190	25	0.37	1.20	<0.02	0.23	22	5.50	1.90	25	34	38	<5	8.9
SW02 Baseline		**6.30 – 7.00**	**292**	**199**	**495**	**1.88**	**8.55**	**0.06**	**0.261**	**17**	**5**	**6**	**32**	**161**	**10**	**182**	**-**
SW03	29/09/2022	6.80	100	120	<5	0.02	1.10	<0.02	<0.01	13	4.4	1	23	24	2.4	<5	9.3
	20/10/2022	5.90	870	650	26	0.03	<0.20	<0.02	<0.01	7.6	2.3	1	12	270	13	<5	7.5
	14/11/2022	6.50	160	140	260	0.13	7.40	<0.01	<0.05	18	5.7	<5	36	27	9	<5	2.6
	14/12/2022	6.50	160	110	11	0.01	3.90	<0.01	0.05	13	<5	<5	18	23	11	<5	4.4
	18/01/2023	6.50	<5	160	8.5	0.02	1.30	<0.02	<0.010	<2	6.2	<5	26	31	17	<5	5.1
	20/02/2023	3.40	720	0.54	13	0.01	5.10	<0.02	<0.010	63	14	3	28	22	100	<5	6
	28/03/2023	3.30	750	400	7.4	0.02	<0.20	<0.02	0.07	63	11	2.3	16	14	110	<5	9.9
	18/04/2023	4.20	450	280	<5	<0.01	<0.2	<0.02	0.04	30	5.0	2.1	22	29	140	<5	7.4
	18/05/2023	4.30	580	310	37	0.02	12.33	<0.02	0.32	48	10	2.8	21	22	230	<5	5.5
	15/06/2023	3.30	870	580	17	0.04	1.40	<0.02	0.68	74	15	2.70	31	32	300	<5	8.9
SW03 Baseline		**6.10 - 6.70**	**281**	**191**	**1005**	**2.14**	**4.31**	**0.041**	**0.155**	**21**	**5**	**4**	**30**	**111**	**6**	**86**	**-**
SW04	29/09/2022	4.50	52	68	<5	0.01	5.10	<0.02	0.18	1.6	2.6	1	17	20	<2	<5	4.8
	20/10/2022	4.20	110	90	<5	0.01	0.30	<0.02	<0.10	1.3	2.3	1	16	20	<2	<5	7.5
	14/11/2022	No surface water located at monitoring site – no sample collected															
	14/12/2022	3.20	280	190	<5	0.01	3.2	<0.10	0.05	<5	<5	<5	20	42	<2	<5	2
	18/01/2023	No surface water located at monitoring site – no sample collected															
	20/02/2023	4.10	160	0.2	<5	0.02	7.40	<0.10	0.090	2.7	3.9	1.6	23	22	15	<5	5.9
	28/03/2023	4.20	130	68	<5	<0.01	<0.25	<0.10	<0.01	<5	<5	<5	14	17	25	<5	8.0
	18/04/2023	4.60	190	130	16	0.01	0.50	<0.02	0.03	1.8	2.7	0.8	21	32	8.7	<5	9.1
	18/05/2023	3.60	1800	1200	42	0.03	1.15	<0.02	1.2	200	31	5.7	53	26	1000	<5	8.0
	15/06/2023	4.20	200	140	160	1.50	12	<0.02	0.44	2.20	4.5	1.40	24	44	<2	8	7.7
SW04 Baseline		**4.20 – 4.50**	**165**	**112**	**293**	**0.50**	**4.47**	**0.052**	**0.693**	**3.2**	**2.3**	**2.9**	**20**	**90**	**3**	**86**	**-**
SW05	29/09/2022	5.90	510	480	5.2	0.12	3.00	<0.20	0.17	9.4	17	7.7	140	220	11	<5	7.7
	20/10/2022	6.20	690	650	7.2	0.06	0.50	<0.20	0.24	11	19	7.9	160	180	8.6	<5	8.9
	14/11/2022	6.20	1000	820	13	0.06	8.10	<0.10	<0.05	18	27	11	260	310	100	<5	4.7
	14/12/2022	6.20	1100	830	16	0.05	3.10	<0.10	0.05	16	21	13	240	330	40	<5	7.5
	18/01/2023	6.30	<5	2800	33	0.09	3.38	<0.02	0.09	<2	96	41	820	1300	160	<5	7
	20/02/2023	6.70	2300	18	18	0.10	3.40	<0.10	0.07	190	550	170	4700	2000	890	<5	5.4

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
	28/03/2023	5.60	760	470	<5	0.02	<0.02	<0.10	0.08	9.4	14	6.4	110	200	23	6.7	9.4
	18/04/2023	6.40	5300	4000	16	0.10	80	<0.02	0.12	42	110	37	1100	2000	230	<5	8.5
	18/05/2023	5.80	460	260	17	0.08	<0.2	<0.02	<0.01	5.2	9.1	4.9	64	110	25	<5	5.7
	15/06/2023	6.20	1400	1100	<5	0.58	1.10	<0.02	0.14	14	27	14	250	450	40	<5	8.80
SW05 Baseline		**5.10 – 7.20**	**6927**	**4710**	**136**	**0.21**	**2.227**	**0.052**	**0.592**	**57**	**130**	**58**	**1667**	**980**	**115**	**63**	**-**
SW06	29/09/2022	6.00	580	480	<5	0.13	8.60	<0.02	0.16	9.4	18	7.7	140	220	11	5.1	7.8
	20/10/2022	6.30	730	580	16	0.05	0.50	<0.02	0.19	9.1	13	5.8	110	330	7.5	6.2	8.7
	14/11/2022	6.20	1000	840	13	0.04	1.10	<0.10	0.36	18	29	12	270	310	100	<5	<5
	14/12/2022	6.30	1200	840	16	0.10	5.80	<0.10	0.05	16	21	13	240	340	44	<5	8.3
	18/01/2023	6.40	5400	3700	31.47	0.07	2.50	<0.02	0.04	<2	120	47	1000	1800	200	<5	6.8
	20/02/2023	6.80	14000	19	89.00	0.09	4.10	<0.10	0.11	170	480	160	4000	22	1200	<5	5.1
	28/03/2023	5.60	730	400	6.20	0.03	<0.20	<0.20	0.07	11	14	6.3	110	180	18	9.7	8.3
	18/04/2023	6.70	6700	6400	18	0.07	1.26	<0.02	1.2	68	200	63	1700	3200	360	<10	7.4
	18/05/2023	5.90	470	280	17	0.08	0.40	<0.02	0.06	14	4.8	3.3	370	120	21	<5	6.3
	15/06/2023	6.40	1400	1100	<5	0.55	0.70	<0.02	0.18	15	28	14	250	440	38	<5	7.40
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	**<2200**	-	**<50**	**<0.05**	**<0.50**	-	-	-	-	-	-	-	-	**5**	-

Table 2 Monthly Surface Water Quality Analytical Results (Metals)

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW01	29/09/2022	0.003	<0.0002	0.002	0.32	0.015	0.005	0.071	2.70	1.50	<0.0001
	20/10/2022	2	<0.0002	0.002	0.16	0.009	0.003	0.042	2.40	0.66	<0.0001
	14/11/2022	1.3	<0.02	<0.10	1.0	0.30	0.10	4.70	130.00	130.00	<0.001
	14/12/2022	0.0016	<0.002	0.014	0.20	0.077	0.015	0.68	1.60	22.00	<0.001
	29/09/2022	3	<0.2	2	320	15	5	0.071	2700	1500	<0.10
	18/01/2023	<0.010	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	3.20	0.70	<0.01
	20/02/2023	0.027	0.0004	0.019	0.07	0.16	0.049	0.35	0.049	37.0	0.002
	28/03/2023	0.002	0.0008	0.002	0.003	0.46	0.003	0.97	36.0	150	0.0001
	18/04/2023	0.002	<0.0002	0.005	0.005	0.002	0.002	0.15	0.002	0.53	<0.0001
	18/05/2023	0.002	<0.0002	<0.001	0.002	0.002	<0.001	0.020	0.240	0.16	<0.0001
	15/06/2023	0.002	0.0003	<0.001	0.004	0.24	0.003	0.35	15	120	<0.0001
SW01 Baseline		**0.003**	**0.001**	**0.002**	**0.041**	**0.006**	**0.001**	**0.058**	**1.223**	**0.496**	**0.0005**
SW02	29/09/2022	0.003	<0.0002	0.002	0.004	0.002	0.001	0.057	1.50	0.42	<0.0001
	20/10/2022	0.001	<0.0002	0.001	0.003	0.001	<0.001	0.032	0.62	0.22	<0.0001
	14/11/2022	0.037	<0.002	<0.001	0.015	<0.01	<0.01	0.096	53.00	1.80	<0.001
	14/12/2022	0.066	<0.002	0.034	0.094	0.013	0.071	1.00	9.70	13.00	<0.001
	18/01/2023	0.023	<0.002	<0.01	0.015	<0.010	0.014	0.15	45.0	3.30	<0.001
	20/02/2023	0.033	0.0002	0.009	0.090	0.018	0.013	0.28	0.013	12.0	<0.001
	28/03/2023	0.002	0.0003	0.002	0.003	0.024	0.001	0.63	2.50	3.4	<0.0001
	18/04/2023	<0.001	<0.0002	0.002	0.002	0.006	<0.001	0.089	<0.001	0.86	<0.0001
	18/05/2023	0.002	<0.0002	0.002	0.006	0.003	0.002	0.081	1.00	0.72	<0.0001
	15/06/2023	0.001	<0.0002	0.001	0.004	0.005	0.001	0.037	2.10	1.70	<0.0001
SW02 Baseline		**0.045**	**0.001**	**0.007**	**0.012**	**0.005**	**0.020**	**0.09**	**71.893**	**3.821**	**0.0005**
SW03	29/09/2022	0.002	<0.0002	0.002	0.003	0.002	<0.001	0.034	0.80	0.42	<0.0001
	20/10/2022	0.002	<0.0002	0.002	0.003	0.001	0.002	0.03	0.86	0.49	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.004	<0.01	<0.010	0.24	1.90	1.10	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.010	<0.01	<0.010	0.53	1.30	0.63	<0.001
	18/01/2023	0.01	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	0.50	0.50	<0.001
	20/02/2023	0.001	<0.0002	0.002	0.02	0.065	0.001	0.12	0.001	17.0	<0.001
	28/03/2023	<0.001	<0.0002	0.001	0.001	0.065	<0.001	0.15	4.50	15.0	<0.0001
	18/04/2023	<0.001	<0.0002	0.001	0.001	0.023	<0.001	0.048	<0.001	3.8	<0.0001
	18/05/2023	<0.001	<0.0002	<0.001	0.002	0.033	<0.001	0.16	14.00	5.8	<0.0001
	15/06/2023	<0.001	<0.0002	<0.001	0.002	0.058	<0.001	0.15	12	11	<0.0001
SW03 Baseline		**0.058**	**0.001**	**0.008**	**0.028**	**0.006**	**0.028**	**0.26**	**85.52**	**7.949**	**0.0005**
SW04	29/09/2022	0.001	<0.0002	0.005	0.001	0.002	0.001	0.027	2.70	1.30	<0.0001
	20/10/2022	<0.001	<0.0002	0.004	0.001	0.002	0.001	0.024	2.40	1.10	<0.0001
	14/11/2022	No surface water located at monitoring site – no sample collected									
	14/12/2022	<0.001	<0.002	<0.001	<0.01	<0.01	<0.01	0.084	3.20	1.20	<0.001
	18/01/2023	No surface water located at monitoring site – no sample collected									
	20/02/2023	0.002	<0.0002	0.005	0.05	0.003	0.002	0.039	0.002	1.60	<0.001
	28/03/2023	<0.01	<0.002	0.002	<0.01	0.01	<0.01	<0.05	2.7	1.10	<0.0001
	18/04/2023	<0.001	<0.0002	<0.01	<0.001	0.001	<0.001	0.034	<0.001	0.85	<0.0001
	18/05/2023	<0.001	0.0005	<0.001	0.003	0.11	0.003	0.400	16	41	<0.0001
	15/06/2023	0.002	<0.0002	0.007	0.007	0.003	0.005	0.075	6.30	3.10	<0.0001
SW04 Baseline		**0.002**	**0.001**	**0.007**	**0.002**	**0.005**	**0.002**	**0.028**	**2.827**	**1.402**	**0.0005**

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW05	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.60	0.83	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.007	3.50	0.66	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.002	<0.001	<0.01	0.12	5.40	0.75	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.10	0.93	<0.001
	18/01/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.20	0.73	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.001	<0.001	0.008	<0.001	0.22	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	0.77	<0.001
	18/04/2023	<0.001	<0.0002	0.001	<0.001	0.003	<0.001	0.008	<0.001	1.0	<0.0001
	18/05/2023	<0.001	<0.0002	<0.001	<0.001	0.002	<0.001	0.009	2.40	0.60	<0.0001
	15/06/2023	<0.001	<0.0002	0.001	2	0.001	<0.001	0.010	2	0.32	<0.0001
SW05 Baseline		**0.002**	**0.001**	**0.002**	**0.003**	**0.011**	0.001	**0.026**	**12.306**	**2.073**	**0.0005**
SW06	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.50	0.78	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.012	2.70	0.54	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.012	<0.01	<0.01	0.11	5.30	0.68	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	5.40	0.75	<0.001
	18/01/2023	<0.010	<0.001	<0.01	<0.01	<0.01	<0.01	<0.05	0.01	0.63	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.002	<0.001	0.008	<0.001	0.34	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	1.10	<0.001
	18/04/2023	<0.001	<0.0002	0.001	<0.001	0.002	<0.001	0.009	<0.001	0.54	<0.0001
	18/05/2023	0.003	<0.0002	<0.001	<0.001	0.008	<0.001	<0.005	0.13	0.44	<0.0001
	15/06/2023	<0.001	<0.0002	<0.001	2.10	0.001	<0.001	<0.005	2.10	0.36	28
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**0.013**	**0.0002**	**0.0033**	**0.0018**	**0.011**	**0.0034**	**0.008**	**0.30**	**0.05**	**0.0006**

Table 3 Monthly Surface Water Quality Analytical Results (Hydrocarbons)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	15/06/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.17	0.3	0.1	0.18	<0.01	0.18	0.3	-	-
	20/02/2023	<0.02	<0.5	<1	<0.1	<0.5	<0.01	<0.5	<1	<1	<1
	28/03/2023	-	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	15/06/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	<0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	-	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	15/06/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	14/11/2022	No surface water observed at monitoring site – No sample collected									
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	No surface water observed at monitoring site – No sample collected									
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	0.1	0.1	0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	15/06/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.06	0.1	-	0.07	<0.01	0.7	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	15/06/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW05 Baseline		-	0.05	0.10	0.06	0.06	-	-	0.20	0.10	0.10
SW06	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<.0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	15/06/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

ATTACHMENT 4

Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	15/06/2023

Description

Sample location SW06.

Photo No.	Date
2	15/06/2023

Description

Sample location SW02.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	15/06/2023

Description

Sample location SW03.

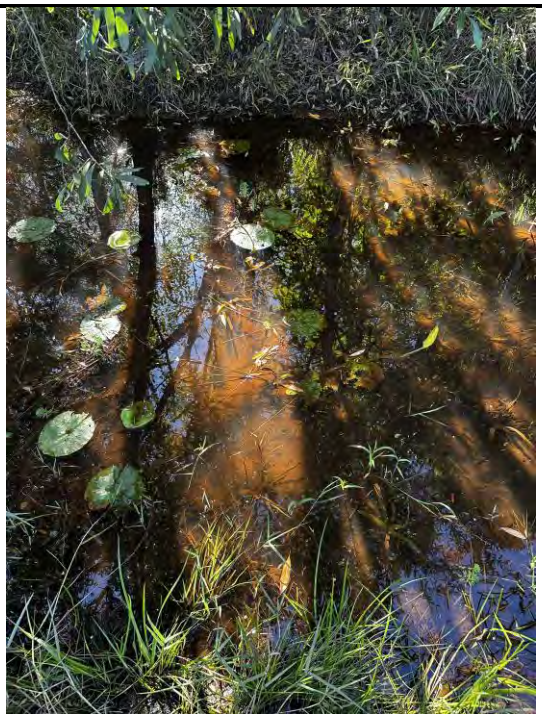


Photo No.	Date
4	15/06/2023

Description

Sample location SW05.

MONTHLY WATER QUALITY MONITORING REPORT

Harvest Estate Urban Development

Monitoring Period: 18th April to May 18th 2023

Ewingsdale Road, Byron Bay, NSW, 2481

Job Number: 217140

For:

Planit Consulting

By:

ENV Services

Date:

1/06/2023

ENV Services Pty Ltd

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DOCUMENT CONTROL

Job No:	Job Number: 217140
Client:	Planit Consulting
Filename:	217140_Harvest Estate_WQ_May 2023

	Name:	**Date:**	**Signature:**
Prepared By:	Jemma Attkins	24/04/2023	
Reviewed By:	Kingsley Baldwin	1/06/2023	
Approved By:	Kingsley Baldwin	1/06/2023	

Revision:	**Date:**	**Details:**

SCOPE OF ENGAGEMENT AND LIMITATIONS

This report has been prepared by ENV Services at the request of Planit Consulting for the purpose of consolidating and assessing water quality monitoring (surface water and ground water) data to determine impact associated with the development of the Harvest Estate. No other parties may rely on the contents of this report for any purposes except those stated.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

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ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

1 INTRODUCTION

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Establishment of internal roads and structures with progressive construction of Stage 1 of the development.
- Fencing works along the perimeter of the site are continuing.
- Stabilization of the site is progressively being carried out.
- Progressive installation of stormwater drainage features is being carried out.

2 MONITORING RESULTS & OBSERVATIONS

2.1 Fortnightly Acid Frog Habitat Groundwater Quality Monitoring

Fortnightly water quality monitoring for a period of 6 months from the commencement of Standing Water Level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP). This monitoring requirement is required for the first 6 months from the commencement of construction activities.

Monitoring for this component of the monitoring programme was completed in April.

2.2 Monthly Groundwater Monitoring

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2 – MW5 & MW7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. An assessment of the monthly analytical results presented in Attachment 2, Table 1, identified the following observations:

Site	Observation	Comments
MW2	Water quality within historic ranges	No site related impacts identified.
MW3	Water quality within historic ranges	No site related impacts identified.
MW4	Water quality within historic ranges	No site related impacts identified.
MW5	pH, EC, TDS, S as SO_4 and several cations (Ca & Mg) concentrations outside baseline ranges	Low pH values along with elevated analytes (EC, TDS & S as SO4) recorded at this site indicate the presences of exposed acid sulfate soils proximal to the monitoring well. All analyte exceedances appear to be trending lower indicating an improvement in the localised aquifer or attributed to meteoric waters interacting with groundwater. Elevated Calcium and Magnesium is likely attributed to carbonate dissolution due to low pH concentrations at the monitoring site.
MW7	Water quality within historic ranges except for S as SO_4	No site related impacts identified. Elevated sulfur concentrations attributed to the presence of naturally occurring acid sulfate soils/acidic aquifer.

2.3 Monthly Surface Water Monitoring

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 1. Select photos of the surface water sampling programme are presented in Attachment 4.

Table 1: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

2.3.1 Physiochemical Parameters, Nutrients and Cation/Anions

Monthly surface water sampling of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Attachment 3, y).

3 CONCLUSION

Surface water quality monitoring results across the site indicate an improvement in water quality onsite with the majority of sites recording analytical results that are either trending towards or within baseline ranges.

These results indicate that the mitigation measures implemented by CCA Winslow to neutralise low pH waters within the drainage lines are effectively alleviating impacts associated with acid generation from acid sulfate soils. However mitigation measures discussed in the meeting with Council such as the installation of tiered weirs along the drainage lines located onsite along with further application of lime onsite through the dusting of drainage lines and the replenishment of lime bags across the site are necessary to see continual improvements onsite.

Water quality within the aquifer underlying the site is naturally acidic, however water quality at MW5 continues to be impacted however improvements were recorded in analytes at this site which may indicate an improvement in the localised aquifer.

, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following;

Site	Observation	Comments
SW01	pH, Ca and S as SO_4 outside baseline ranges	Elevated pH is likely attributed to drainage works carried out by BSC whereby lime was added to mitigate acid sulfate soil exposure during the works Calcium and Sulfate concentrations are trending lower towards baseline ranges
SW02	Water quality within historic ranges except for S as SO_4	No site related impacts identified. Sulfate concentrations are trending lower towards baseline ranges
SW03	pH, EC, TDS, S as SO_4 and several cations' concentrations (Ca & Mg) outside baseline ranges	This site is located downstream but proximal to the site within the Northern Main Drain. Water quality remains similar to the previous round of monitoring conducted on the 18th April. Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.
SW04	pH, EC, TDS, Ca S as SO_4 and several cations' concentrations (Ca, Mg, K & Na) outside baseline ranges	This site is located downstream but proximal to the site within the Southern Swale Drain. Water quality remains similar to the previous round of monitoring conducted on the 18th April. Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.
SW05	Water quality within historic ranges	No site related impacts identified.
SW06	Water quality outside ANZG ranges for pH	pH is slightly outside ANZG guidelines however values are within baseline values observed in the Union Drain at SW05 located downstream of this monitoring site. No site related impacts identified.

3.1.1 Metals

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, **Error! Reference source not found.**, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

Site	Observation	Comments
SW01	Metals concentrations within baseline values	No site related impacts identified.
SW02	Metals concentrations within baseline values	No site related impacts identified.
SW03	Metals concentrations (Ni) outside baseline values	Residual elevation in Nickel just outside baseline values. Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.
SW04	Metals concentrations (Cu, Ni, Pb, Zn, Fe & Al) outside baseline ranges	Elevated metals concentrations at this site are a result of metal mobilisation through exposure from acidic processes (I.e acid sulfate soil exposure). Further mitigation measures (further application of lime within drains and the inclusion of lime bags) are necessary to ensure water quality is restored to within baseline ranges.
SW05	Water quality within historic ranges	No site related impacts identified.
SW06	Water quality outside ANZG ranges for Al	Aluminium concentrations are slightly outside ANZG guidelines however values are within baseline values observed in the Union Drain at SW05 located downstream of this monitoring site. No site related impacts identified.

3.1.2 Hydrocarbons

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, Table 3, hydrocarbon parameters of all surface water sampling locations were within historic baseline values.

During this monitoring period (18/04/2023 to 18/05/2023), 147 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

4 CONCLUSION

Surface water quality monitoring results across the site indicate an improvement in water quality onsite with the majority of sites recording analytical results that are either trending towards or within baseline ranges.

These results indicate that the mitigation measures implemented by CCA Winslow to neutralise low pH waters within the drainage lines are effectively alleviating impacts associated with acid generation from acid sulfate soils. However mitigation measures discussed in the meeting with Council such as the installation of tiered weirs along the drainage lines located onsite along with further application of lime onsite through the

dusting of drainage lines and the replenishment of lime bags across the site are necessary to see continual improvements onsite.

Water quality within the aquifer underlying the site is naturally acidic, however water quality at MW5 continues to be impacted however improvements were recorded in analytes at this site which may indicate an improvement in the localised aquifer.

ATTACHMENT 1

Groundwater Quality Analytical Results

Table 1 Groundwater Quality Analytical Results

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	TN mg/L	Nitrite mg/L	NH_3 mg/L	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Cl mg/L	SO_4 (as S) mg/L
MW2	29/09/2022	5.80	54	92	<5	0.12	0.50	0.02	0.51	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.60	100	110	<5	0.09	2.00	0.02	0.24	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.00	100	240	<5	0.07	<0.2	<0.10	0.24	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.60	110	170	<5	0.02	3.10	<0.10	<0.05	<5	<5	<5	29	15	5.0
	18/01/2023	4.60	130	76	9.2	0.12	2.50	<0.05	0.09	<5	<5	<5	29	17	7.0
	20/02/2023	6.00	100	160	5.3	0.09	0.25	<0.25	0.10	<0.5	0.7	3.1	27	27	3.7
	28/03/2023	5.90	140	92	17.0	0.02	<0.2	<0.02	0.12	<5	<5	<5	21	15	7.2
	18/04/2023	6.20	170	88	<5	0.08	7.70	<0.02	1.20	<5	<5	<5	18	15	5.2
	18/05/2023	5.90	130	76	10	0.09	9.00	<0.02	0.10	0.6	0.9	2.6	28	13	2.1
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0.45**	**2.03**	**0.07**	**0.338**	**0.7**	**1.4**	**4.2**	**29.7**	**189**	**9.8**
MW3	29/09/2022	4.20	53	40	370	0.09	0.50	0.02	0.05	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.10	64	62	130	0.01	0.50	0.02	0.20	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.60	57	84	170	0.03	<0.2	<0.02	0.27	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.30	43	32	280	<0.01	1.10	<0.02	<0.01	<5	<5	<5	6.0	5.2	<2
	18/01/2023	4.25	54	28	670	0.03	1.40	<0.05	<0.01	<5	<5	<5	<5	4.1	4.1
	20/02/2023	4.20	36	40	76	0.02	7.26	0.06	<0.10	<0.5	1	<0.5	7.6	6.8	<2
	28/03/2023	4.10	70	44	<5	<0.01	0.22	<0.02	<0.01	<0.5	1	0.6	4.8	7.9	2.2
	18/04/2023	4.60	89	54	110	0.02	5.70	<0.02	0.10	<0.5	0.6	<0.5	4.3	9.6	4.3
	18/05/2023	4.50	60	40	450	0.02	1.00	<0.02	0.04	0.6	0.8	<0.5	4.8	5.8	2.1
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**4.14**	**0.167**	**0.294**	**3.8**	**5.3**	**3.1**	**26.4**	**121**	**13.4**
MW4	29/09/2022	4.50	100	88	350	0.03	1.50	0.10	0.16	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.50	110	100	69	0.02	1.00	0.04	0.78	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.20	130	340	16	0.01	7.00	<0.10	0.13	2.6	4.8	1.1	22	30	5
	14/12/2022	4.20	140	140	60	<0.01	3.00	<0.10	<0.05	<5	<5	<5	21	23	7.8
	18/01/2023	5.73	170	110	170	0.02	2.40	<0.50	0.16	<5	<5	<5	20	26	6.6
	20/02/2023	3.90	87	110	31	0.04	3.88	0.28	<0.05	3.5	5.4	0.9	15	15	5.8
	28/03/2023	4.70	180	120	190	0.04	22.00	<0.02	0.08	8.8	5.1	<5	18	28	6.0
	18/04/2023	3.70	500	280	340	0.11	0.90	<0.02	0.07	3.4	5.0	<0.5	19	27	130
	18/05/2023	5.40	110	72	70	0.03	2.89	<0.02	<0.01	5.7	3.7	<0.5	11	14	10
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**4.36**	**0.185**	**1.392**	**11.3**	**15.6**	**5.4**	**146.3**	**199**	**19.2**
MW5	29/09/2022	4.50	59	68	630	0.13	6.33	0.02	0.41	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.40	75	82	92	0.02	0.50	0.02	0.10	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.60	120	270	150	0.08	7.80	<0.10	0.52	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.50	150	150	230	0.02	11.0	<0.05	<0.060	<5	<5	<5	24	29	9.7
	18/01/2023	2.80	1600	1100	480	0.05	5.70	<0.05	1.70	90	72	<5	49	43	6.6
	20/02/2023	2.60	2700	3200	310	0.03	3.20	<0.05	4.20	390	76	7.8	47	27	750
	28/03/2023	3.00	5200	3700	130	0.02	11.0	<0.02	5.90	440	57	7.1	34	28	1100
	18/04/2023	2.90	3800	5100	300	0.01	4.00	<0.02	4.00	380	120	4.7	49	44	3800
	18/05/2023	3.40	3100	3400	150	<0.01	4.90	<0.02	<0.01	240	31	4.2	23	15	2200
MW5 Baseline		**4.31 - 5.53**	**191**	**130**	**3003**	**0.97**	**13.40**	**0.117**	**0. 863**	**6.0**	**8.4**	**5.4**	**27.2**	**82**	**8.3**

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	TN mg/L	Nitrite mg/L	NH_3 mg/L	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Cl mg/L	SO_4 (as S) mg/L
MW7	29/09/2022	4.60	26	40	190	0.10	2.50	0.020	0.30	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.50	86	70	120	0.01	2.90	0.040	0.40	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.50	44	170	<100	0.03	<2.00	<0.10	0.01	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.60	56	92	23	0.04	11.0	<0.20	<0.10	<5	<5	<5	8.7	7.5	2.5
	18/01/2023	4.38	63	32	390	0.09	2.00	<0.025	<0.05	<5	<5	<5	11.0	7.5	31.0
	20/02/2023	4.10	87	60	30	0.02	4.90	0.42	<0.05	1.4	1.9	1.1	5.8	9.1	5.7
	28/03/2023	4.50	160	94	18	0.02	4.40	<0.02	0.02	2.0	2.0	0.6	12.0	21.0	66.0
	18/04/2023	4.90	150	58	7.4	<0.01	<0.20	<0.02	0.11	1.9	0.8	<0.5	9.8	11	120
	18/05/2023	4.90	78	56	130	0.03	0.89	<0.02	<0.01	1.4	0.9	<0.5	9.3	11	9.3
MW7 Baseline		**4.65 - 5.62**	**147**	**100**	**3140**	**0.71**	**4.15**	**0.048**	**0.471**	**3.4**	**2.2**	**3.1**	**31.0**	**172**	**7.3**
ANZG (2018): SE Aust 95% Undisturbed Lowland River		**6.50 – 8.00**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ATTACHMENT 2

Surface Water Quality Analytical Results

Table 1 Monthly Surface Water Quality Analytical Results (Physiochemical, Nutrients and Cation/Anions)

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW01	29/09/2022	6.90	140	180	11	0.47	5.2	<0.02	<0.01	22	14	3	30	14	3.4	450	3.1
	20/10/2022	6.60	400	320	30	0.03	<0.02	<0.02	0.03	24	9.1	2.9	31	22	33	43	4.7
	14/11/2022	6.00	920	780	4900	3.10	14.00	<0.02	6.90	280	73	<50	200	25	3.7	67	0.2
	14/12/2022	4.50	1100	800	210	0.150	23.27	<0.10	0.05	180	43	6.8	54	24	560	88	3.6
	18/01/2023	6.30	25	380	120	0.047	5.20	<0.02	0.087	<2	13	<5	40	24	180	25	4.7
	20/02/2023	3.40	1300	1100	32	0.42	8.90	<0.02	0.37	170	57	6.3	57	28	350	<5	3.8
	28/03/2023	3.00	3000	2000	100	<0.01	1.29	<0.02	2.10	290	38	5.1	47	29	880	<5	7.7
	18/04/2023	7.70	320	130	33	0.06	8.4	<0.02	0.01	13	2.7	0.8	16	24	14	8.8	8.6
	18/05/2023	7.40	250	130	6	0.21	0.9	<0.02	0.14	23	7.5	2.3	14	11	10	<5	4.4
SW01 Baseline		**6.20 – 7.00**	**428**	**291**	**73**	**3.52**	**3.52**	**0.039**	**0.164**	**22**	**16**	**6**	**51**	**118**	**9**	**768**	**-**
SW02	29/09/2022	6.90	160	170	8.8	0.04	1.30	<0.02	0.03	19	5.8	1.9	27	29	2.8	22	8.0
	20/10/2022	6.50	140	120	6.2	0.02	<0.20	<0.02	0.01	12	3.4	1.7	16	17	2.9	<5	8.7
	14/11/2022	6.40	190	150	210	0.18	13.0	<0.02	<0.01	47	11	<5	62	54	18	24	0.1
	14/12/2022	6.30	200	110	870	0.27	2.70	<0.10	0.05	38	5.9	5.1	25	26	29	14	0.1
	18/01/2023	6.60	61	220	190	0.79	21.0	<0.20	0.049	<2	5.8	<5	27	31	6.2	61	0.1
	20/02/2023	6.50	1300	240	29	0.023	1.90	<0.10	0.31	38	11	4.1	29	26	24	<5	4.4
	28/03/2023	4.80	370	310	370	1.50	<0.20	<0.02	0.19	43	8.4	4.1	17	22	92	<10	5.7
	18/04/2023	6.20	410	300	60	0.05	1.38	<0.02	0.16	20	4.0	2.7	25	32	120	<5	7.3
	18/05/2023	6.50	270	130	39	0.06	<0.2	<0.02	0.09	17	4.3	2.4	18	25	29	<5	6.0
SW02 Baseline		**6.30 – 7.00**	**292**	**199**	**495**	**1.88**	**8.55**	**0.06**	**0.261**	**17**	**5**	**6**	**32**	**161**	**10**	**182**	**-**
SW03	29/09/2022	6.80	100	120	<5	0.02	1.10	<0.02	<0.01	13	4.4	1	23	24	2.4	<5	9.3
	20/10/2022	5.90	870	650	26	0.03	<0.20	<0.02	<0.01	7.6	2.3	1	12	270	13	<5	7.5
	14/11/2022	6.50	160	140	260	0.13	7.40	<0.01	<0.05	18	5.7	<5	36	27	9	<5	2.6
	14/12/2022	6.50	160	110	11	0.01	3.90	<0.01	0.05	13	<5	<5	18	23	11	<5	4.4
	18/01/2023	6.50	<5	160	8.5	0.02	1.30	<0.02	<0.010	<2	6.2	<5	26	31	17	<5	5.1
	20/02/2023	3.40	720	0.54	13	0.01	5.10	<0.02	<0.010	63	14	3	28	22	100	<5	6
	28/03/2023	3.30	750	400	7.4	0.02	<0.20	<0.02	0.07	63	11	2.3	16	14	110	<5	9.9
	18/04/2023	4.20	450	280	<5	<0.01	<0.2	<0.02	0.04	30	5.0	2.1	22	29	140	<5	7.4
	18/05/2023	4.30	580	310	37	0.02	12.33	<0.02	0.32	48	10	2.8	21	22	230	<5	5.5
SW03 Baseline		**6.10 - 6.70**	**281**	**191**	**1005**	**2.14**	**4.31**	**0.041**	**0.155**	**21**	**5**	**4**	**30**	**111**	**6**	**86**	**-**
SW04	29/09/2022	4.50	52	68	<5	0.01	5.10	<0.02	0.18	1.6	2.6	1	17	20	<2	<5	4.8
	20/10/2022	4.20	110	90	<5	0.01	0.30	<0.02	<0.10	1.3	2.3	1	16	20	<2	<5	7.5
	14/11/2022	No surface water located at monitoring site – no sample collected															
	14/12/2022	3.20	280	190	<5	0.01	3.2	<0.10	0.05	<5	<5	<5	20	42	<2	<5	2
	18/01/2023	No surface water located at monitoring site – no sample collected															
	20/02/2023	4.10	160	0.2	<5	0.02	7.40	<0.10	0.090	2.7	3.9	1.6	23	22	15	<5	5.9
	28/03/2023	4.20	130	68	<5	<0.01	<0.25	<0.10	<0.01	<5	<5	<5	14	17	25	<5	8.0
	18/04/2023	4.60	190	130	16	0.01	0.50	<0.02	0.03	1.8	2.7	0.8	21	32	8.7	<5	9.1
	18/05/2023	3.60	1800	1200	42	0.03	1.15	<0.02	1.2	200	31	5.7	53	26	1000	<5	8.0
SW04 Baseline		**4.20 – 4.50**	**165**	**112**	**293**	**0.50**	**4.47**	**0.052**	**0.693**	**3.2**	**2.3**	**2.9**	**20**	**90**	**3**	**86**	**-**
SW05	29/09/2022	5.90	510	480	5.2	0.12	3.00	<0.20	0.17	9.4	17	7.7	140	220	11	<5	7.7
	20/10/2022	6.20	690	650	7.2	0.06	0.50	<0.20	0.24	11	19	7.9	160	180	8.6	<5	8.9
	14/11/2022	6.20	1000	820	13	0.06	8.10	<0.10	<0.05	18	27	11	260	310	100	<5	4.7
	14/12/2022	6.20	1100	830	16	0.05	3.10	<0.10	0.05	16	21	13	240	330	40	<5	7.5
	18/01/2023	6.30	<5	2800	33	0.09	3.38	<0.02	0.09	<2	96	41	820	1300	160	<5	7
	20/02/2023	6.70	2300	18	18	0.10	3.40	<0.10	0.07	190	550	170	4700	2000	890	<5	5.4
	28/03/2023	5.60	760	470	<5	0.02	<0.02	<0.10	0.08	9.4	14	6.4	110	200	23	6.7	9.4
	18/04/2023	6.40	5300	4000	16	0.10	80	<0.02	0.12	42	110	37	1100	2000	230	<5	8.5
	18/05/2023	5.80	460	260	17	0.08	<0.2	<0.02	<0.01	5.2	9.1	4.9	64	110	25	<5	5.7
SW05 Baseline		**5.10 – 7.20**	**6927**	**4710**	**136**	**0.21**	**2.227**	**0.052**	**0.592**	**57**	**130**	**58**	**1667**	**980**	**115**	**63**	**-**

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW06	29/09/2022	6.00	580	480	<5	0.13	8.60	<0.02	0.16	9.4	18	7.7	140	220	11	5.1	7.8
	20/10/2022	6.30	730	580	16	0.05	0.50	<0.02	0.19	9.1	13	5.8	110	330	7.5	6.2	8.7
	14/11/2022	6.20	1000	840	13	0.04	1.10	<0.10	0.36	18	29	12	270	310	100	<5	<5
	14/12/2022	6.30	1200	840	16	0.10	5.80	<0.10	0.05	16	21	13	240	340	44	<5	8.3
	18/01/2023	6.40	5400	3700	31.47	0.07	2.50	<0.02	0.04	<2	120	47	1000	1800	200	<5	6.8
	20/02/2023	6.80	14000	19	89.00	0.09	4.10	<0.10	0.11	170	480	160	4000	22	1200	<5	5.1
	28/03/2023	5.60	730	400	6.20	0.03	<0.20	<0.20	0.07	11	14	6.3	110	180	18	9.7	8.3
	18/04/2023	6.70	6700	6400	18	0.07	1.26	<0.02	1.2	68	200	63	1700	3200	360	<10	7.4
	18/05/2023	5.90	470	280	17	0.08	0.40	<0.02	0.06	14	4.8	3.3	370	120	21	<5	6.3
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	**<2200**	-	**<50**	**<0.05**	**<0.50**	-	-	-	-	-	-	-	-	**5**	-

Table 2 Monthly Surface Water Quality Analytical Results (Metals)

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW01	29/09/2022	0.003	<0.0002	0.002	0.32	0.015	0.005	0.071	2.70	1.50	<0.0001
	20/10/2022	2	<0.0002	0.002	0.16	0.009	0.003	0.042	2.40	0.66	<0.0001
	14/11/2022	1.3	<0.02	<0.10	1.0	0.30	0.10	4.70	130.00	130.00	<0.001
	14/12/2022	0.0016	<0.002	0.014	0.20	0.077	0.015	0.68	1.60	22.00	<0.001
	29/09/2022	3	<0.2	2	320	15	5	0.071	2700	1500	<0.10
	18/01/2023	<0.010	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	3.20	0.70	<0.01
	20/02/2023	0.027	0.0004	0.019	0.07	0.16	0.049	0.35	0.049	37.0	0.002
	28/03/2023	0.002	0.0008	0.002	0.003	0.46	0.003	0.97	36.0	150	0.0001
	18/04/2023	0.002	<0.0002	0.005	0.005	0.002	0.002	0.15	0.002	0.53	<0.0001
	18/05/2023	0.002	<0.0002	<0.001	0.002	0.002	<0.001	0.020	0.240	0.16	<0.0001
SW01 Baseline		**0.003**	**0.001**	**0.002**	**0.041**	**0.006**	**0.001**	**0.058**	**1.223**	**0.496**	**0.0005**
SW02	29/09/2022	0.003	<0.0002	0.002	0.004	0.002	0.001	0.057	1.50	0.42	<0.0001
	20/10/2022	0.001	<0.0002	0.001	0.003	0.001	<0.001	0.032	0.62	0.22	<0.0001
	14/11/2022	0.037	<0.002	<0.001	0.015	<0.01	<0.01	0.096	53.00	1.80	<0.001
	14/12/2022	0.066	<0.002	0.034	0.094	0.013	0.071	1.00	9.70	13.00	<0.001
	18/01/2023	0.023	<0.002	<0.01	0.015	<0.010	0.014	0.15	45.0	3.30	<0.001
	20/02/2023	0.033	0.0002	0.009	0.090	0.018	0.013	0.28	0.013	12.0	<0.001
	28/03/2023	0.002	0.0003	0.002	0.003	0.024	0.001	0.63	2.50	3.4	<0.0001
	18/04/2023	<0.001	<0.0002	0.002	0.002	0.006	<0.001	0.089	<0.001	0.86	<0.0001
	18/05/2023	0.002	<0.0002	0.002	0.006	0.003	0.002	0.081	1.00	0.72	<0.0001
SW02 Baseline		**0.045**	**0.001**	**0.007**	**0.012**	**0.005**	**0.020**	**0.09**	**71.893**	**3.821**	**0.0005**
SW03	29/09/2022	0.002	<0.0002	0.002	0.003	0.002	<0.001	0.034	0.80	0.42	<0.0001
	20/10/2022	0.002	<0.0002	0.002	0.003	0.001	0.002	0.03	0.86	0.49	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.004	<0.01	<0.010	0.24	1.90	1.10	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.010	<0.01	<0.010	0.53	1.30	0.63	<0.001
	18/01/2023	0.01	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	0.50	0.50	<0.001
	20/02/2023	0.001	<0.0002	0.002	0.02	0.065	0.001	0.12	0.001	17.0	<0.001
	28/03/2023	<0.001	<0.0002	0.001	0.001	0.065	<0.001	0.15	4.50	15.0	<0.0001
	18/04/2023	<0.001	<0.0002	0.001	0.001	0.023	<0.001	0.048	<0.001	3.8	<0.0001
	18/05/2023	<0.001	<0.0002	<0.001	0.002	0.033	<0.001	0.16	14.00	5.8	<0.0001
SW03 Baseline		**0.058**	**0.001**	**0.008**	**0.028**	**0.006**	**0.028**	**0.26**	**85.52**	**7.949**	**0.0005**
SW04	29/09/2022	0.001	<0.0002	0.005	0.001	0.002	0.001	0.027	2.70	1.30	<0.0001
	20/10/2022	<0.001	<0.0002	0.004	0.001	0.002	0.001	0.024	2.40	1.10	<0.0001
	14/11/2022	No surface water located at monitoring site – no sample collected									
	14/12/2022	<0.001	<0.002	<0.001	<0.01	<0.01	<0.01	0.084	3.20	1.20	<0.001
	18/01/2023	No surface water located at monitoring site – no sample collected									
	20/02/2023	0.002	<0.0002	0.005	0.05	0.003	0.002	0.039	0.002	1.60	<0.001
	28/03/2023	<0.01	<0.002	0.002	<0.01	0.01	<0.01	<0.05	2.7	1.10	<0.0001
	18/04/2023	<0.001	<0.0002	<0.01	<0.001	0.001	<0.001	0.034	<0.001	0.85	<0.0001
	18/05/2023	<0.001	0.0005	<0.001	0.003	0.11	0.003	0.400	16	41	<0.0001
SW04 Baseline		**0.002**	**0.001**	**0.007**	**0.002**	**0.005**	**0.002**	**0.028**	**2.827**	**1.402**	**0.0005**

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW05	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.60	0.83	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.007	3.50	0.66	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.002	<0.001	<0.01	0.12	5.40	0.75	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.10	0.93	<0.001
	18/01/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.20	0.73	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.001	<0.001	0.008	<0.001	0.22	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	0.77	<0.001
	18/04/2023	<0.001	<0.0002	0.001	<0.001	0.003	<0.001	0.008	<0.001	1.0	<0.0001
	18/05/2023	<0.001	<0.0002	<0.001	<0.001	0.002	<0.001	0.009	2.40	0.60	<0.0001
SW05 Baseline		**0.002**	**0.001**	**0.002**	**0.003**	**0.011**	0.001	**0.026**	**12.306**	**2.073**	**0.0005**
SW06	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.50	0.78	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.012	2.70	0.54	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.012	<0.01	<0.01	0.11	5.30	0.68	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	5.40	0.75	<0.001
	18/01/2023	<0.010	<0.001	<0.01	<0.01	<0.01	<0.01	<0.05	0.01	0.63	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.002	<0.001	0.008	<0.001	0.34	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	1.10	<0.001
	18/04/2023	<0.001	<0.0002	0.001	<0.001	0.002	<0.001	0.009	<0.001	0.54	<0.0001
	18/05/2023	0.003	<0.0002	<0.001	<0.001	0.008	<0.001	<0.005	0.13	0.44	<0.0001
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**0.013**	**0.0002**	**0.0033**	**0.0018**	**0.011**	**0.0034**	**0.008**	**0.30**	**0.05**	**0.0006**

Table 3 Monthly Surface Water Quality Analytical Results (Hydrocarbons)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW01 Baseline		**-**	**0.05**	**0.13**	**0.09**	**0.06**	**-**	**-**	**0.24**	**0.10**	**0.17**
SW02	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.17	0.3	0.1	0.18	<0.01	0.18	0.3	-	-
	20/02/2023	<0.02	<0.5	<1	<0.1	<0.5	<0.01	<0.5	<1	<1	<1
	28/03/2023	-	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW02 Baseline		**-**	**0.05**	**0.10**	**0.05**	**0.06**	**-**	**-**	**0.22**	**0.10**	**0.14**
SW03	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	<0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	-	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		**-**	**0.05**	**0.10**	**0.06**	**0.06**	**-**	**-**	**0.20**	**0.10**	**0.12**
SW04	14/11/2022	No surface water observed at monitoring site – No sample collected									
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	No surface water observed at monitoring site – No sample collected									
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	0.1	0.1	0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW04 Baseline		**-**	**0.05**	**0.10**	**0.06**	**0.06**	**-**	**-**	**0.20**	**0.10**	**0.10**
SW05	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.06	0.1	-	0.07	<0.01	0.7	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		**-**	**0.05**	**0.10**	**0.06**	**0.06**	**-**	**-**	**0.20**	**0.10**	**0.10**

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW06	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<.0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/05/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

ATTACHMENT 4

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MONTHLY WATER QUALITY MONITORING REPORT

Harvest Estate Urban Development

Monitoring Period: 28th March – 18th April 2023

Ewingsdale Road, Byron Bay, NSW, 2481

Job Number: 217140

For:

Planit Consulting

By:

ENV Services

Date:

15 May 2023

ENV Services Pty Ltd

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DOCUMENT CONTROL

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	Name:	**Date:**	**Signature:**
Prepared By:	Jemma Attkins	24/04/2023	
Reviewed By:	Kingsley Baldwin	26/04/2023	
Approved By:	Kingsley Baldwin	15/05/2023	

Revision:	**Date:**	**Details:**

SCOPE OF ENGAGEMENT AND LIMITATIONS

This report has been prepared by ENV Services at the request of Planit Consulting for the purpose of consolidating and assessing water quality monitoring (surface water and ground water) data to determine impact associated with the development of the Harvest Estate. No other parties may rely on the contents of this report for any purposes except those stated.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

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ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

1 INTRODUCTION

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Establishment of internal roads and structures with progressive construction of Stage 1 of the development.
- Fencing works along the perimeter of the site are continuing.
- Stabilization of the site is progressively being carried out.
- Progressive installation of stormwater drainage features is being carried out.

2 MONITORING RESULTS & OBSERVATIONS

2.1 Fortnightly Acid Frog Habitat Groundwater Quality Monitoring

Fortnightly water quality monitoring for a period of 6 months from the commencement of Standing Water Level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP). This monitoring requirement is required for the first 6 months from the commencement of construction activities.

Monitoring results from each of the bores were assessed against site specific baseline monitoring results and ANZG (2018) default ranges (freshwater: 95% species protection). An assessment of the monthly results against the thresholds presented in Table 1, identified the following observations:

Site	Observation	Comments
MW3	Water quality within historic ranges	No site related impacts identified.
MW4	Water quality within historic ranges	No site related impacts identified.
MW6	pH values below ANZG 95% species protection ranges (6.50 – 8.00)	No site related impacts identified. Water quality has remained stable since the commencement of sampling.
MW7	pH values outside baseline ranges (4.65 – 5.62)	No site related impacts identified. pH values are in line with baseline values observed within the localised aquifer (MW3 and MW4). Monitoring well is likely to be influenced from dynamic surface water interaction (Union Drain and opening of ICOLL) whereby lowering water table that has subsequently allowed lateral movement of acidic aquifer
MW8	pH values below ANZG 95% species protection ranges (6.50 – 8.00) and baseline ranges observed within localised aquifer. Standing water levels are 0.3m below levels recorded in 2022	MW8 is located within the southern swale drain. The lowering of the standing water level at this site is directly associated with the excavation of the swale drain whereby the water table is now located at the base of excavation. pH values recorded at this site are likely to be influenced by the lateral movement of groundwater due to the change in the hydraulic gradient allowing naturally acidic waters derived from the localised aquifer to migrate into the southern swale, exposing acid sulfate soils along the margin of the drain due to the change in hydraulic gradient.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	11/10/22	2.96	4.25	46
	20/10/22	2.98	4.10	64
	03/11/22	3.04	4.91	*340*
	14/11/22	2.84	4.60	34
	07/12/22	2.81	4.30	43
	14/12/22	2.71	4.30	56
	18/01/23	2.34	4.25	180
	08/02/23	2.22	4.38	73
	20/02/23	2.70	4.20	36
	08/03/23	2.87	4.18	80
	28/03/23	2.87	4.04	114
MW3 Baseline		**2.08 – 3.96**	**3.99 – 5.33**	**< 206**
MW4	11/10/22	2.56	*4.42*	85
	20/10/22	2.70	*4.50*	110
	03/11/22	2.29	*4.47*	270
	14/11/22	2.30	*4.20*	130
	07/12/22	2.48	*4.46*	140
	14/12/22	2.43	*4.20*	124
	18/01/23	2.09	*4.73*	252
	08/02/23	2.21	*4.99*	308
	20/02/23	2.42	*3.90*	87
	08/03/23	2.35	*4.10*	120
	28/03/23	2.61	*4.32*	259
MW4 Baseline		**0.52 - 2.96**	**3.97 – 5.84**	**< 890**
MW6	11/10/22	1.43	*4.39*	80
	20/10/22	1.41	*4.66*	75
	03/11/22	1.39	*5.89*	1250
	14/11/22	1.34	*4.47*	70
	07/12/22	1.34	6.97	1300
	14/12/22	1.31	*5.86*	760
	18/01/23	1.07	*6.26*	136
	08/02/23	1.27	*5.56*	450
	20/02/23	1.37	*6.03*	1370
	08/03/23	1.32	*5.75*	1280
	28/03/23	1.38	*5.85*	1390
MW6 Baseline		**0.88 – 2.14**	**-**	**-**
MW7	11/10/22	1.66	4.82	85
	20/10/22	1.88	*4.50*	86
	03/11/22	1.62	*4.24*	*161*
	14/11/22	1.46	*4.50*	44
	07/12/22	1.51	4.80	105
	14/12/22	1.46	*4.60*	56
	18/01/23	1.42	5.38	90
	08/02/23	1.34	4.91	125
	20/02/23	1.36	*4.10*	*87*
	08/03/23	1.56	*4.07*	95
	28/03/23	1.31	*4.15*	135
MW7 Baseline		**0.85 – 2.36**	**4.65 – 5.62**	**< 147**
MW8	11/10/22	2.52	*4.01*	46
	20/10/22	2.54	*4.07*	117
	03/11/22	2.29	*3.92*	290
	14/11/22	2.08	*3.51*	227
	07/12/22	2.38	*4.12*	533
	14/12/22	2.40	*3.88*	201
	18/01/23	2.32	*4.10*	431
	08/02/23	2.28	*4.08*	360
	20/02/23	2.18	*3.50*	638
	08/03/23	2.17	*3.40*	756
	28/03/23	2.25	*3.10*	474
MW8 Baseline		**1.44 – 2.73**	**-**	**-**
ANZG (2018) – Freshwater: 95% Species Protection			**6.50 – 8.00**	**< 2200**

2.2 Monthly Groundwater Monitoring

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2 – MW5 & MW7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. An assessment of the monthly analytical results presented in Attachment 2, Table 1, identified the following observations:

Site	Observation	Comments
MW2	Water quality within historic ranges except for Total Nitrogen and Ammonia	No site related impacts identified. Total nitrogen values are within ANZG 95% species protection ranges (<500mg/L). Elevated ammonia as an isolated indicator is indicative of the degradation of naturally occurring organic matter.
MW3	Water quality within historic ranges except for Total Nitrogen	No site related impacts identified. Total nitrogen values are within ANZG 95% species protection ranges (<500mg/L).
MW4	pH and sulfur concentrations outside baseline ranges	pH values recorded at this monitoring site are likely to be influenced by the lateral movement of groundwater due to the change in the hydraulic gradient allowing naturally acidic waters derived from the localised aquifer to migrate into the excavation, along with the localised exposure of acid sulfate soils along the margin of the drain due to the change in hydraulic gradient. The exposure of acid sulfate soils is confirmed with elevated sulfur concentrations.
MW5	pH, EC, TDS, Ammonia, Sulfur and several cations (Ca & Mg) concentrations outside baseline ranges	Low pH values along with elevated analytes (EC, TDS, NH_3 & S as SO4) recorded at this site indicate the presences of exposed acid sulfate soils proximal to the monitoring well. An assessment of works completed by the Principal Contractor indicate that a number of longitudinal drains had been constructed adjacent to this location that have influenced the lowering of the water table subsequently exposing acid sulfate soils along the margin of the drain. Elevated Calcium and Magnesium is likely attributed to carbonate dissolution due to low pH concentrations at the monitoring site.
MW7	Water quality within historic ranges except for S as SO_4	No site related impacts identified. Elevated sulfur concentrations attributed to the presence of naturally occurring acid sulfate soils/acidic aquifer within the catchment.

2.3 Monthly Surface Water Monitoring

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 2. Select photos of the surface water sampling programme are presented in Attachment 4.

Table 2: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

2.3.1 Physiochemical Parameters, Nutrients and Cation/Anions

Monthly surface water sampling of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Attachment 3, Table 1, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following;

Site	Observation	Comments
SW01	Water quality within historic ranges	No site related impacts identified. Total nitrogen values are within ANZG 95% species protection ranges (<500mg/L). Elevated ammonia as an isolated indicator is indicative of the degradation of naturally occurring organic matter.
SW02	Water quality within historic ranges except for EC, TDS, Ca and S as SO_4	No site related impacts identified. Residual elevation in EC, TDS, Ca and S concentrations derived from minor exposure of acid sulfate soils reported in previous monitoring rounds (March 2023).
SW03	pH, EC, TDS, Ca and S as SO_4 concentrations outside baseline ranges	Improvements in water quality have been recorded during the recent monitoring round when compared to the previous monitoring rounds (February and March). This is attributed to the implementation of corrective actions onsite to mitigate the effects of acid generation through the exposure of acid sulfate soils. Further requirements are necessary to ensure water quality is restored to within baseline ranges.

		Ongoing monitoring is required to assess whether water quality is improving due to the inclusion of corrective actions by the Principal Contractor to mitigate acid sulfate soil related impacts.
SW04	Water quality within historic ranges except for EC, TDS, Ca, Na and S as SO_4 concentrations	Elevated EC, TDS, Ca, Na and S as SO_4 concentrations just outside baseline ranges indicating a slight deterioration in water quality. This is likely attributed to the minor presence of exposed acid sulfate soils onsite. Ongoing monitoring is required to assess whether water quality is improving due to the inclusion of corrective actions by the Principal Contractor to mitigate acid sulfate soil related impacts.
SW05	Water quality within historic ranges except for TN, Cl and S as SO_4 concentrations	No site related impacts identified. Total nitrogen values are within ANZG 95% species protection ranges (<500mg/L). Chloride and sulfate concentrations influenced by seawater intrusion likely from the opening of the Belongil ICOLL.
SW06	Water quality within historic ranges except for EC and TN concentrations	No site related impacts identified. Elevated EC influenced by seawater intrusion likely from the opening of the Belongil ICOLL. Elevated Total Nitrogen (TN) concentrations within historic ranges observed within the upstream site (SW05) and is likely indicative of seasonal variation within the catchment.

2.3.2 Metals

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, Table 2, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

Site	Observation	Comments
SW01	Metals concentrations (Cr, Zn and Al) outside baseline but trending lower	Residual mobilisation of metals associated with low pH values observed at this monitoring site over recent months. pH has now reverted to within baseline ranges.
SW02	Metals concentrations (Ni) outside baseline but trending lower	Residual mobilisation of metals associated with low pH values observed at this monitoring site over recent months. pH has now reverted to within baseline ranges.
SW03	Metals concentrations (Ni) outside baseline but trending lower	Residual mobilisation of metals associated with low pH values observed at this monitoring site over recent months. pH has now reverted to within baseline ranges.
SW04	Metals concentrations (Zn) outside baseline ranges	Residual elevation in Zn just outside baseline values. The incorporation of ag-lime sandbags in the invert of drainage lines to neutralise low pH waters has effectively controlled metal mobilisation onsite.
SW05	Water quality within historic ranges	No site related impacts identified.
SW06	Water quality within historic ranges	No site related impacts identified.

2.3.3 Hydrocarbons

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, Table 3, hydrocarbon parameters of all surface water sampling locations were within historic baseline values.

During this monitoring period (28/03/2023 to 18/04/2023), 56.4 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

3 CONCLUSION

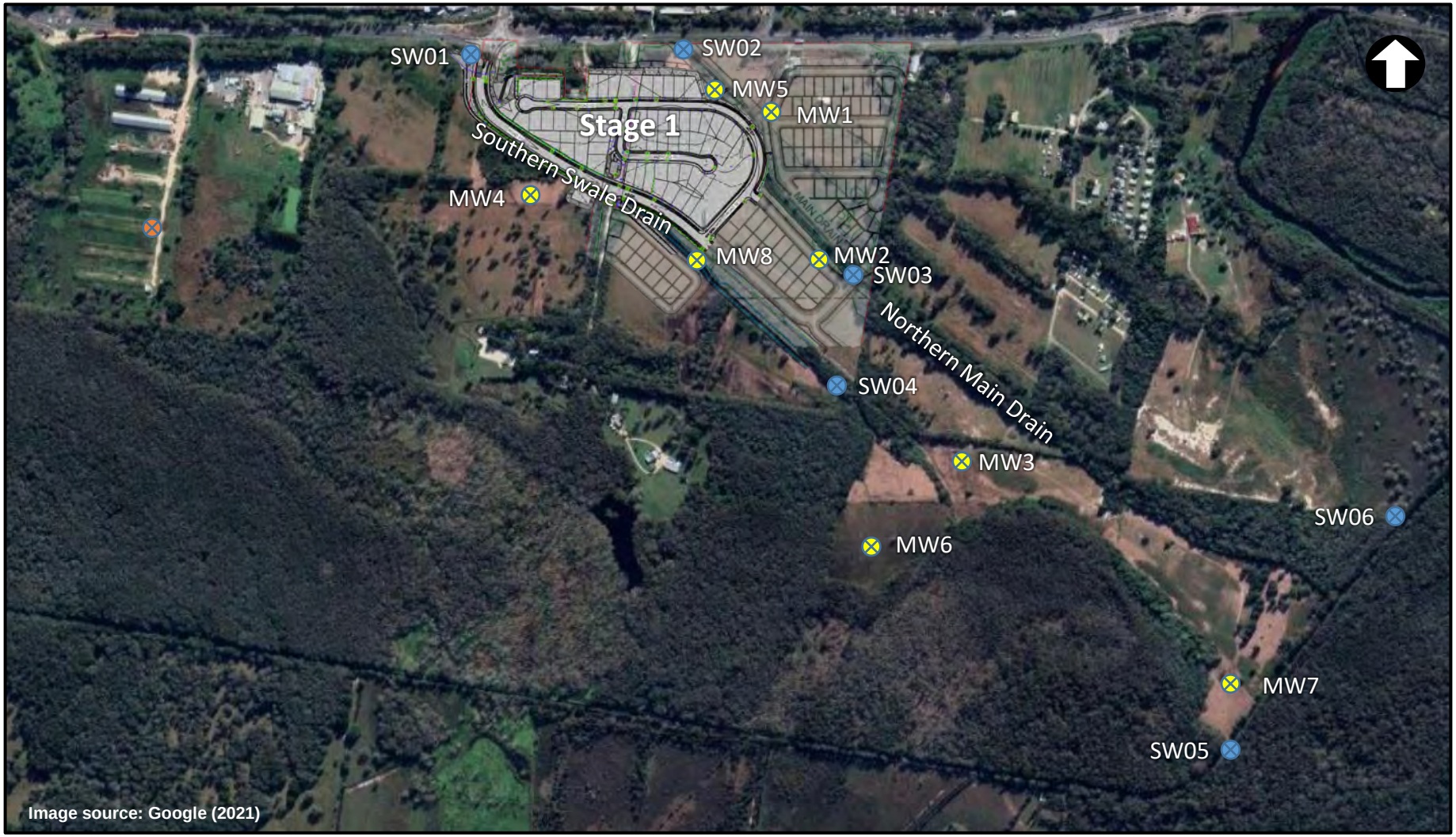
Surface water quality monitoring results across the site indicate an improvement in water quality onsite with the majority of sites recording analytical results that are either trending towards or within baseline ranges.

These results indicate that the mitigation measures implemented by CCA Winslow to neutralise low pH waters within the drainage lines are effectively alleviating impacts associated with acid generation from acid sulfate soils. It is anticipated that water quality results will continue to improve over the coming months with the management of these implemented mitigation measures.

Water quality within the aquifer underlying the site is naturally acidic, however water quality at MW5 is impacted from site activities. Investigations suggest that minor acid generation from exposed ASS along the peripheries of the longitudinal drain is likely causing localised impacts to the aquifer. The inclusion of ag-lime in the construction of any future longitudinal drains needs to be implemented into the scope of the works to assist in mitigating acid generation.

ATTACHMENT 1

Figures



Site Location (Stage 1)

Surface Water Sampling Locations

Ground Water Sampling Locations

0 0.1 0.2km

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Figure 1: Water Quality Sampling Locations
Harvest Estate – Stage 1

ATTACHMENT 2

Groundwater Quality Analytical Results

Table 1 Groundwater Quality Analytical Results

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	TN mg/L	Nitrite mg/L	NH_3 mg/L	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Cl mg/L	SO_4 (as S) mg/L
MW2	29/09/2022	5.80	54	92	<5	0.12	0.50	0.02	0.51	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.60	100	110	<5	0.09	2.00	0.02	0.24	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.00	100	240	<5	0.07	<0.2	<0.10	0.24	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.60	110	170	<5	0.02	3.10	<0.10	<0.05	<5	<5	<5	29	15	5.0
	18/01/2023	4.60	130	76	9.2	0.12	2.50	<0.05	0.09	<5	<5	<5	29	17	7.0
	20/02/2023	6.00	100	160	5.3	0.09	0.25	<0.25	0.10	<0.5	0.7	3.1	27	27	3.7
	28/03/2023	5.90	140	92	17.0	0.02	<0.2	<0.02	0.12	<5	<5	<5	21	15	7.2
	18/04/2023	6.20	170	88	<5	0.08	7.70	<0.02	1.20	<5	<5	<5	18	15	5.2
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0. 45**	**2.03**	**0.07**	**0.338**	**0.7**	**1.4**	**4.2**	**29.7**	**189**	**9.8**
MW3	29/09/2022	4.20	53	40	370	0.09	0.50	0.02	0.05	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.10	64	62	130	0.01	0.50	0.02	0.20	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.60	57	84	170	0.03	<0.2	<0.02	0.27	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.30	43	32	280	<0.01	1.10	<0.02	<0.01	<5	<5	<5	6.0	5.2	<2
	18/01/2023	4.25	54	28	670	0.03	1.40	<0.05	<0.01	<5	<5	<5	<5	4.1	4.1
	20/02/2023	4.20	36	40	76	0.02	7.26	0.06	<0.10	<0.5	1	<0.5	7.6	6.8	<2
	28/03/2023	4.10	70	44	<5	<0.01	0.22	<0.02	<0.01	<0.5	1	0.6	4.8	7.9	2.2
	18/04/2023	4.60	89	54	110	0.02	5.70	<0.02	0.10	<0.5	0.6	<0.5	4.3	9.6	4.3
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**4.14**	**0.167**	**0.294**	**3.8**	**5.3**	**3.1**	**26.4**	**121**	**13.4**
MW4	29/09/2022	4.50	100	88	350	0.03	1.50	0.10	0.16	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.50	110	100	69	0.02	1.00	0.04	0.78	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.20	130	340	16	0.01	7.00	<0.10	0.13	2.6	4.8	1.1	22	30	5
	14/12/2022	4.20	140	140	60	<0.01	3.00	<0.10	<0.05	<5	<5	<5	21	23	7.8
	18/01/2023	5.73	170	110	170	0.02	2.40	<0.50	0.16	<5	<5	<5	20	26	6.6
	20/02/2023	3.90	87	110	31	0.04	3.88	0.28	<0.05	3.5	5.4	0.9	15	15	5.8
	28/03/2023	4.70	180	120	190	0.04	22.00	<0.02	0.08	8.8	5.1	<5	18	28	6.0
	18/04/2023	3.70	500	280	340	0.11	0.90	<0.02	0.07	3.4	5.0	<0.5	19	27	130
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**4.36**	**0.185**	**1.392**	**11.3**	**15.6**	**5.4**	**146.3**	**199**	**19.2**
MW5	29/09/2022	4.50	59	68	630	0.13	6.33	0.02	0.41	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.40	75	82	92	0.02	0.50	0.02	0.10	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.60	120	270	150	0.08	7.80	<0.10	0.52	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.50	150	150	230	0.02	11.0	<0.05	<0.060	<5	<5	<5	24	29	9.7
	18/01/2023	2.80	1600	1100	480	0.05	5.70	<0.05	1.70	90	72	<5	49	43	6.6
	20/02/2023	2.60	2700	3200	310	0.03	3.20	<0.05	4.20	390	76	7.8	47	27	750
	28/03/2023	3.00	5200	3700	130	0.02	11.0	<0.02	5.90	440	57	7.1	34	28	1100
	18/04/2023	2.90	3800	5100	300	0.01	4	<0.02	4	380	120	4.7	49	44	3800
MW5 Baseline		**4.31 - 5.53**	**191**	**130**	**3003**	**0.97**	**13.40**	**0.117**	**0. 863**	**6.0**	**8.4**	**5.4**	**27.2**	**82**	**8.3**
MW7	29/09/2022	4.60	26	40	190	0.10	2.50	0.020	0.30	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.50	86	70	120	0.01	2.90	0.040	0.40	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.50	44	170	<100	0.03	<2.00	<0.10	0.01	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.60	56	92	23	0.04	11.0	<0.20	<0.10	<5	<5	<5	8.7	7.5	2.5
	18/01/2023	4.38	63	32	390	0.09	2.00	<0.025	<0.05	<5	<5	<5	11.0	7.5	31.0
	20/02/2023	4.10	87	60	30	0.02	4.90	0.42	<0.05	1.4	1.9	1.1	5.8	9.1	5.7
	28/03/2023	4.50	160	94	18	0.02	4.40	<0.02	0.02	2.0	2.0	0.6	12.0	21.0	66.0
	18/04/2023	4.90	150	58	7.4	<0.01	<0.20	<0.02	0.11	1.9	0.8	<0.5	9.8	11	120
MW7 Baseline		**4.65 - 5.62**	**147**	**100**	**3140**	**0.71**	**4.15**	**0.048**	**0.471**	**3.4**	**2.2**	**3.1**	**31.0**	**172**	**7.3**
ANZG (2018): SE Aust 95% Undisturbed Lowland River		**6.50 – 8.00**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ATTACHMENT 3

Surface Water Quality Analytical Results

Table 1 Monthly Surface Water Quality Analytical Results (Physiochemical, Nutrients and Cation/Anions)

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW01	29/09/2022	6.90	140	180	11	0.47	5.2	<0.02	<0.01	22	14	3	30	14	3.4	450	3.1
	20/10/2022	6.60	400	320	30	0.03	<0.02	<0.02	0.03	24	9.1	2.9	31	22	33	43	4.7
	14/11/2022	6.00	920	780	4900	3.10	14.00	<0.02	6.90	280	73	<50	200	25	3.7	67	0.2
	14/12/2022	4.50	1100	800	210	0.150	23.27	<0.10	0.05	180	43	6.8	54	24	560	88	3.6
	18/01/2023	6.30	25	380	120	0.047	5.20	<0.02	0.087	<2	13	<5	40	24	180	25	4.7
	20/02/2023	3.40	1300	1100	32	0.42	8.90	<0.02	0.37	170	57	6.3	57	28	350	<5	3.8
	28/03/2023	3.00	3000	2000	100	<0.01	1.29	<0.02	2.10	290	38	5.1	47	29	880	<5	7.7
	18/04/2023	7.70	320	130	33	0.06	8.4	<0.02	0.01	13	2.7	0.8	16	24	14	8.8	8.6
SW01 Baseline		**6.20 – 7.00**	**428**	**291**	**73**	**3.52**	**3.52**	**0.039**	**0.164**	**22**	**16**	**6**	**51**	**118**	**9**	**768**	**-**
SW02	29/09/2022	6.90	160	170	8.8	0.04	1.30	<0.02	0.03	19	5.8	1.9	27	29	2.8	22	8.0
	20/10/2022	6.50	140	120	6.2	0.02	<0.20	<0.02	0.01	12	3.4	1.7	16	17	2.9	<5	8.7
	14/11/2022	6.40	190	150	210	0.18	13.0	<0.02	<0.01	47	11	<5	62	54	18	24	0.1
	14/12/2022	6.30	200	110	870	0.27	2.70	<0.10	0.05	38	5.9	5.1	25	26	29	14	0.1
	18/01/2023	6.60	61	220	190	0.79	21.0	<0.20	0.049	<2	5.8	<5	27	31	6.2	61	0.1
	20/02/2023	6.50	1300	240	29	0.023	1.90	<0.10	0.31	38	11	4.1	29	26	24	<5	4.4
	28/03/2023	4.80	370	310	370	1.50	<0.20	<0.02	0.19	43	8.4	4.1	17	22	92	<10	5.7
	18/04/2023	6.20	410	300	60	0.05	1.38	<0.02	0.16	20	4.0	2.7	25	32	120	<5	7.3
SW02 Baseline		**6.30 – 7.00**	**292**	**199**	**495**	**1.88**	**8.55**	**0.06**	**0.261**	**17**	**5**	**6**	**32**	**161**	**10**	**182**	**-**
SW03	29/09/2022	6.80	100	120	<5	0.02	1.10	<0.02	<0.01	13	4.4	1	23	24	2.4	<5	9.3
	20/10/2022	5.90	870	650	26	0.03	<0.20	<0.02	<0.01	7.6	2.3	1	12	270	13	<5	7.5
	14/11/2022	6.50	160	140	260	0.13	7.40	<0.01	<0.05	18	5.7	<5	36	27	9	<5	2.6
	14/12/2022	6.50	160	110	11	0.01	3.90	<0.01	0.05	13	<5	<5	18	23	11	<5	4.4
	18/01/2023	6.50	<5	160	8.5	0.02	1.30	<0.02	<0.010	<2	6.2	<5	26	31	17	<5	5.1
	20/02/2023	3.40	720	0.54	13	0.01	5.10	<0.02	<0.010	63	14	3	28	22	100	<5	6
	28/03/2023	3.30	750	400	7.4	0.02	<0.20	<0.02	0.07	63	11	2.3	16	14	110	<5	9.9
	18/04/2023	4.20	450	280	<5	<0.01	<0.2	<0.02	0.04	30	5.0	2.1	22	29	140	<5	7.4
SW03 Baseline		**6.10 - 6.70**	**281**	**191**	**1005**	**2.14**	**4.31**	**0.041**	**0.155**	**21**	**5**	**4**	**30**	**111**	**6**	**86**	**-**
SW04	29/09/2022	4.50	52	68	<5	0.01	5.10	<0.02	0.18	1.6	2.6	1	17	20	<2	<5	4.8
	20/10/2022	4.20	110	90	<5	0.01	0.30	<0.02	<0.10	1.3	2.3	1	16	20	<2	<5	7.5
	14/11/2022	No surface water located at monitoring site – no sample collected															
	14/12/2022	3.20	280	190	<5	0.01	3.2	<0.10	0.05	<5	<5	<5	20	42	<2	<5	2
	18/01/2023	No surface water located at monitoring site – no sample collected															
	20/02/2023	4.10	160	0.2	<5	0.02	7.40	<0.10	0.090	2.7	3.9	1.6	23	22	15	<5	5.9
	28/03/2023	4.20	130	68	<5	<0.01	<0.25	<0.10	<0.01	<5	<5	<5	14	17	25	<5	8.0
	18/04/2023	4.60	190	130	16	0.01	0.5	<0.02	0.03	1.8	2.7	0.8	21	32	8.7	<5	9.1
SW04 Baseline		**4.20 – 4.50**	**165**	**112**	**293**	**0.50**	**4.47**	**0.052**	**0.693**	**3.2**	**2.3**	**2.9**	**20**	**90**	**3**	**86**	**-**
SW05	29/09/2022	5.90	510	480	5.2	0.12	3.00	<0.20	0.17	9.4	17	7.7	140	220	11	<5	7.7
	20/10/2022	6.20	690	650	7.2	0.06	0.50	<0.20	0.24	11	19	7.9	160	180	8.6	<5	8.9
	14/11/2022	6.20	1000	820	13	0.06	8.10	<0.10	<0.05	18	27	11	260	310	100	<5	4.7
	14/12/2022	6.20	1100	830	16	0.05	3.10	<0.10	0.05	16	21	13	240	330	40	<5	7.5
	18/01/2023	6.30	<5	2800	33	0.09	3.38	<0.02	0.09	<2	96	41	820	1300	160	<5	7
	20/02/2023	6.70	2300	18	18	0.10	3.40	<0.10	0.07	190	550	170	4700	2000	890	<5	5.4
	28/03/2023	5.60	760	470	<5	0.02	<0.02	<0.10	0.08	9.4	14	6.4	110	200	23	6.7	9.4
	18/04/2023	6.40	5300	4000	16	0.10	80	<0.02	0.12	42	110	37	1100	2000	230	<5	8.5
SW05 Baseline		**5.10 – 7.20**	**6927**	**4710**	**136**	**0.21**	**2.227**	**0.052**	**0.592**	**57**	**130**	**58**	**1667**	**980**	**115**	**63**	**-**

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW06	29/09/2022	6.00	580	480	<5	0.13	8.60	<0.02	0.16	9.4	18	7.7	140	220	11	5.1	7.8
	20/10/2022	6.30	730	580	16	0.05	0.50	<0.02	0.19	9.1	13	5.8	110	330	7.5	6.2	8.7
	14/11/2022	6.20	1000	840	13	0.04	1.10	<0.10	0.36	18	29	12	270	310	100	<5	<5
	14/12/2022	6.30	1200	840	16	0.10	5.80	<0.10	0.05	16	21	13	240	340	44	<5	8.3
	18/01/2023	6.40	5400	3700	31.47	0.07	2.50	<0.02	0.04	<2	120	47	1000	1800	200	<5	6.8
	20/02/2023	6.80	14000	19	89.00	0.09	4.10	<0.10	0.11	170	480	160	4000	22	1200	<5	5.1
	28/03/2023	5.60	730	400	6.20	0.03	<0.20	<0.20	0.07	11	14	6.3	110	180	18	9.7	8.3
	18/04/2023	6.70	6700	6400	18	0.07	1.26	<0.02	1.2	68	200	63	1700	3200	360	<10	7.4
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	**<2200**	-	**<50**	**<0.05**	**<0.50**	-	-	-	-	-	-	-	-	**5**	-

Table 2 Monthly Surface Water Quality Analytical Results (Metals)

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW01	29/09/2022	0.003	<0.0002	0.002	0.32	0.015	0.005	0.071	2.70	1.50	<0.0001
	20/10/2022	2	<0.0002	0.002	0.16	0.009	0.003	0.042	2.40	0.66	<0.0001
	14/11/2022	1.3	<0.02	<0.10	1.0	0.30	0.10	4.70	130.00	130.00	<0.001
	14/12/2022	0.0016	<0.002	0.014	0.20	0.077	0.015	0.68	1.60	22.00	<0.001
	29/09/2022	3	<0.2	2	320	15	5	0.071	2700	1500	<0.10
	18/01/2023	<0.010	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	3.20	0.70	<0.01
	20/02/2023	0.027	0.0004	0.019	0.07	0.16	0.049	0.35	0.049	37.0	0.002
	28/03/2023	0.002	0.0008	0.002	0.003	0.46	0.003	0.97	36.0	150	0.0001
	18/04/2023	0.002	<0.0002	0.005	0.005	0.002	0.002	0.15	0.002	0.53	<0.0001
SW01 Baseline		**0.003**	**0.001**	**0.002**	**0.041**	**0.006**	**0.001**	**0.058**	**1.223**	**0.496**	**0.0005**
SW02	29/09/2022	0.003	<0.0002	0.002	0.004	0.002	0.001	0.057	1.50	0.42	<0.0001
	20/10/2022	0.001	<0.0002	0.001	0.003	0.001	<0.001	0.032	0.62	0.22	<0.0001
	14/11/2022	0.037	<0.002	<0.001	0.015	<0.01	<0.01	0.096	53.00	1.80	<0.001
	14/12/2022	0.066	<0.002	0.034	0.094	0.013	0.071	1.00	9.70	13.00	<0.001
	18/01/2023	0.023	<0.002	<0.01	0.015	<0.010	0.014	0.15	45.0	3.30	<0.001
	20/02/2023	0.033	0.0002	0.009	0.090	0.018	0.013	0.28	0.013	12.0	<0.001
	28/03/2023	0.002	0.0003	0.002	0.003	0.024	0.001	0.63	2.50	3.4	<0.0001
	18/04/2023	<0.001	<0.0002	0.002	0.002	0.006	<0.001	0.089	<0.001	0.86	<0.0001
SW02 Baseline		**0.045**	**0.001**	**0.007**	**0.012**	**0.005**	**0.020**	**0.09**	**71.893**	**3.821**	**0.0005**
SW03	29/09/2022	0.002	<0.0002	0.002	0.003	0.002	<0.001	0.034	0.80	0.42	<0.0001
	20/10/2022	0.002	<0.0002	0.002	0.003	0.001	0.002	0.03	0.86	0.49	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.004	<0.01	<0.010	0.24	1.90	1.10	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.010	<0.01	<0.010	0.53	1.30	0.63	<0.001
	18/01/2023	0.01	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	0.50	0.50	<0.001
	20/02/2023	0.001	<0.0002	0.002	0.02	0.065	0.001	0.12	0.001	17.0	<0.001
	28/03/2023	<0.001	<0.0002	0.001	0.001	0.065	<0.001	0.15	4.50	15.0	<0.0001
	18/04/2023	<0.001	<0.0002	0.001	0.001	0.023	<0.001	0.048	<0.001	3.8	<0.0001
SW03 Baseline		**0.058**	**0.001**	**0.008**	**0.028**	**0.006**	**0.028**	**0.26**	**85.52**	**7.949**	**0.0005**
SW04	29/09/2022	0.001	<0.0002	0.005	0.001	0.002	0.001	0.027	2.70	1.30	<0.0001
	20/10/2022	<0.001	<0.0002	0.004	0.001	0.002	0.001	0.024	2.40	1.10	<0.0001
	14/11/2022	No surface water located at monitoring site – no sample collected									
	14/12/2022	<0.001	<0.002	<0.001	<0.01	<0.01	<0.01	0.084	3.20	1.20	<0.001
	18/01/2023	No surface water located at monitoring site – no sample collected									
	20/02/2023	0.002	<0.0002	0.005	0.05	0.003	0.002	0.039	0.002	1.60	<0.001
	28/03/2023	<0.01	<0.002	0.002	<0.01	0.01	<0.01	<0.05	2.7	1.10	<0.0001
	18/04/2023	<0.001	<0.0002	<0.01	<0.001	0.001	<0.001	0.034	<0.001	0.85	<0.0001
SW04 Baseline		**0.002**	**0.001**	**0.007**	**0.002**	**0.005**	**0.002**	**0.028**	**2.827**	**1.402**	**0.0005**
SW05	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.60	0.83	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.007	3.50	0.66	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.002	<0.001	<0.01	0.12	5.40	0.75	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.10	0.93	<0.001
	18/01/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.20	0.73	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.001	<0.001	0.008	<0.001	0.22	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	0.77	<0.001
	18/04/2023	<0.001	<0.0002	0.001	<0.001	0.003	<0.001	0.008	<0.001	1.0	<0.0001
SW05 Baseline		**0.002**	**0.001**	**0.002**	**0.003**	**0.011**	0.001	**0.026**	**12.306**	**2.073**	**0.0005**

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW06	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.50	0.78	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.012	2.70	0.54	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.012	<0.01	<0.01	0.11	5.30	0.68	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	5.40	0.75	<0.001
	18/01/2023	<0.010	<0.001	<0.01	<0.01	<0.01	<0.01	<0.05	0.01	0.63	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.002	<0.001	0.008	<0.001	0.34	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	1.10	<0.001
	18/04/2023	<0.001	<0.0002	0.001	<0.001	0.002	<0.001	0.009	<0.001	0.54	<0.0001
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**0.013**	**0.0002**	**0.0033**	**0.0018**	**0.011**	**0.0034**	**0.008**	**0.30**	**0.05**	**0.0006**

Table 3 Monthly Surface Water Quality Analytical Results (Hydrocarbons)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.17	0.3	0.1	0.18	<0.01	0.18	0.3	-	-
	20/02/2023	<0.02	<0.5	<1	<0.1	<0.5	<0.01	<0.5	<1	<1	<1
	28/03/2023	-	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	<0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	-	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	14/11/2022	No surface water observed at monitoring site – No sample collected									
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	No surface water observed at monitoring site – No sample collected									
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	0.1	0.1	0.1
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.06	0.1	-	0.07	<0.01	0.7	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW06	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<.0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/04/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

ATTACHMENT 4

Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	18/04/2023

Description

Image of surface water location SW03.

Photo No.	Date
2	18/04/2023

Description

Water sample collected at SW02.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	18/04/2023

Description

Outlook of site facing east from Melaleuca Drive.

Photo No.	Date
4	18/04/2023

Description

Image showing water quality at monitoring location SW06.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	18/04/2023

Description

Image showing drain adjacent to MW5.

Photo No.	Date
6	18/04/2023

Description

Image showing water sample collected at SW04.

MONTHLY WATER QUALITY MONITORING REPORT

Harvest Estate Urban Development

Monitoring Period: 20th February – 28th March 2023

Ewingsdale Road, Byron Bay, NSW, 2481

Job Number: 217140

For:

Planit Consulting

By:

ENV Services

Date:

28 April 2023

ENV Services Pty Ltd

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DOCUMENT CONTROL

Job No:	Job Number: 217140
Client:	Planit Consulting
Filename:	217140_Harvest Estate_WQ_20230428

	Name:	**Date:**	**Signature:**
Prepared By:	Jemma Attkins	24/04/2023	
Reviewed By:	Kingsley Baldwin	26/04/2023	
Approved By:	Kingsley Baldwin	28/04/2023	

Revision:	**Date:**	**Details:**

SCOPE OF ENGAGEMENT AND LIMITATIONS

This report has been prepared by ENV Services at the request of Planit Consulting for the purpose of consolidating and assessing water quality monitoring (surface water and ground water) data to determine impact associated with the development of the Harvest Estate. No other parties may rely on the contents of this report for any purposes except those stated.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

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ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.

To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

1 INTRODUCTION

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Establishment of internal roads and structures with progressive construction of Stage 1 of the development.
- Fencing works along the perimeter of the site are continuing.
- Stabilization of the site is progressively being carried out.
- Progressive installation of stormwater drainage features is being carried out.

2 MONITORING RESULTS & OBSERVATIONS

2.1 Fortnightly Acid Frog Habitat Groundwater Quality Monitoring

Fortnightly water quality monitoring for a period of 6 months from the commencement of Standing Water Level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP). This monitoring requirement is required for the first 6 months from the commencement of construction activities.

Monitoring results from each of the bores were assessed against site specific baseline monitoring results and ANZG (2018) default ranges (freshwater: 95% species protection). An assessment of the monthly results against the thresholds presented in Table 1, identified that:

- All standing water levels were within baseline ranges.
- pH values at all sites were found to be outside the ANZG (2018) default ranges (freshwater: 95% species protection) however pH values were within the site-specific baseline water quality ranges with the exception of MW4 and MW7, where the values were slightly lower than baseline ranges. Although these values are outside baseline ranges, the low pH values recorded are analogous with the Coastal Swamp EEC and particularly Wallum Sedge Frog habitat (pH 3.50 – 6.00).
- Electrical conductivity values were lower than the ANZG (2018) default ranges (freshwater: 95% species protection) which indicate that there are no salinity impacts. All EC values were within baseline ranges at all sites.
- No baseline data (pH and EC) is available for MW6 and MW8 however recorded values are in-line with other groundwater monitoring sites.
- Fortnightly monitoring as per this condition is considered complete as of the 28th March 2023.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	11/10/22	2.96	4.25	46
	20/10/22	2.98	4.10	64
	03/11/22	3.04	4.91	*340*
	14/11/22	2.84	4.60	34
	07/12/22	2.81	4.30	43
	14/12/22	2.71	4.30	56
	18/01/23	2.34	4.25	180
	08/02/23	2.22	4.38	73
	20/02/23	2.70	4.20	36
	08/03/23	2.87	4.18	80
	28/03/23	2.87	4.04	114
MW3 Baseline		**2.08 – 3.96**	**3.99 – 5.33**	**< 206**
MW4	11/10/22	2.56	*4.42*	85
	20/10/22	2.70	*4.50*	110
	03/11/22	2.29	*4.47*	270
	14/11/22	2.30	*4.20*	130
	07/12/22	2.48	*4.46*	140
	14/12/22	2.43	*4.20*	124
	18/01/23	2.09	*4.73*	252
	08/02/23	2.21	*4.99*	308
	20/02/23	2.42	*3.90*	87
	08/03/23	2.35	*4.10*	120
	28/03/23	2.61	*4.32*	259
MW4 Baseline		**0.52 - 2.96**	**3.97 – 5.84**	**< 890**
MW6	11/10/22	1.43	*4.39*	80
	20/10/22	1.41	*4.66*	75
	03/11/22	1.39	*5.89*	1250
	14/11/22	1.34	*4.47*	70
	07/12/22	1.34	6.97	1300
	14/12/22	1.31	*5.86*	760
	18/01/23	1.07	*6.26*	136
	08/02/23	1.27	*5.56*	450
	20/02/23	1.37	*6.03*	1370
	08/03/23	1.32	*5.75*	1280
	28/03/23	1.38	*5.85*	1390
MW6 Baseline		**0.88 – 2.14**	-	-
MW7	11/10/22	1.66	4.82	85
	20/10/22	1.88	*4.50*	86
	03/11/22	1.62	*4.24*	*161*
	14/11/22	1.46	*4.50*	44
	07/12/22	1.51	4.80	105
	14/12/22	1.46	*4.60*	56
	18/01/23	1.42	5.38	90
	08/02/23	1.34	4.91	125
	20/02/23	1.36	*4.10*	*87*
	08/03/23	1.56	*4.07*	95
	28/03/23	1.31	*4.15*	135
MW7 Baseline		**0.85 – 2.36**	**4.65 – 5.62**	**< 147**
MW8	11/10/22	2.52	*4.01*	46
	20/10/22	2.54	*4.07*	117
	03/11/22	2.29	*3.92*	290
	14/11/22	2.08	*3.51*	227
	07/12/22	2.38	*4.12*	533
	14/12/22	2.40	*3.88*	201
	18/01/23	2.32	*4.10*	431
	08/02/23	2.28	*4.08*	360
	20/02/23	2.18	*3.50*	638
	08/03/23	2.17	*3.40*	756
	28/03/23	2.25	*3.10*	474
MW8 Baseline		**1.44 – 2.73**	-	-
ANZG (2018) – Freshwater: 95% Species Protection			**6.50 – 8.00**	**< 2200**

2.2 Monthly Groundwater Monitoring

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2 – MW5 & MW7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Attachment 2, Table 1, the required parameters of all groundwater wells can be summarised as predominantly within historic baseline range values with the exception of;

MW5

- pH (3.00) values are recorded outside of the minimum baseline value (4.31) however, water quality has improved from the previous month (pH 2.60).
- Electrical Conductivity (EC) (5200 µδ/cm) exceeded the maximum baseline value (191 µδ/cm)
- TDS (3700 mg/L) exceeded the maximum baseline value (130 mg/L)
- Total Phosphorus (TP) (0.02 mg/L) fell below the minimum baseline value (0.07 mg/L)
- Calcium (Ca) (440 mg/L) exceeded the maximum baseline value (6.0 mg/L)
- Magnesium (Mg) (57 mg/L) exceeded the maximum baseline value (8.4 mg/L)
- Potassium (K) (7.1 mg/L) exceeded the maximum baseline value (5.4 mg/L)
- Sodium (Na) (34 mg/L) exceeded the maximum baseline value (27.2 mg/L)
- Sulphate (SO_4 as S) (1100 mg/L) exceeded the maximum baseline value (8.3 mg/L)

MW7

- pH (4.50) improved from the previous month (4.10) at this monitoring location, however it remains below the minimum baseline value (4.65)
- Total Nitrogen (TN) (4.40mg/L) exceeds the maximum baseline value (4.14mg/L)
- Sulphate (SO_4 as S) (66 mg/L) exceeded the maximum baseline value (7.3 mg/L)

Monitoring well MW5 is located on the northern margin of the project (Attachment 1) and therefore considered 'up-gradient' of civil works at the site.

Poor water quality observed within MW5 along with observations of deteriorating surface water quality within SW01 – SW04 triggered a preliminary investigation into the possible source. This investigation was primarily targeting whether imported fill utilised in raising the site was influencing (acid generating) localised water quality within the aquifer at MW5 and more broadly across the site. An assessment of ASS validation results derived from the source of the fill material along with an ASS investigation carried out by Douglas Partners on imported fill stockpiled onsite was able to rule out the fill as an influence on the elevated results. Reference to the investigation is provided in the letter to the Principal Contractor, CCA Winslow (low pH in surface water) dated 21st April 2023. Further investigations into the source of the low pH readings has been initiated with the results of this investigation pending.

Monitoring well MW7 is situated approximately 800 metres down-gradient of the Stage 1 construction activities. It is postulated that the deterioration in water quality at this monitoring site is associated with localised influences such as the natural lowering of the water table after a prolonged La Nina event that is mobilising acid generated from in-situ natural acid sulfate soils underlying the monitoring site. Additionally,

site activities can be ruled out as the cause of deteriorating water quality at this monitoring site as similar water quality would be observed within the monitoring wells (MW2 and MW3) located up gradient of MW7.

2.3 Monthly Surface Water Monitoring

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 2. Select photos of the surface water sampling programme are presented in Attachment 4.

Table 2: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

2.3.1 Physiochemical Parameters, Nutrients and Cation/Anions

Monthly surface water sampling of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Attachment 3, Table 1, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following;

SW01

- pH (3.00) fell below the minimum baseline value (6.20).
- Electrical conductivity (EC) exceeded (3000 µδ/cm) the maximum baseline value (428 µδ/cm).
- Total Dissolved Solids (TDS) exceeded (2000 µδ/cm) the maximum baseline value (291 µδ/cm).
- Ammonia (NH_3) exceeded (2.10 mg/L) he maximum baseline value (0.164 mg/L)
- Calcium (Ca) exceeded (290 mg/L) the maximum baseline value (22 mg/L).
- Sulfate as (S) exceeded (880 mg/L) the maximum baseline value (9 mg/L)

SW02

- pH (4.80) fell below the minimum baseline value (6.30)
- Electrical conductivity (EC) exceeded (370 µδ/cm) the maximum baseline value (292 µδ/cm).
- Total Dissolved Solids (TDS) exceeded (310 µδ/cm) the maximum baseline value (199 µδ/cm).
- Calcium (Ca) exceeded (38 mg/L) the maximum baseline value (17 mg/L).
- Magnesium (Mg) exceeded (8.4 mg/L) the maximum baseline value (5 mg/L)
- Sulfate as (S) exceeded (92 mg/L) the maximum baseline value (10 mg/L).

SW03

- pH fell below (3.30) the minimum baseline value (6.10).
- Electrical conductivity (EC) exceeded (750 µδ/cm) the maximum baseline value (281 µδ/cm)
- Total dissolved solids (TDS) exceeded (400 mg/L) the maximum baseline value (191 mg/L).
- Calcium (Ca) exceeded (63 mg/L) the maximum baseline value (21 mg/L).

- Magnesium (Mg) exceeded (11 mg/L) the maximum baseline value (5 mg/L).
- Sulfate as (S) exceeded (110 mg/L) the maximum baseline value (6 mg/L).

SW04

- Sulfate as (S) exceeded (25 mg/L) the maximum baseline value (3 mg/L).

Summary of Results

Monitoring locations SW01 and SW02 are both located 'upstream' of the site. As such, elevated physicochemical and nutrient exceedances at these locations are attributed to extraneous sources. These elevated parameters have impacted water quality within the downstream monitoring sites (SW03 and SW04) Also of note, elevated EC, NH_3 and SO_4 along with low pH concentrations reported at SW01 are indicators of acid sulfate soils and subsequent acid generation. Water quality at the monitoring site downstream (SW04) of SW01 would be influenced by this deterioration however the inclusion of mitigation measures including the emplacement of ag-lime sandbags by the Principal Contractor have enabled the improvement of water quality at SW04, whereby parameters are trending towards or within baseline ranges. The observations of acid sulfate soil indicators at SW01 support the theory of localised acid generation occurring through the natural lowering of the water table exposing acid sulfate soils after a prolonged La Nina event.

2.3.2 Metals

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, Table 2, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

SW01

- Zinc (Zn) exceeded (0.35 mg/L) the maximum baseline value (0.058 mg/L).
- Iron (Fe) exceeded (36 mg/L) the maximum baseline value (1.223 mg/L).
- Aluminium (Al) exceeded (150 mg/L) the maximum baseline value (0.496 mg/L)

SW02

- Nickel (Ni) exceeded (0.024 mg/L) the maximum baseline value (0.005 mg/L).
- Zinc (Zn) exceeded (0.63 mg/L) the maximum baseline value (0.09 mg/L).

SW03

- Nickel (Ni) exceeded (0.065 mg/L) the maximum baseline value (0.006 mg/L).
- Aluminium (Al) exceeded (17 mg/L) the maximum baseline value (7.949 mg/L)

SW04

- Nickel (Ni) exceeded (0.01 mg/L) the maximum baseline value (0.005 mg/L).

Summary of Results

Monitoring sites SW01 and SW02 are located 'upstream' of the site. As such, the metals exceedances noted are likely attributed to extraneous sources.

Monitoring location SW03 is downstream from SW02. As such, elevated aluminium values reported at this site are likely attributed to extraneous sources and is noted to be decreasing down through the site.

SW04 is downstream from SW01. As such, elevated nickel values reported at this site are likely attributed to extraneous sources and is noted to be decreasing down through the site.

2.3.3 Hydrocarbons

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Attachment 3, Table 3, hydrocarbon parameters of all surface water sampling locations were within historic baseline values.

During this monitoring period (20/02/2023 to 28/03/2023), 203.6 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

3 CONCLUSION

Water quality monitoring results from several surface water monitoring locations (SW01 - SW04) along with water quality within groundwater well MW05 have shown a deterioration in water quality proximal to the site works associated with the construction of Harvest Estate Stage 1. Several parameters (pH, along with ammonia and sulfur) which are indicators of acid generation through the exposure of acid sulfate soils were recorded at several sites (SW01 – SW04). A preliminary investigation into the source of deteriorating water quality was triggered. This investigation determined that the source of the poor water quality was not associated with the importation of fill and was likely attributed to other localised sources. Further investigations into the source are pending based on an assessment of parameters including localised groundwater quality and levels, localised surface water quality within the catchment and rainfall data.

Additionally the Principal Contractor, CCA Winslow implemented mitigation measures (installation of ag-lime sandbags within drainage lines and stormwater outlets) to neutralise low pH waters within the drainage lines. These measures were implemented within a timely manner after deteriorating water quality was observed and reported to the Principal Contractor as per the CEMP. This action has assisted in neutralising low pH waters traversing through the site, with water quality results recording improvements as reported within the preliminary investigation letter dated 21 April 2023.

It is anticipated that water quality results will continue to improve over the coming months with the management of these implemented mitigation measures

ATTACHMENT 1

Figures

Legend

Site Location

0 0.5 1km

Figure 1 – Site Location
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

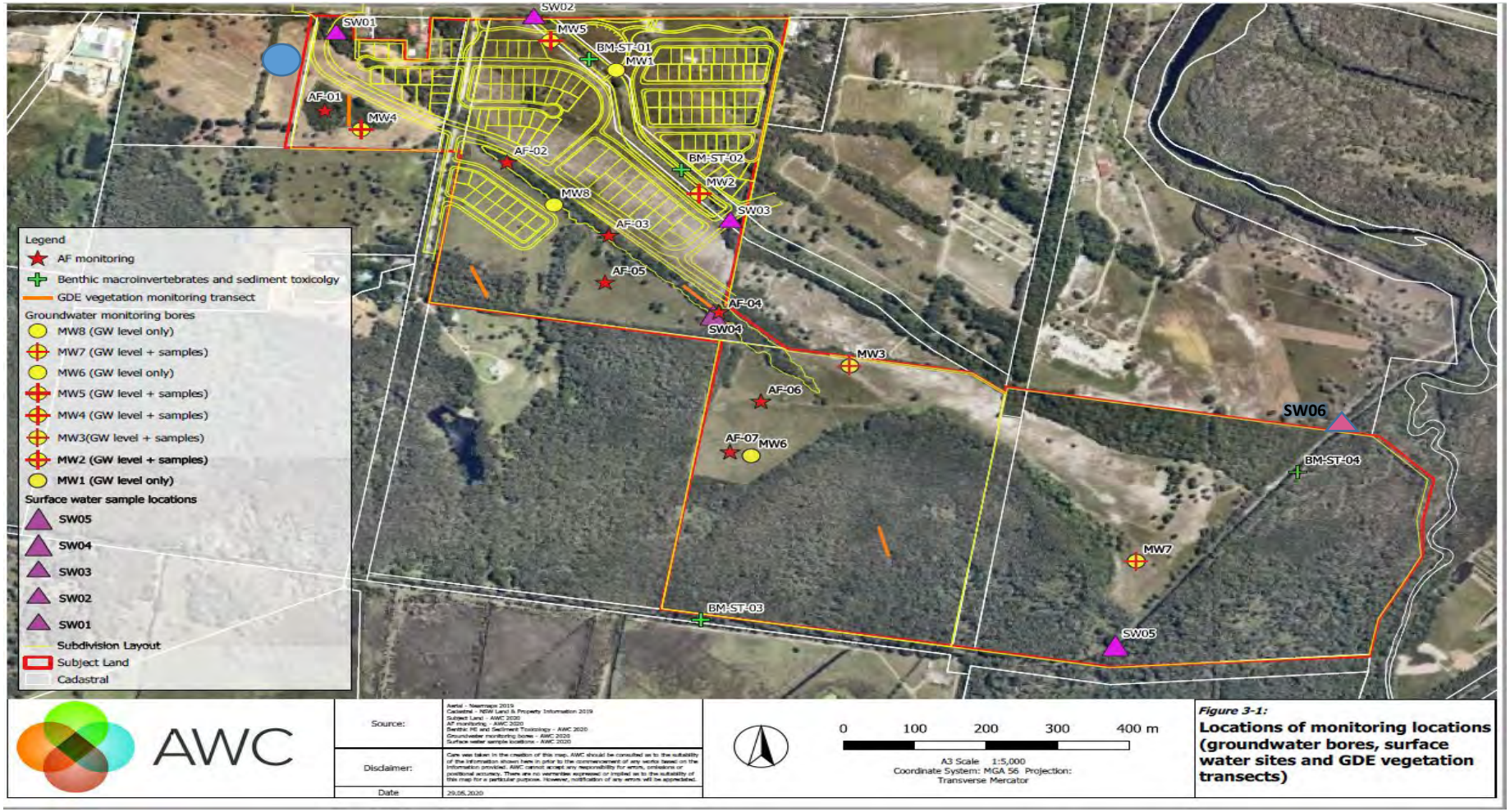

Figure 2 – AWC Surface Water Monitoring Locations
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

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ATTACHMENT 2

Groundwater Quality Analytical Results

Table 1 Groundwater Quality Analytical Results

Site	Date	pH	EC µδ/cm	TDS mg/L	TSS mg/L	TP mg/L	TN mg/L	Nitrite mg/L	NH_3 mg/L	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Cl mg/L	SO_4 (as S) mg/L
MW2	29/09/2022	5.80	54	92	<5	0.12	0.50	0.02	0.51	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.60	100	110	<5	0.09	2.00	0.02	0.24	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.00	100	240	<5	0.07	<0.2	<0.10	0.24	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.60	110	170	<5	0.02	3.10	<0.10	<0.05	<5	<5	<5	29	15	5.0
	18/01/2023	4.60	130	76	9.2	0.12	2.50	<0.05	0.09	<5	<5	<5	29	17	7.0
	20/02/2023	6.00	100	160	5.3	0.09	0.25	<0.25	0.10	<0.5	0.7	3.1	27	27	3.7
	28/03/2023	5.90	140	92	17.0	0.02	<0.2	<0.02	0.12	<5	<5	<5	21	15	7.2
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0. 45**	**2.03**	**0.07**	**0.338**	**0.7**	**1.4**	**4.2**	**29.7**	**189**	**9.8**
MW3	29/09/2022	4.20	53	40	370	0.09	0.50	0.02	0.05	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.10	64	62	130	0.01	0.50	0.02	0.20	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.60	57	84	170	0.03	<0.2	<0.02	0.27	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.30	43	32	280	<0.01	1.10	<0.02	<0.01	<5	<5	<5	6.0	5.2	<2
	18/01/2023	4.25	54	28	670	0.03	1.40	<0.05	<0.01	<5	<5	<5	<5	4.1	4.1
	20/02/2023	4.20	36	40	76	0.02	7.26	0.06	<0.10	<0.5	1	<0.5	7.6	6.8	<2
	28/03/2023	4.10	70	44	<5	<0.01	0.22	<0.02	<0.01	<0.5	1	0.6	4.8	7.9	2.2
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**4.14**	**0.167**	**0.294**	**3.8**	**5.3**	**3.1**	**26.4**	**121**	**13.4**
MW4	29/09/2022	4.50	100	88	350	0.03	1.50	0.10	0.16	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.50	110	100	69	0.02	1.00	0.04	0.78	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.20	130	340	16	0.01	7.00	<0.10	0.13	2.6	4.8	1.1	22	30	5
	14/12/2022	4.20	140	140	60	<0.01	3.00	<0.10	<0.05	<5	<5	<5	21	23	7.8
	18/01/2023	5.73	170	110	170	0.02	2.40	<0.50	0.16	<5	<5	<5	20	26	6.6
	20/02/2023	3.90	87	110	31	0.04	3.88	0.28	<0.05	3.5	5.4	0.9	15	15	5.8
	28/03/2023	4.70	180	120	190	0.04	22.00	<0.02	0.08	8.8	5.1	<5	18	28	6.0
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**4.36**	**0.185**	**1.392**	**11.3**	**15.6**	**5.4**	**146.3**	**199**	**19.2**
MW5	29/09/2022	4.50	59	68	630	0.13	6.33	0.02	0.41	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.40	75	82	92	0.02	0.50	0.02	0.10	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.60	120	270	150	0.08	7.80	<0.10	0.52	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.50	150	150	230	0.02	11.0	<0.05	<0.060	<5	<5	<5	24	29	9.7
	18/01/2023	2.80	1600	1100	480	0.05	5.70	<0.05	1.70	90	72	<5	49	43	6.6
	20/02/2023	2.60	2700	3200	310	0.03	3.20	<0.05	4.20	390	76	7.8	47	27	750
	28/03/2023	3.00	5200	3700	130	0.02	11.0	<0.02	5.90	440	57	7.1	34	28	1100
MW5 Baseline		**4.31 - 5.53**	**191**	**130**	**3003**	**0.97**	**13.40**	**0.117**	**0. 863**	**6.0**	**8.4**	**5.4**	**27.2**	**82**	**8.3**
MW7	29/09/2022	4.60	26	40	190	0.10	2.50	0.020	0.30	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.50	86	70	120	0.01	2.90	0.040	0.40	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.50	44	170	<100	0.03	<2.00	<0.10	0.01	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.60	56	92	23	0.04	11.0	<0.20	<0.10	<5	<5	<5	8.7	7.5	2.5
	18/01/2023	4.38	63	32	390	0.09	2.00	<0.025	<0.05	<5	<5	<5	11.0	7.5	31.0
	20/02/2023	4.10	87	60	30	0.02	4.90	0.42	<0.05	1.4	1.9	1.1	5.8	9.1	5.7
	28/03/2023	4.50	160	94	18	0.02	4.40	<0.02	0.02	2.0	2.0	0.6	12.0	21.0	66.0
MW7 Baseline		**4.65 - 5.62**	**147**	**100**	**3140**	**0.71**	**4.15**	**0.048**	**0.471**	**3.4**	**2.2**	**3.1**	**31.0**	**172**	**7.3**
ANZG (2018): SE Aust 95% Undisturbed Lowland River		**6.50 – 8.00**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

ATTACHMENT 3

Surface Water Quality Analytical Results

Table 1 Monthly Surface Water Quality Analytical Results (Physiochemical, Nutrients and Cation/Anions)

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 as S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW01	29/09/2022	6.90	140	180	11	0.47	5.2	<0.02	<0.01	22	14	3	30	14	3.4	450	3.1
	20/10/2022	6.60	400	320	30	0.03	<0.02	<0.02	0.03	24	9.1	2.9	31	22	33	43	4.7
	14/11/2022	6.00	920	780	4900	3.10	14.00	<0.02	6.90	280	73	<50	200	25	3.7	67	0.2
	14/12/2022	4.50	1100	800	210	0.150	23.27	<0.10	0.05	180	43	6.8	54	24	560	88	3.6
	18/01/2023	6.30	25	380	120	0.047	5.20	<0.02	0.087	<2	13	<5	40	24	180	25	4.7
	20/02/2023	3.40	1300	1100	32	0.42	8.90	<0.02	0.37	170	57	6.3	57	28	350	<5	3.8
	28/03/2023	3.00	3000	2000	100	<0.01	1.29	<0.02	2.10	290	38	5.1	47	29	880	<5	7.7
SW01 Baseline		**6.20 – 7.00**	**428**	**291**	**73**	**3.52**	**3.52**	**0.039**	**0.164**	**22**	**16**	**6**	**51**	**118**	**9**	**768**	**-**
SW02	29/09/2022	6.90	160	170	8.8	0.04	1.30	<0.02	0.03	19	5.8	1.9	27	29	2.8	22	8.0
	20/10/2022	6.50	140	120	6.2	0.02	<0.20	<0.02	0.01	12	3.4	1.7	16	17	2.9	<5	8.7
	14/11/2022	6.40	190	150	210	0.18	13.0	<0.02	<0.01	47	11	<5	62	54	18	24	0.1
	14/12/2022	6.30	200	110	870	0.27	2.70	<0.10	0.05	38	5.9	5.1	25	26	29	14	0.1
	18/01/2023	6.60	61	220	190	0.79	21.0	<0.20	0.049	<2	5.8	<5	27	31	6.2	61	0.1
	20/02/2023	6.50	1300	240	29	0.023	1.90	<0.10	0.31	38	11	4.1	29	26	24	<5	4.4
	28/03/2023	4.80	370	310	370	1.50	<0.20	<0.02	0.19	43	8.4	4.1	17	22	92	<10	5.7
SW02 Baseline		**6.30 – 7.00**	**292**	**199**	**495**	**1.88**	**8.55**	**0.06**	**0.261**	**17**	**5**	**6**	**32**	**161**	**10**	**182**	**-**
SW03	29/09/2022	6.80	100	120	<5	0.02	1.10	<0.02	<0.01	13	4.4	1	23	24	2.4	<5	9.3
	20/10/2022	5.90	870	650	26	0.03	<0.20	<0.02	<0.01	7.6	2.3	1	12	270	13	<5	7.5
	14/11/2022	6.50	160	140	260	0.13	7.40	<0.01	<0.05	18	5.7	<5	36	27	9	<5	2.6
	14/12/2022	6.50	160	110	11	0.01	3.90	<0.01	0.05	13	<5	<5	18	23	11	<5	4.4
	18/01/2023	6.50	<5	160	8.5	0.02	1.30	<0.02	<0.010	<2	6.2	<5	26	31	17	<5	5.1
	20/02/2023	3.40	720	0.54	13	0.01	5.10	<0.02	<0.010	63	14	3	28	22	100	<5	6
	28/03/2023	3.30	750	400	7.4	0.02	<0.20	<0.02	0.07	63	11	2.3	16	14	110	<5	9.9
SW03 Baseline		**6.10 - 6.70**	**281**	**191**	**1005**	**2.14**	**4.31**	**0.041**	**0.155**	**21**	**5**	**4**	**30**	**111**	**6**	**86**	**-**
SW04	29/09/2022	4.50	52	68	<5	0.01	5.10	<0.02	0.18	1.6	2.6	1	17	20	<2	<5	4.8
	20/10/2022	4.20	110	90	<5	0.01	0.30	<0.02	<0.10	1.3	2.3	1	16	20	<2	<5	7.5
	14/11/2022	No surface water located at monitoring site – no sample collected															
	14/12/2022	3.20	280	190	<5	0.01	3.2	<0.10	0.05	<5	<5	<5	20	42	<2	<5	2
	18/01/2023	No surface water located at monitoring site – no sample collected															
	20/02/2023	4.10	160	0.2	<5	0.02	7.40	<0.10	0.090	2.7	3.9	1.6	23	22	15	<5	5.9
	28/03/2023	4.20	130	68	<5	<0.01	<0.25	<0.10	<0.01	<5	<5	<5	14	17	25	<5	8.0
SW04 Baseline		**4.20 – 4.50**	**165**	**112**	**293**	**0.50**	**4.47**	**0.052**	**0.693**	**3.2**	**2.3**	**2.9**	**20**	**90**	**3**	**86**	**-**
SW05	29/09/2022	5.90	510	480	5.2	0.12	3.00	<0.20	0.17	9.4	17	7.7	140	220	11	<5	7.7
	20/10/2022	6.20	690	650	7.2	0.06	0.50	<0.20	0.24	11	19	7.9	160	180	8.6	<5	8.9
	14/11/2022	6.20	1000	820	13	0.06	8.10	<0.10	<0.05	18	27	11	260	310	100	<5	4.7
	14/12/2022	6.20	1100	830	16	0.05	3.10	<0.10	0.05	16	21	13	240	330	40	<5	7.5
	18/01/2023	6.30	<5	2800	33	0.09	3.38	<0.02	0.09	<2	96	41	820	1300	160	<5	7
	20/02/2023	6.70	2300	18	18	0.10	3.40	<0.10	0.07	190	550	170	4700	2000	890	<5	5.4
	28/03/2023	5.60	760	470	<5	0.02	<0.02	<0.10	0.08	9.4	14	6.4	110	200	23	6.7	9.4
SW05 Baseline		**5.10 – 7.20**	**6927**	**4710**	**136**	**0.21**	**2.227**	**0.052**	**0.592**	**57**	**130**	**58**	**1667**	**980**	**115**	**63**	**-**
SW06	29/09/2022	6.00	580	480	<5	0.13	8.60	<0.02	0.16	9.4	18	7.7	140	220	11	5.1	7.8
	20/10/2022	6.30	730	580	16	0.05	0.50	<0.02	0.19	9.1	13	5.8	110	330	7.5	6.2	8.7
	14/11/2022	6.20	1000	840	13	0.04	1.10	<0.10	0.36	18	29	12	270	310	100	<5	<5
	14/12/2022	6.30	1200	840	16	0.10	5.80	<0.10	0.05	16	21	13	240	340	44	<5	8.3
	18/01/2023	6.40	5400	3700	31.47	0.07	2.50	<0.02	0.04	<2	120	47	1000	1800	200	<5	6.8
	20/02/2023	6.80	14000	19	89.00	0.09	4.10	<0.10	0.11	170	480	160	4000	22	1200	<5	5.1
	28/03/2023	5.60	730	400	6.20	0.03	<0.20	<0.20	0.07	11	14	6.3	110	180	18	9.7	8.3
SW06 Baseline		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	**<2200**	**-**	**<50**	**<0.05**	**<0.50**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**-**

Table 2 Monthly Surface Water Quality Analytical Results (Metals)

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW01	29/09/2022	0.003	<0.0002	0.002	0.32	0.015	0.005	0.071	2.70	1.50	<0.0001
	20/10/2022	2	<0.0002	0.002	0.16	0.009	0.003	0.042	2.40	0.66	<0.0001
	14/11/2022	1.3	<0.02	<0.10	1.0	0.30	0.10	4.70	130.00	130.00	<0.001
	14/12/2022	0.0016	<0.002	0.014	0.20	0.077	0.015	0.68	1.60	22.00	<0.001
	29/09/2022	3	<0.2	2	320	15	5	0.071	2700	1500	<0.10
	18/01/2023	<0.010	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	3.20	0.70	<0.01
	20/02/2023	0.027	0.0004	0.019	0.07	0.16	0.049	0.35	0.049	37.0	0.002
	28/03/2023	0.002	0.0008	0.002	0.003	0.46	0.003	0.97	36.0	150	0.0001
SW01 Baseline		**0.003**	**0.001**	**0.002**	**0.041**	**0.006**	**0.001**	**0.058**	**1.223**	**0.496**	**0.0005**
SW02	29/09/2022	0.003	<0.0002	0.002	0.004	0.002	0.001	0.057	1.50	0.42	<0.0001
	20/10/2022	0.001	<0.0002	0.001	0.003	0.001	<0.001	0.032	0.62	0.22	<0.0001
	14/11/2022	0.037	<0.002	<0.001	0.015	<0.01	<0.01	0.096	53.00	1.80	<0.001
	14/12/2022	0.066	<0.002	0.034	0.094	0.013	0.071	1.00	9.70	13.00	<0.001
	18/01/2023	0.023	<0.002	<0.01	0.015	<0.010	0.014	0.15	45.0	3.30	<0.001
	20/02/2023	0.033	0.0002	0.009	0.090	0.018	0.013	0.28	0.013	12.0	<0.001
	28/03/2023	0.002	0.0003	0.002	0.003	0.024	0.001	0.63	2.50	3.4	<0.0001
SW02 Baseline		**0.045**	**0.001**	**0.007**	**0.012**	**0.005**	**0.020**	**0.09**	**71.893**	**3.821**	**0.0005**
SW03	29/09/2022	0.002	<0.0002	0.002	0.003	0.002	<0.001	0.034	0.80	0.42	<0.0001
	20/10/2022	0.002	<0.0002	0.002	0.003	0.001	0.002	0.03	0.86	0.49	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.004	<0.01	<0.010	0.24	1.90	1.10	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.010	<0.01	<0.010	0.53	1.30	0.63	<0.001
	18/01/2023	0.01	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	0.50	0.50	<0.001
	20/02/2023	0.001	<0.0002	0.002	0.02	0.065	0.001	0.12	0.001	17.0	<0.001
	28/03/2023	<0.001	<0.0002	0.001	0.001	0.065	<0.001	0.15	4.50	15.0	<0.0001
SW03 Baseline		**0.058**	**0.001**	**0.008**	**0.028**	**0.006**	**0.028**	**0.26**	**85.52**	**7.949**	**0.0005**
SW04	29/09/2022	0.001	<0.0002	0.005	0.001	0.002	0.001	0.027	2.70	1.30	<0.0001
	20/10/2022	<0.001	<0.0002	0.004	0.001	0.002	0.001	0.024	2.40	1.10	<0.0001
	14/11/2022	No surface water located at monitoring site – no sample collected									
	14/12/2022	<0.001	<0.002	<0.001	<0.01	<0.01	<0.01	0.084	3.20	1.20	<0.001
	18/01/2023	No surface water located at monitoring site – no sample collected									
	20/02/2023	0.002	<0.0002	0.005	0.05	0.003	0.002	0.039	0.002	1.60	<0.001
	28/03/2023	<0.01	<0.002	0.002	<0.01	0.01	<0.01	<0.05	2.7	1.10	<0.0001
SW04 Baseline		**0.002**	**0.001**	**0.007**	**0.002**	**0.005**	**0.002**	**0.028**	**2.827**	**1.402**	**0.0005**
SW05	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.60	0.83	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.007	3.50	0.66	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.002	<0.001	<0.01	0.12	5.40	0.75	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.10	0.93	<0.001
	18/01/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.20	0.73	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.001	<0.001	0.008	<0.001	0.22	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	0.77	<0.001
SW05 Baseline		**0.002**	**0.001**	**0.002**	**0.003**	**0.011**	0.001	**0.026**	**12.306**	**2.073**	**0.0005**
SW06	29/09/2022	<0.001	<0.0002	0.002	<0.001	0.002	<0.001	0.008	4.50	0.78	<0.0001
	20/10/2022	<0.001	<0.0002	0.001	<0.001	0.002	0.001	0.012	2.70	0.54	<0.0001
	14/11/2022	<0.001	<0.002	<0.001	0.012	<0.01	<0.01	0.11	5.30	0.68	<0.001
	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	5.40	0.75	<0.001
	18/01/2023	<0.010	<0.001	<0.01	<0.01	<0.01	<0.01	<0.05	0.01	0.63	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.002	<0.001	0.008	<0.001	0.34	<0.001
	28/03/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	3.80	1.10	<0.001
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**0.013**	**0.0002**	**0.0033**	**0.0018**	**0.011**	**0.0034**	**0.008**	**0.30**	**0.05**	**0.0006**

Table 3 Monthly Surface Water Quality Analytical Results (Hydrocarbons)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
SW01 Baseline		**-**	**0.05**	**0.13**	**0.09**	**0.06**	**-**	**-**	**0.24**	**0.10**	**0.17**
SW02	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.17	0.3	0.1	0.18	<0.01	0.18	0.3	-	-
	20/02/2023	<0.02	<0.5	<1	<0.1	<0.5	<0.01	<0.5	<1	<1	<1
	28/03/2023		<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
SW02 Baseline		**-**	**0.05**	**0.10**	**0.05**	**0.06**	**-**	**-**	**0.22**	**0.10**	**0.14**
SW03	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	<0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023		<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
SW03 Baseline		**-**	**0.05**	**0.10**	**0.06**	**0.06**	**-**	**-**	**0.20**	**0.10**	**0.12**
SW04	14/11/2022	No surface water observed at monitoring site – No sample collected									
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	No surface water observed at monitoring site – No sample collected									
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.05	<0.1	<0.02
SW04 Baseline		**-**	**0.05**	**0.10**	**0.06**	**0.06**	**-**	**-**	**0.20**	**0.10**	**0.10**
SW05	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.06	0.1	-	0.07	<0.01	0.7	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		**-**	**0.05**	**0.10**	**0.06**	**0.06**	**-**	**-**	**0.20**	**0.10**	**0.10**
SW06	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<.002	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1
	28/03/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

ATTACHMENT 4

Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	28/03/2023

Description

Image of surface water location SW03.

Photo No.	Date
2	28/03/2023

Description

Water sample collected at SW02.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	28/03/2023

Description

Outlook of site facing east from Melaleuca Drive.

Photo No.	Date
4	28/03/2023

Description

Image showing water quality at monitoring location SW06.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	28/03/2023

Description

Image showing drain adjacent to MW5.

Photo No.	Date
6	28/03/2023

Description

Image showing water sample collected at SW04.

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

MONTHLY WATER QUALITY REPORT

Harvest Estate Urban Development

Harvest Estate

Ewingsdale Road, Byron Bay, NSW 2481

Reporting Period: February 2023

ENV217140_Harvest Estate_WQ_20230314

14/03/2023

Monitoring Period: 18th January – 20th February 2023

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was carried out by Australian Wetlands Consulting (AWC) and undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Bulk fill and general earthworks associated with progressive construction of Stage 1 of the development.

Fortnightly Acid Frog Habitat Groundwater Quality Monitoring (First 6 months of Construction)

Fortnightly water quality monitoring of Standing Water Level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP).

Monitoring results from each of the bores were assessed against site specific baseline monitoring results and ANZG (2018) default ranges (freshwater: 95% species protection). An assessment of the monthly results against the thresholds presented in Table 1, identified that:

- All standing water levels were within baseline ranges.
- pH values at all sites were found to be outside the ANZG (2018) default ranges (freshwater: 95% species protection) however pH values were within the site-specific baseline water quality ranges

with the exception of MW4 and MW7, where the values were slightly lower than baseline ranges. Although these values are outside baseline ranges, the low pH values recorded are analogous with the Coastal Swamp EEC and particularly Wallum Sedge Frog habitat (pH 3.50 – 6.00).

- Electrical conductivity values were lower than the ANZG (2018) default ranges (freshwater: 95% species protection) which indicate that there is no salinity impacts. All EC values were within baseline ranges at all sites.
- No baseline data (pH and EC) is available for MW6 and MW8 however recorded values are in line with other monitoring sites.
- Fortnightly monitoring as per this condition shall conclude in early April.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	11/10/22	2.96	*4.25*	*46*
	20/10/22	2.98	*4.10*	*64*
	03/11/22	3.04	*4.91*	*340*
	14/11/22	2.84	*4.60*	*34*
	07/12/22	2.81	*4.30*	*43*
	14/12/22	2.71	*4.30*	*56*
	18/01/23	2.34	*4.25*	180
	08/02/23	2.22	*4.38*	*73*
	20/02/23	2.70	*4.20*	*36*
MW3 Baseline		**2.08 – 3.96**	**3.99 – 5.33**	**38 - 206**
MW4	11/10/22	2.56	*4.42*	*85*
	20/10/22	2.70	*4.50*	*110*
	03/11/22	2.29	*4.47*	270
	14/11/22	2.30	*4.20*	130
	07/12/22	2.48	*4.46*	140
	14/12/22	2.43	*4.20*	*124*
	18/01/23	2.09	*4.73*	252
	08/02/23	2.21	*4.99*	308
	20/02/23	2.42	*3.90*	*87*
MW4 Baseline		**0.52 - 2.96**	**3.97 – 5.84**	**102 - 890**
MW6	11/10/22	1.43	*4.39*	*80*
	20/10/22	1.41	*4.66*	*75*
	03/11/22	1.39	*5.89*	1250
	14/11/22	1.34	*4.47*	*70*
	07/12/22	1.34	6.97	1300
	14/12/22	1.31	*5.86*	760
	18/01/23	1.07	*6.26*	136
	08/02/23	1.27	*5.56*	450
	20/02/23	1.37	*6.03*	1370
MW6 Baseline		**0.88 – 2.14**	**-**	**-**
MW7	11/10/22	1.66	*4.82*	*85*
	20/10/22	1.88	*4.50*	*86*
	03/11/22	1.62	*4.24*	161
	14/11/22	1.46	*4.50*	*44*
	07/12/22	1.51	*4.80*	*105*
	14/12/22	1.46	*4.60*	*56*
	18/01/23	1.42	*5.38*	*90*
	08/02/23	1.34	*4.91*	125
	20/02/23	1.36	*4.10*	*87*
MW7 Baseline		**0.85 – 2.36**	**4.65 – 5.62**	**39 - 147**
MW8	11/10/22	2.52	*4.01*	*46*
	20/10/22	2.54	*4.07*	117
	03/11/22	2.29	*3.92*	290
	14/11/22	2.08	*3.51*	227
	07/12/22	2.38	*4.12*	533
	14/12/22	2.40	*3.88*	201
	18/01/23	2.32	*4.10*	431
	08/02/23	2.28	*4.08*	360
	20/02/23	2.18	*3.50*	638
MW8 Baseline		**1.44 – 2.73**	**-**	**-**
ANZG (2018) – Freshwater: 95% Species Protection			**6.50 – 8.00**	**125 - 2200**

Monthly Groundwater Sampling Event (5 Sites)

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2 – MW5 & MW7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Table 2, the required parameters of all groundwater wells can be summarised as predominantly within historic baseline range values with the exception of;

MW2

- Total Dissolved Solids (TDS) exceeded (160 mg/L) the maximum baseline value of (103 mg/L).

MW5

- pH fell (2.60) below the minimum baseline value (4.31).
- Ammonia (NH_3) exceeded (4.2 mg/L) the maximum baseline value (0.86 mg/L).
- Conductivity (EC) exceeded (2700 µS/cm) the maximum baseline value (191 µS/cm).
- Sulphate (as Sulfur) exceeded (750 mg/L) the maximum baseline value (25 mg/L).
- Total Dissolved Solids (TDS) exceeded (3200 mg/L) the maximum baseline value (130 mg/L) .
- Calcium exceeded (390 mg/L) the maximum baseline value (6.0 mg/L).
- Potassium (K) exceeded (7.8 mg/L) the maximum baseline value (5.4 mg/L).
- Sodium (Na) exceeded (47.0 mg/L) the maximum baseline value (27.2 mg/L).

MW5 is considered an 'up-gradient' of active works at the site, as such exceedances are likely to be attributed to extraneous sources. However, further investigations are required at this site as localised influences such as the percolation of meteoric water through imported fill material located adjacent to the monitoring well cannot be ruled out as influencing the elevated results. Further investigation of surface water seepage or the collection of soil samples from fill material adjacent to this monitoring well is required to be carried out to determine whether the fill material is generating the anomalous results.

MW2 is situated down-gradient from MW5, as such elevated concentrations at this location are attributed to flow on effects from extraneous sources. TDS levels down-gradient from MW2 are noted to be decreasing as water moves through the site.

Table 2: Monthly Groundwater Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 (as S) (mg/L)
MW2	14/11/2022	6.00	100	240	<5	0.07	<0.20	<0.10	0.24	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.60	110	170	<5	0.020	3.1	<0.10	<0.05	<5	<5	<5	29	15	5
	18/01/2023	4.60	130	76	9.2	0.12	2.5	<0.05	0.09	<5	<5	<5	29	17	7
	20/02/2023	6.00	100	160	5.3	0.09	0.25	<0.25	0.10	<0.5	0.7	3.1	27	27	3.7
MW2 Baseline		**4.22 - 5.70**	**152**	**103**	**483**	**0.45**	**2.03**	**0.07**	**0.338**	**0.7**	**1.4**	**4.2**	**29.7**	**189**	**29**
MW3	14/11/2022	4.60	57	84	170	0.03	<0.2	<0.02	0.27	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.30	43	32	280	<0.01	1.1	<0.02	<0.01	<5	<5	<5	6	5.2	<2
	18/01/2023	4.25	54	28	670	0.03	1.4	<0.05	<0.01	<5	<5	<5	<5	4.1	4.1
	20/02/2023	4.20	36	40	76	0.02	7.26	0.06	<0.10	<0.5	1	<0.5	7.6	6.8	<2
MW3 Baseline		**3.99 - 5.33**	**206**	**140**	**5223**	**1.57**	**4.14**	**0.167**	**294**	**3.8**	**5.3**	**3.1**	**26.4**	**121**	**40**
MW4	14/11/2022	4.50	130	340	16	0.010	7000	<0.10	0.13	2.6	4.8	1.1	22	30	5
	14/12/2022	4.20	140	140	60	<0.01	3	<0.10	<0.05	<5	<5	<5	21	23	7.8
	18/01/2023	5.73	170	110	170	0.020	2.40	<0.50	0.16	<5	<5	<5	20	26	6.6
	20/02/2023	3.90	87	110	31	0.0	3.88	0.28	<0.05	3.5	5.4	0.9	15	15	5.8
MW4 Baseline		**3.97 - 5.84**	**890**	**605**	**1220**	**0.43**	**4.36**	**0.185**	**1.392**	**11.3**	**15.6**	**5.4**	**146.3**	**199**	**58**
MW5	14/11/2022	4.60	120	270	150	0.08	7.80	<0.10	0.520	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.50	150	150	230	0.02	11.00	<0.05	<0.060	<5	<5	<5	24	29	9.7
	18/01/2023	2.80	1600	1100	480	0.05	5.70	<0.05	1.70	90	72	<5	49	43	6.6
	20/02/2023	2.60	2700	3200	310	0.03	3.2	<0.05	4.20	390	76	7.8	47	27	750
MW5 Baseline		**<5.53**	**191**	**130**	**3003**	**0.97**	**13.4**	**0.117**	**0. 863**	**6.0**	**8.4**	**5.4**	**27.2**	**82**	**25**
MW7	14/11/2022	4.50	44	170	<100	0.03	<2.00	<0.10	0.010	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.60	56	92	23	0.04	11.00	<0.20	<0.10	<5	<5	<5	8.7	7.5	2.5
	18/01/2023	4.38	63	32	390	0.09	2.00	<0.025	<0.05	<5	<5	<5	11	7.5	31
	20/02/2023	4.10	87	60	30	0.02	4.90	0.420	<0.05	1.4	1.9	1.1	5.8	9.1	5.7
MW7 Baseline		**< 5.62**	**147**	**100**	**3140**	**0.71**	**4.15**	**0.048**	**0.471**	**3.4**	**2.2**	**3.1**	**31.0**	**172**	**22**
ANZG (2018) (95% Undisturbed Freshwater)		**6.5 – 8.0**	**<2200**	**-**	**50**	**50**	**500**	**-**	**0.9**	**-**	**-**	**-**	**-**	**-**	**-**

Note: Maximum values are provided for all baseline analytes.

Monthly Surface Water Sampling Event (6 Sites)

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 3. Select photos of the surface water sampling programme are presented in Attachment 3.

Table 3: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

Monthly surface water sampling of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 4, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following;

SW01

- pH exceeded (3.40) the minimum baseline value (6.20).
- Electrical conductivity (EC) exceeded (1300 µδ/cm) the maximum baseline value (428 µδ/cm).
- Total Dissolved Solids (TDS) exceeded (1100 mg/L) the maximum baseline value (291 mg/L).
- Total Nitrogen (TN) exceeded (8.9 mg/L) the maximum baseline value (3.52 mg/L).
- Calcium (Ca) exceeded (170 mg/L) the maximum baseline value (22 mg/L).
- Potassium (K) marginally exceeded (6.3 mg/L) the maximum baseline value (6.0 mg/L).
- Sulfate as (S) exceeded (350 mg/L) the maximum baseline value (9 mg/L).

SW02

- Calcium (Ca) exceeded (38 mg/L) the maximum baseline value (17 mg/L).
- Sulfate as (S) exceeded (24 mg/L) the maximum baseline value (10 mg/L).

SW03

- pH fell below (3.40) the minimum baseline value (6.10).
- Total Nitrogen (TN) exceeded (5.1 mg/L) the maximum baseline value (4.31 mg/L).
- Calcium (Ca) exceeded (63 mg/L) the maximum baseline value (21 mg/L).
- Sulfate as (S) exceeded (100 mg/L) the maximum baseline value (6 mg/L).

SW04

- pH fell below (4.10) the minimum baseline value (4.20).
- Total Nitrogen (TN) exceeded (7.4 mg/L) the maximum baseline value (4.47 mg/L).
- Sulfate as (S) exceeded (15 mg/L) the maximum baseline value (3 mg/L).

SW05

- Total Nitrogen (TN) exceeded (3.4 mg/L) the maximum baseline value (2.27 mg/L).
- Calcium (Ca) exceeded (190 mg/L) the maximum baseline value (57 mg/L).
- Magnesium (Mg) exceeded (550 mg/L) the maximum baseline concentration (130 mg/L).

Monitoring locations SW01 and SW02 are both located 'upstream' of the site. As such, elevated physicochemical and nutrient exceedances at these locations are attributed to by extraneous sources.

Elevated nitrogen, sulfate and calcium along with low pH observed at monitoring location SW03 is likely associated with the elevated results observed within groundwater monitoring well MW5 located adjacent to the drainage line that runs proximal to the north-eastern boundary of Stage 1. Low pH and elevated sulfate are indicative of impacts derived from acid sulfate soils. Therefore further investigations of surface water and fill material are required adjacent to MW5 to determine whether the fill is acid generating.

Low pH, elevated sulfur and total nitrogen were observed at monitoring location SW04. This site is located downstream of the site, and it is likely that site activities are possibly contributing to the elevated results. The monitoring round scheduled to be carried out March will ascertain whether analyte values remain high and whether an investigation in to the source of the elevated results is warranted.

Monitoring site SW05 is considered an 'upstream' location. As such elevated TN, Ca and Mg at this location are likely attributed to extraneous sources.

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 5, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

SW01

- Chromium (Cr) exceeded (0.019 mg/L) the maximum baseline value (0.002 mg/L).
- Copper (Cu) exceeded the maximum baseline value (0.041 mg/L). (0.07 mg/L)
- Nickel (Ni) exceeded (0.16 mg/L) the maximum baseline value (0.006 mg/L).
- Lead (Pb) exceeded (0.049 mg/L) the maximum baseline value (0.001 mg/L).
- Zinc (Zn) exceeded (0.35 mg/L) the maximum baseline value (0.058 mg/L).

SW02

- Ammonia (NH_3) exceeded (0.310 mg/L) the maximum baseline value (0.261 mg/L).
- Chromium (Cr) exceeded (0.009 mg/L) the maximum baseline value (0.007 mg/L).
- Copper (Cu) exceeded (0.09 mg/L) the maximum baseline value (0.012 mg/L).
- Nickel (Ni) exceeded (0.018 mg/L) the maximum baseline value (0.005 mg/L).
- Zinc (Zn) exceeded (0.0039 mg/L) the maximum baseline value (0.028 mg/L).
- Aluminium (Al) exceeded (12 mg/L) the maximum baseline value (3.821 mg/L).

SW03

- Aluminium (Al) exceeded (17 mg/L) the maximum baseline value (7.949 mg/L).

SW04

- Copper (Cu) exceeded (0.050 mg/L) the maximum baseline value (0.002 mg/L).
- Zinc (Zn) exceeded (0.039 mg/L) the maximum baseline value (0.028 mg/L).
- Aluminium (Al) exceeded (1.60 mg/L) the maximum baseline value (1.402 mg/L).

SW05

- Copper (Cu) exceeded (0.010 mg/L) the maximum baseline value (0.003 mg/L).

Monitoring sites SW01 and SW02 are both located 'upstream' of the site. As such, the metals exceedances noted at these locations are likely attributed to by extraneous sources.

Monitoring location SW03 is downstream from SW02. As such, elevated aluminium values reported at this site are likely attributed to extraneous sources and is noted to be decreasing down through the site.

Monitoring site SW04 is downstream of the site. Elevated Cu and Zn appear to be anomalous, however ongoing monitoring will identify potential trends relating to these exceedances.

Sample location SW05 is an upstream location, as such elevated Cu at this location is likely attributed to extraneous sources.

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in Chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 6, these required hydrocarbon parameters of all surface water sampling locations can be summarised as in line with the historic baseline values.

During this monitoring period (18/01/2023-20/02/2023), 96 mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology.

Table 4: Monthly Surface Water Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Nitrite (mg/L)	NH_3 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	S (mg/L)	Chlorophyll a (µg/L)	DO (mg/L)
SW01	14/12/2022	4.5	1100	800	210	0.15	2.327	<0.10	0.05	180	43	6.8	54	24	560	88	3.6
	18/01/2023	6.3	25	380	120	0.047	5.20	<0.02	0.087	<2	13	<5	40	24	180	25	4.7
	20/02/2023	3.4	1300	1100	32	0.42	8.90	<0.02	0.37	170	57	6.3	57	28	350	<5	3.8
SW01 Baseline		**6.2 – 7.0**	**428**	**291**	**73**	**3.52**	**3.52**	**0.039**	**0.164**	**22**	**16**	**6**	**51**	**118**	**9**	**768**	-
SW02	14/12/2022	6.3	200	110	870	0.27	2.70	<0.10	0.050	38	5.9	5.1	25	26	29	14	0.1
	18/01/2023	6.6	61	220	190	0.79	21	<0.20	0.049	<2	5.8	<5	27	31	6.2	61	0.1
	20/02/2023	6.5	1300	240	29	0.023	1.90	<0.10	0.31	38	11	4.1	29	26	24	<5	4.4
SW02 Baseline		**6.3 – 7.0**	**292**	**199**	**495**	**1.88**	**8.55**	**0.06**	**0.261**	**17**	**5**	**6**	**32**	**161**	**10**	**182**	-
SW03	14/12/2022	6.5	160	110	11	0.01	3.90	<0.10	0.05	13	<5	<5	18	23	11	<5	4.4
	18/01/2023	6.5	<5	160	8.5	0.02	1.30	<0.02	<0.010	<2	6.2	<5	26	31	17	<5	5.1
	20/02/2023	3.4	720	540	13	0.01	5.10	<0.02	<0.010	63	14	3	28	22	100	<5	6
SW03 Baseline		**6.1 - 6.7**	**281**	**191**	**1005**	**2.14**	**4.31**	**0.041**	**0.155**	**21**	**5**	**4**	**30**	**111**	**6**	**86**	-
SW04	14/12/2022	3.2	280	190	<5	0.01	32	<0.10	0.050	<5	<5	<5	20	42	<2	<5	2
	18/01/2023	No water at monitoring site – no sample collected															
	20/02/2023	4.1	160	200	<5	0.02	7.40	<0.10	0.090	2.7	3.9	1.6	23	22	15	<5	5.9
SW04 Baseline		**4.2 – 4.5**	**165**	**112**	**293**	**0.50**	**4.47**	**0.052**	**0.693**	**3.2**	**2.3**	**2.9**	**20**	**90**	**3**	**86**	-
SW05	14/12/2022	6.2	1100	830	16	0.05	3.10	<0.10	0.05	16	21	13	240	330	40	<5	7.5
	18/01/2023	6.3	<5	2800	33	0.09	3.38	<0.02	0.09	<2	96	41	820	1300	160	<5	7
	20/02/2023	6.7	2300	18000	18	0.10	3.40	<0.10	0.07	190	550	170	4700	2000	890	<5	5.4
SW05 Baseline		**5.1 – 7.2**	**6927**	**4710**	**136**	**0.21**	**2.227**	**0.052**	**0.592**	**57**	**130**	**58**	**1667**	**1980**	**115**	**63**	-
SW06	14/12/2022	6.3	1200	840	16	0.10	5.80	<0.10	0.05	16	21	13	240	340	44	<5	8.3
	18/01/2023	6.4	5400	3700	31.47	0.07	2.50	<0.02	0.04	<2	120	47	1000	1800	200	<5	6.8
	20/02/2023	6.8	14000	19000	89	0.09	4.10	<0.10	0.11	170	480	160	4000	22	1200	<5	5.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**6.5 – 8.0**	**2200**	-	**50**	**0.05**	**0.50**	-	**0.02**	-	-	-	-	-	-	**5**	

Note: Maximum values are provided for all baseline analytes.

Table 5: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	Fe (total) (mg/L)	Al (total) (mg/L)	Hg (mg/L)
SW01	14/12/2022	0.016	<0.002	0.014	0.20	0.077	0.015	0.68	1.60	22	<0.001
	18/01/2023	<0.010	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	3.20	0.70	<0.01
	20/02/2023	0.027	0.0004	0.019	0.07	0.16	0.049	0.35	0.049	37	0.002
SW01 Baseline		**0.003**	**0.001**	**0.002**	**0.041**	**0.006**	**0.001**	**0.058**	**1.223**	**0.496**	**0.0005**
SW02	14/12/2022	0.066	<0.002	0.034	0.094	0.013	0.071	1	9.70	13	<0.001
	18/01/2023	0.023	<0.002	<0.01	0.015	<0.010	0.014	0.15	45	3.30	<0.001
	20/02/2023	0.033	0.0002	0.009	0.090	0.018	0.013	0.28	0.013	12	<0.001
SW02 Baseline		**0.045**	**0.001**	**0.007**	**0.012**	**0.005**	**0.020**	**0.09**	**71.893**	**3.821**	**0.0005**
SW03	14/12/2022	<0.001	<0.002	<0.010	<0.01	<0.01	<0.01	0.053	1.30	0.63	<0.001
	18/01/2023	0.01	<0.002	<0.010	<0.01	<0.01	<0.01	<0.05	0.50	<0.50	<0.001
	20/02/2023	0.001	<0.0002	0.002	0.02	0.065	0.001	0.12	0.001	17	<0.001
SW03 Baseline		**0.058**	**0.001**	**0.008**	**0.028**	**0.006**	**0.028**	**0.26**	**85.52**	**7.949**	**0.0005**
SW04	14/12/2022	<0.001	<0.002	<0.010	<0.01	<0.010	<0.01	0.084	3.20	1.20	<0.001
	18/01/2023	No water at monitoring site – no sample collected									
	20/02/2023	0.002	<0.0002	0.005	0.05	0.003	0.002	0.039	0.002	1.60	<0.001
SW04 Baseline		**0.002**	**0.001**	**0.007**	**0.002**	**0.005**	**0.002**	**0.028**	**2.827**	**1.402**	**0.0005**
SW05	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.10	0.93	<0.001
	18/01/2023	<0.01	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	6.20	0.73	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.001	<0.001	0.008	<0.001	0.22	<0.001
SW05 Baseline		**0.002**	**0.001**	**0.002**	**0.003**	**0.011**	**<0.001**	**0.026**	**12.306**	**2.073**	**0.0005**
SW06	14/12/2022	<0.001	<0.002	<0.01	<0.01	<0.01	<0.01	<0.05	5.40	0.075	<0.001
	18/01/2023	<0.010	<0.001	<0.01	<0.01	<0.01	<0.01	<0.05	0.01	0.63	<0.001
	20/02/2023	0.002	<0.0002	0.001	0.01	0.002	<0.001	0.008	<0.001	0.34	<0.001
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		**0.013**	**0.0002**	**0.0033**	**0.0018**	**0.011**	**0.0034**	**0.008**	**0.30**	**0.05**	**0.0006**

Note: Maximum values are provided for all baseline analytes.

Table 6: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.17	0.3	0.1	0.18	<0.01	0.18	0.3	-	-
	20/02/2023	<0.02	<0.5	<1	<0.1	<0.5	<0.01	<0.5	<1	<1	<1
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	<0.1	0.1	<0.05	<0.01	<0.05	0.2	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	No water at monitoring site – no sample collected									
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.06	0.1	-	0.07	<0.01	0.7	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW06	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<.002	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	-	-	-
	20/02/2023	<0.02	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018): 95% Slightly Disturbed Freshwater Ecosystem		-	-	-	-	-	-	-	-	-	-

Note: Maximum values are provided for all baseline analytes.

On the basis of results presented in this WQMR, it is recommended that:

1. Investigations occur on surface water seepage pooled adjacent to the fill material located adjacent to MW05 to determine whether elevated TDS, electrical conductivity and acidic pH values within the well are associated with imported fill. This would include the collection of up to two (2) water samples from pooled water sitting at the toe of the fill batter proximal to the well (M05).
2. The collection of several soils samples derived from fill material and topsoil placed adjacent to MW5. These samples would be submitted for acid sulfate soils parameters. It is recommended that two (2) samples are collected from fill material whilst an additional two (2) samples are collected from topsoil utilised within the rehabilitation of the site adjacent to MW5.

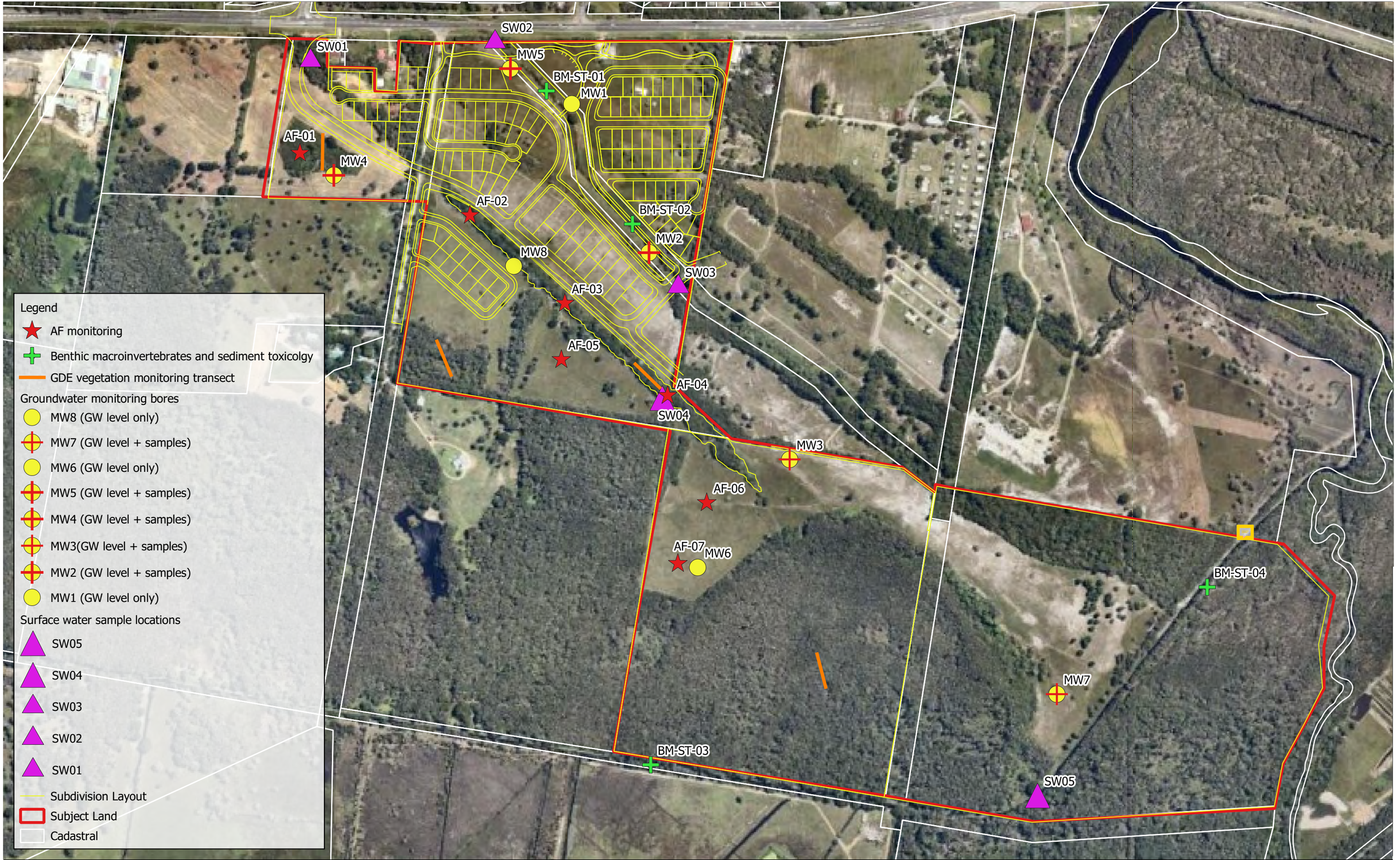
No further recommendations or modifications to current construction activities and associated water quality management methodologies identified within the Planit CEMP have been identified.

Should you have any queries about this Water Quality Monitoring Report, please do not hesitate to contact me directly. The next monthly monitoring event is scheduled for the 20th of March 2023.

Yours sincerely

Jemma Attkins
Environmental Scientist
ENV Services Pty Ltd

Attachment 1 – Locality



AWC

Source:	Aerial - Nearmaps 2019 Cadastral - NSW Land & Property Information 2019 Subject Land - AWC 2020 AF monitoring - AWC 2020 Benthic MI and Sediment Toxicology - AWC 2020 Groundwater monitoring bores - AWC 2020 Surface water sample locations - AWC 2020
Disclaimer:	Care was taken in the creation of this map. AWC should be consulted as to the suitability of the information shown here in prior to the commencement of any works based on the information provided. AWC cannot accept any responsibility for errors, omissions or positional accuracy. There are no warranties expressed or implied as to the suitability of this map for a particular purpose. However, notification of any errors will be appreciated.
Date	29.05.2020

0 100 200 300 400 m

A3 Scale 1:5,000
Coordinate System: MGA 56 Projection: Transverse Mercator

Figure 3-1:

Locations of monitoring locations (groundwater bores, surface water sites and GDE vegetation transects)

Attachment 2 – Analytical Results

eurofins | Environment Testing

Certificate of Analysis

ENV Services Pty Ltd
313 River Street
Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Robert Todhunter**

Report **966487-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Feb 22, 2023

Client Sample ID			**MW2**	**MW3**	**MW4**	**MW5**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S23-Fe0056034**	**S23-Fe0056035**	**S23-Fe0056036**	**S23-Fe0056037**
Date Sampled			**Feb 20, 2023**	**Feb 20, 2023**	**Feb 20, 2023**	**Feb 20, 2023**
Test/Reference	LOR	Unit				
Ammonia (as N)	0.01	mg/L	0.10	< 0.01	< 0.05	4.2
Chloride	1	mg/L	27	6.8	15	27
Conductivity (at 25 °C)	10	uS/cm	100	36	87	2700
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25	0.06	0.28	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.25	0.06	0.28	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.1	< 0.02	< 0.1	< 0.02
pH (at 25 °C)	0.1	pH Units	6.0	4.2	3.9	2.6
Phosphate total (as P)	0.01	mg/L	0.09	0.02	0.04	0.03
Sulphate (as S)	2	mg/L	3.7	< 2	5.8	750
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	160	40	110	3200
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	< 0.2	7.2	3.6	4.9
Total Nitrogen (as N)*	0.2	mg/L	< 0.25	7.26	3.88	4.9
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	5.3	76	31	310
Alkali Metals						
Calcium	0.5	mg/L	< 0.5	< 0.5	3.5	390
Magnesium	0.5	mg/L	0.7	1.0	5.4	76
Potassium	0.5	mg/L	3.1	< 0.5	0.9	7.8
Sodium	0.5	mg/L	27	7.6	15	47

Client Sample ID			**MW7**
Sample Matrix			**Water**
Eurofins Sample No.			**S23-Fe0056038**
Date Sampled			**Feb 20, 2023**
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	< 0.05
Chloride	1	mg/L	9.1
Conductivity (at 25 °C)	10	uS/cm	87
Nitrate & Nitrite (as N)	0.05	mg/L	0.42
Nitrate (as N)	0.02	mg/L	0.42
Nitrite (as N)	0.02	mg/L	< 0.1
pH (at 25 °C)	0.1	pH Units	4.1
Phosphate total (as P)	0.01	mg/L	0.02
Sulphate (as S)	2	mg/L	5.7

Client Sample ID			MW7
Sample Matrix			**Water**
Eurofins Sample No.			**S23-Fe0056038**
Date Sampled			**Feb 20, 2023**
Test/Reference	LOR	Unit	
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	60
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.0
Total Nitrogen (as N)*	0.2	mg/L	1.42
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	30
Alkali Metals			
Calcium	0.5	mg/L	1.4
Magnesium	0.5	mg/L	1.9
Potassium	0.5	mg/L	1.1
Sodium	0.5	mg/L	5.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Feb 27, 2023	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Feb 24, 2023	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Conductivity (at 25 °C)	Sydney	Feb 24, 2023	28 Days
- Method: LTM-INO-4030 Conductivity			
pH (at 25 °C)	Sydney	Feb 24, 2023	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Feb 24, 2023	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Feb 24, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Feb 27, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Feb 24, 2023	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: ENV Services Pty Ltd
Address: 313 River Street
Ballina
NSW 2478

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Order No.:
Report #: 966487
Phone: 1300 861 325
Fax:

Received: Feb 22, 2023 10:01 AM
Due: Feb 27, 2023
Priority: 3 Day
Contact Name: Robert Todhunter

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Chloride	Conductivity (at 25 °C)	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254											X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X		X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	MW2	Feb 20, 2023		Water	S23-Fe0056034	X	X	X	X	X	X	X	X
2	MW3	Feb 20, 2023		Water	S23-Fe0056035	X	X	X	X	X	X	X	X
3	MW4	Feb 20, 2023		Water	S23-Fe0056036	X	X	X	X	X	X	X	X
4	MW5	Feb 20, 2023		Water	S23-Fe0056037	X	X	X	X	X	X	X	X
5	MW7	Feb 20, 2023		Water	S23-Fe0056038	X	X	X	X	X	X	X	X
Test Counts						5	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Ammonia (as N)	%	100			70-130	Pass	
Chloride	%	87			70-130	Pass	
Conductivity (at 25 °C)	%	97			70-130	Pass	
Nitrate & Nitrite (as N)	%	99			70-130	Pass	
Nitrate (as N)	%	99			70-130	Pass	
Nitrite (as N)	%	100			70-130	Pass	
Phosphate total (as P)	%	95			70-130	Pass	
Sulphate (as S)	%	124			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	98			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	120			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	120			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	95			80-120	Pass	
Magnesium	%	104			80-120	Pass	
Potassium	%	101			80-120	Pass	
Sodium	%	106			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Chloride	S23-Fe0044108	NCP	%	86			70-130	Pass	
Sulphate (as S)	S23-Fe0044108	NCP	%	91			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	S23-Fe0056034	CP	%	110			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0056020	NCP	%	112			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S23-Fe0056037	CP	%	109			75-125	Pass	
Magnesium	S23-Fe0056037	CP	%	110			75-125	Pass	
Potassium	S23-Fe0056037	CP	%	107			75-125	Pass	
Sodium	S23-Fe0056037	CP	%	116			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S23-Fe0056038	CP	%	109			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Magnesium	S23-Fe0056038	CP	%	110			75-125	Pass	
Potassium	S23-Fe0056038	CP	%	107			75-125	Pass	
Sodium	S23-Fe0056038	CP	%	116			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25 °C)	S23-Fe0056034	CP	uS/cm	100	110	4.0	30%	Pass	
Phosphate total (as P)	B23-Fe0044101	NCP	mg/L	0.01	0.02	52	30%	Fail	Q15
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S23-Fe0056020	NCP	mg/L	170	170	<1	30%	Pass	
Magnesium	S23-Fe0056020	NCP	mg/L	57	55	2.5	30%	Pass	
Potassium	S23-Fe0056020	NCP	mg/L	6.3	6.0	5.2	30%	Pass	
Sodium	S23-Fe0056020	NCP	mg/L	57	56	1.7	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S23-Fe0056035	CP	mg/L	6.8	6.4	5.4	30%	Pass	
Sulphate (as S)	S23-Fe0056035	CP	mg/L	< 2	< 2	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	S23-Fe0056035	CP	mg/L	7.2	6.8	5.9	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	S23-Fe0056036	CP	mg/L	3.6	4.3	18	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Dissolved Solids Dried at 180 °C ± 2 °C	S23-Fe0056038	CP	mg/L	60	60	<1	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0056038	CP	mg/L	30	29	2.7	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Adam Bateup	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ENV Services Pty Ltd
313 River Street
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NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Jemma Attkins**

Report **966485-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Feb 22, 2023

Client Sample ID			**SW01**	**SW02**	**SW03**	**SW04**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S23-Fe0056020**	**S23-Fe0056021**	**S23-Fe0056022**	**S23-Fe0056023**
Date Sampled			**Feb 20, 2023**	**Feb 20, 2023**	**Feb 20, 2023**	**Feb 20, 2023**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.5	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.5	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.5	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Ammonia (as N)	0.01	mg/L	0.37	0.31	< 0.01	0.09
Chloride	1	mg/L	28	26	22	22
Chlorophyll a	5	ug/L	< 5	< 5	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	1300	340	720	160
Dissolved Oxygen	0.1	mg/L	3.8	4.4	6.0	5.9
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.25	< 0.05	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.1	< 0.02	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.1	< 0.02	< 0.1
pH (at 25 °C)	0.1	pH Units	3.4	6.5	3.4	4.1
Phosphate total (as P)	0.01	mg/L	0.42	0.23	0.01	0.02
Sulphate (as S)	2	mg/L	350	24	100	15
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	1100	240	540	200
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	8.9	1.9	5.1	7.4
Total Nitrogen (as N)*	0.2	mg/L	8.9	1.9	5.1	7.4
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	32	29	13	< 5
Heavy Metals						
Aluminium	0.05	mg/L	37	12	17	1.6
Arsenic	0.001	mg/L	0.027	0.033	< 0.001	0.002
Cadmium	0.0002	mg/L	0.0004	0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.019	0.009	0.002	0.005

Client Sample ID			SW01	SW02	SW03	SW04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0056020	S23-Fe0056021	S23-Fe0056022	S23-Fe0056023
Date Sampled			Feb 20, 2023	Feb 20, 2023	Feb 20, 2023	Feb 20, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Copper	0.001	mg/L	0.070	0.011	0.002	0.002
Iron	0.05	mg/L	29	68	2.4	3.6
Lead	0.001	mg/L	0.049	0.013	0.001	0.002
Mercury	0.0001	mg/L	0.0002	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.16	0.018	0.065	0.003
Zinc	0.005	mg/L	0.35	0.28	0.12	0.039
Alkali Metals						
Calcium	0.5	mg/L	170	38	63	2.7
Magnesium	0.5	mg/L	57	11	14	3.9
Potassium	0.5	mg/L	6.3	4.1	3.0	1.6
Sodium	0.5	mg/L	57	29	28	23

Client Sample ID			SW05	SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S23-Fe0056024	S23-Fe0056025
Date Sampled			Feb 20, 2023	Feb 20, 2023
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01
Ammonia (as N)	0.01	mg/L	0.07	0.11
Chloride	1	mg/L	20000	25000
Chlorophyll a	5	ug/L	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	23000	14000
Dissolved Oxygen	0.1	mg/L	5.4	5.1
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.1	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.1	< 0.1
pH (at 25 °C)	0.1	pH Units	6.7	6.8
Phosphate total (as P)	0.01	mg/L	0.10	0.09
Sulphate (as S)	2	mg/L	890	1200
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	18000	19000
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.4	4.1
Total Nitrogen (as N)*	0.2	mg/L	3.4	4.1
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	18	89

Client Sample ID			SW05	SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S23-Fe0056024	S23-Fe0056025
Date Sampled			Feb 20, 2023	Feb 20, 2023
Test/Reference	LOR	Unit		
Heavy Metals				
Aluminium	0.05	mg/L	0.22	0.34
Arsenic	0.001	mg/L	0.002	0.002
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.001	0.001
Copper	0.001	mg/L	< 0.001	< 0.001
Iron	0.05	mg/L	2.0	2.5
Lead	0.001	mg/L	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.001	0.002
Zinc	0.005	mg/L	0.008	0.008
Alkali Metals				
Calcium	0.5	mg/L	190	170
Magnesium	0.5	mg/L	550	480
Potassium	0.5	mg/L	170	160
Sodium	0.5	mg/L	4700	4000

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Feb 24, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 24, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 24, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Feb 27, 2023	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Feb 24, 2023	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Chlorophyll a	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4340 Chlorophyll a in Waters			
Conductivity (at 25 °C)	Sydney	Feb 24, 2023	28 Days
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Sydney	Feb 24, 2023	1 Days
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25 °C)	Sydney	Feb 24, 2023	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Feb 24, 2023	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Feb 24, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Sydney	Feb 27, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Feb 27, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Feb 27, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Feb 24, 2023	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Order No.:
Report #: 966485
Phone: 1300 861 325
Fax:

Received: Feb 22, 2023 10:01 AM
Due: Feb 27, 2023
Priority: 3 Day
Contact Name: Jemma Attkins

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Aluminium	Chloride	Chlorophyll a	Conductivity (at 25 °C)	Dissolved Oxygen	Iron	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Total Recoverable Hydrocarbons	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254								X							X	X	X		X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X	X	X		X	X
External Laboratory																			
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**														
1	SW01	Feb 20, 2023		Water	S23-Fe0056020	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	SW02	Feb 20, 2023		Water	S23-Fe0056021	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	SW03	Feb 20, 2023		Water	S23-Fe0056022	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	SW04	Feb 20, 2023		Water	S23-Fe0056023	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	SW05	Feb 20, 2023		Water	S23-Fe0056024	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	SW06	Feb 20, 2023		Water	S23-Fe0056025	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						6	6	6	6	6	6	6	6	6	6	6	6	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Chlorophyll a	ug/L	< 5			5	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	95			70-130	Pass	
TRH C10-C14	%	113			70-130	Pass	
TRH C6-C10	%	93			70-130	Pass	
TRH >C10-C16	%	109			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	92			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ammonia (as N)	%	100			70-130	Pass	
Chloride	%	108			70-130	Pass	
Conductivity (at 25 °C)	%	97			70-130	Pass	
Nitrate & Nitrite (as N)	%	99			70-130	Pass	
Nitrate (as N)	%	99			70-130	Pass	
Nitrite (as N)	%	100			70-130	Pass	
Phosphate total (as P)	%	95			70-130	Pass	
Sulphate (as S)	%	112			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	98			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	120			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	120			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	100			80-120	Pass	
Arsenic	%	108			80-120	Pass	
Cadmium	%	100			80-120	Pass	
Chromium	%	102			80-120	Pass	
Copper	%	100			80-120	Pass	
Iron	%	85			80-120	Pass	
Lead	%	101			80-120	Pass	
Mercury	%	104			80-120	Pass	
Nickel	%	100			80-120	Pass	
Zinc	%	100			80-120	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	108			80-120	Pass	
Magnesium	%	104			80-120	Pass	
Potassium	%	117			80-120	Pass	
Sodium	%	114			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	R23-Fe0053369	NCP	%	85			70-130	Pass	
TRH >C10-C16	R23-Fe0053369	NCP	%	82			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S23-Fe0044108	NCP	%	86			70-130	Pass	
Sulphate (as S)	S23-Fe0044108	NCP	%	91			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0056020	CP	%	112			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	M23-Fe0048089	NCP	%	96			75-125	Pass	
Arsenic	M23-Fe0048089	NCP	%	106			75-125	Pass	
Cadmium	M23-Fe0048089	NCP	%	101			75-125	Pass	
Chromium	M23-Fe0048089	NCP	%	98			75-125	Pass	
Copper	M23-Fe0048089	NCP	%	88			75-125	Pass	
Iron	S23-Fe0056038	NCP	%	80			75-125	Pass	
Lead	M23-Fe0048089	NCP	%	101			75-125	Pass	
Mercury	M23-Fe0048089	NCP	%	109			75-125	Pass	
Nickel	M23-Fe0048089	NCP	%	95			75-125	Pass	
Zinc	M23-Fe0048089	NCP	%	96			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Calcium	B23-Fe0043157	NCP	%	87			75-125	Pass	
Magnesium	B23-Fe0043157	NCP	%	89			75-125	Pass	
Potassium	B23-Fe0043157	NCP	%	108			75-125	Pass	
Sodium	S23-Fe0056038	NCP	%	116			75-125	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	S23-Fe0056024	CP	%	35			70-130	Fail	Q08
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S23-Fe0043119	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	R23-Fe0053378	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	R23-Fe0053378	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	R23-Fe0053378	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C6-C10	S23-Fe0043119	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	R23-Fe0053378	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	R23-Fe0053378	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	R23-Fe0053378	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S23-Fe0043119	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S23-Fe0042731	NCP	mg/L	210	220	2.2	30%	Pass	
Chlorophyll a	S23-Fe0056183	NCP	ug/L	< 5	< 5	<1	30%	Pass	
Conductivity (at 25 °C)	S23-Fe0056020	CP	uS/cm	1300	1300	<1	30%	Pass	
Phosphate total (as P)	B23-Fe0044101	NCP	mg/L	0.01	0.02	52	30%	Fail	Q15
Sulphate (as S)	S23-Fe0042731	NCP	mg/L	20	20	2.8	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S23-Fe0056020	CP	mg/L	1100	1100	<1	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0056020	CP	mg/L	32	32	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S23-Fe0056020	CP	mg/L	37	36	2.0	30%	Pass	
Arsenic	S23-Fe0056020	CP	mg/L	0.027	0.028	5.4	30%	Pass	
Cadmium	S23-Fe0056020	CP	mg/L	0.0004	0.0004	10	30%	Pass	
Chromium	S23-Fe0056020	CP	mg/L	0.019	0.019	<1	30%	Pass	
Copper	S23-Fe0056020	CP	mg/L	0.070	0.068	2.8	30%	Pass	
Iron	S23-Fe0056020	CP	mg/L	29	30	2.8	30%	Pass	
Lead	S23-Fe0056020	CP	mg/L	0.049	0.049	<1	30%	Pass	
Mercury	S23-Fe0056020	CP	mg/L	0.0002	0.0001	15	30%	Pass	
Nickel	S23-Fe0056020	CP	mg/L	0.16	0.16	<1	30%	Pass	
Zinc	S23-Fe0056020	CP	mg/L	0.35	0.34	4.0	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S23-Fe0056020	CP	mg/L	170	170	<1	30%	Pass	
Magnesium	S23-Fe0056020	CP	mg/L	57	55	2.5	30%	Pass	
Potassium	S23-Fe0056020	CP	mg/L	6.3	6.0	5.2	30%	Pass	
Sodium	S23-Fe0056020	CP	mg/L	57	56	1.7	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S23-Fe0056021	CP	mg/L	12	13	4.8	30%	Pass	
Arsenic	S23-Fe0056021	CP	mg/L	0.033	0.035	6.8	30%	Pass	
Cadmium	S23-Fe0056021	CP	mg/L	0.0002	< 0.0002	37	30%	Fail	Q15
Chromium	S23-Fe0056021	CP	mg/L	0.009	0.010	7.4	30%	Pass	
Copper	S23-Fe0056021	CP	mg/L	0.011	0.012	7.7	30%	Pass	
Iron	S23-Fe0056021	CP	mg/L	68	76	12	30%	Pass	
Lead	S23-Fe0056021	CP	mg/L	0.013	0.013	3.0	30%	Pass	
Mercury	S23-Fe0056021	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S23-Fe0056021	CP	mg/L	0.018	0.020	7.0	30%	Pass	
Zinc	S23-Fe0056021	CP	mg/L	0.28	0.29	3.9	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S23-Fe0056021	CP	mg/L	38	38	<1	30%	Pass	
Magnesium	S23-Fe0056021	CP	mg/L	11	10	<1	30%	Pass	
Potassium	S23-Fe0056021	CP	mg/L	4.1	4.1	<1	30%	Pass	
Sodium	S23-Fe0056021	CP	mg/L	29	29	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	S23-Fe0056022	CP	mg/L	5.1	5.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	S23-Fe0056023	CP	mg/L	7.4	6.6	12	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Adam Bateup	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Attachment 3: Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	20/02/2023

Description

Sample location SW01.

Photo No.	Date
2	20/02/2023

Description

Sample location SW02.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	20/02/2023

Description

Eastern end of main swale. Photo showing that the swale is stabilized with vegetation and erosion and sediment controls are installed along the perimeter.

Photo No.	Date
4	20/02/2023

Description

Sample location SW05.

Water was low in TSS

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date	
5	20/02/2023	

Description

Sample location SW01.

Water level was low with high organic matter.

Photo No.	Date	
6	20/02/2023	

Description

Surface water monitoring location SW03

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

MONTHLY WATER QUALITY REPORT

Harvest Estate Urban Development

Harvest Estate

Ewingsdale Road, Byron Bay, NSW 2481

January 2023

ENV217140_Harvest Estate_WQ_20230112

January 2023

Monitoring Period: 14th December – 18th January 2023

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this water quality report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Bulk fill and general earthworks associated with progressive construction of Stage 1 of the development.

Fortnightly Acid Frog Habitat Groundwater Quality Monitoring (First 6 months of Construction)

Fortnightly water quality monitoring of Standing Water level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6, MW7 & MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 1, SWL's and pH of all groundwater wells are outside the ANZG (2018) default ranges (freshwater: 95% species protection), however SWL's and pH for all groundwater wells were within historic baseline water quality values with the exception of MW6 and MW8, where no baseline data has been collected. EC was within historic baseline values at all locations.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	16/09/22	2.50	4.11	48
	29/09/22	3.01	4.20	53
	11/10/22	2.96	4.25	46
	20/10/22	2.98	4.10	64
	03/11/22	3.04	4.91	340
	14/11/22	2.84	4.60	34
	07/12/22	2.81	4.30	43
	14/12/22	2.71	4.30	56
	18/01/23	2.34	4.25	180
MW3 Baseline		**2.79**	**4.29**	**38 - 206**
MW4	16/09/22	2.47	5.09	98
	29/09/22	2.57	4.50	100
	11/10/22	2.56	4.42	85
	20/10/22	2.70	4.5	110
	03/11/22	2.29	4.47	270
	14/11/22	2.30	4.20	130
	07/12/22	2.48	4.46	140
	14/12/22	2.43	4.20	124
	18/01/23	1.48	4.73	252
MW4 Baseline		**2.51**	**4.58**	**102 - 890**
MW6	16/09/22	1.42	5.84	828
	29/09/22	1.56	5.96	1280
	11/10/22	1.43	4.39	80
	20/10/22	1.41	4.66	75
	03/11/22	1.39	5.89	1250
	14/11/22	1.34	4.47	70
	07/12/22	1.34	6.97	1300
	14/12/22	1.31	5.86	760
	18/01/23	0.58	6.26	136
MW6 Baseline		**1.34**	**-**	**-**
MW7	16/09/22	1.65	4.74	54
	29/09/22	1.68	4.60	26
	11/10/22	1.66	4.82	85
	20/10/22	1.88	4.50	86
	03/11/22	1.62	4.24	161
	14/11/22	1.46	4.50	44
	07/12/22	1.51	4.80	105
	14/12/22	1.46	4.60	56
	18/01/23	1.42	5.38	90
MW7 Baseline		**1.53**	**5.0**	**39 - 147**
MW8	16/09/22	2.63	4.30	100
	29/09/22	2.62	3.80	129
	11/10/22	2.52	4.01	46
	20/10/22	2.54	4.07	117
	03/11/22	2.29	3.92	290
	14/11/22	2.08	3.51	227
	07/12/22	2.38	4.12	533
	14/12/22	2.40	3.88	201
	18/01/23	2.32	4.1	431
MW8 Baseline		**2.26**	**-**	**-**
ANZECC (2000) / ANZG (2018) (Freshwater)		**-**	**6.5 – 8.0**	**125 - 2200**

Monthly Groundwater Sampling Event (5 Sites)

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2, 3, 4, 5 & 7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Table 2, the required parameters of all groundwater wells can be summarised as predominantly within historic baseline range values with the exception of;

MW2

- Total Nitrogen (TN) exceeded the maximum baseline value of 2030 ($\mu g/L^{-1}$) (2500 $\mu g/L^{-1}$)

MW5

- Electrical Conductivity exceeded the maximum baseline value of 191 µδ/cm (1600 µδ/cm)
- Total dissolved Solids (TDS) exceeded the maximum baseline value of 130 mg/L (1100 mg/L)
- Ammonia (NH3) exceeded the maximum baseline value of 863 µg/L (1700 µg/L)
- Calcium (Ca) exceed the maximum baseline concentration of 6 mg/L (90 mg/L)
- Sodium (Na) exceeded the maximum baseline concentration 27.2 mg/L (49 mg/L).

MW7

- Sulfur (S) exceeded the maximum baseline value of 7.3 mg/L (31mg/L)

MW2 is situated down-gradient from MW5, as such elevated concentrations at this location attributed to flow on effects from extraneous sources. TN levels at MW2 are noted to be decreasing as water moves through the site.

MW5 is located ‘up-gradient’ of active works at the site, as such exceedances are to be attributed to extraneous sources.

MW7 location is subject to down-gradient water flow. As such, the elevated Sulfur concentrations at MW7 are likely attributable to by Surface water monitoring locations, which are subject to extraneous sources.

Table 2: Monthly Groundwater Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg/ L^{-1})	TN (µg/L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	S (mg/L)
MW2	20/10/2022	5.6	100	110	<5	90	2000	20	240	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.0	100	240	<5	70	<200	<100	240	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.6	110	170	<5	20	3100	<100	<50	<5	<5	<5	29	15	5
	18/01/2023	4.6	130	76	9.2	120	2500	<50	90	<5	<5	<5	29	17	7
MW2 Baseline		**4.22 - 5.70**	**109 - 152**	**74 – 103**	**3 - 483**	**80 - 450**	**780 - 2030**	**6 – 70**	**128 - 338**	**0.2 - 0.7**	**0.7 - 1.4**	**1.0 - 4.2**	**13.8 - 29.7**	**19 – 189**	**<0.2 - 9.8**
MW3	20/10/2022	4.1	64	62	130	10	500	20	200	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.6	57	84	170	30	<200	<20	270	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.3	43	32	280	<10	1100	<20	<10	<5	<5	<5	6	5.2	<2
	18/01/2023	4.2	54	28	670	30	1400	<50	<10	<5	<5	<5	<5	4.1	4.1
MW3 Baseline		**3.99 - 5.33**	**38 - 206**	**26 – 140**	**45 - 5223**	**60 - 1570**	**430 - 41400**	**5 - 167**	**5 - 294**	**0.1 - 3.8**	**0.7 - 5.3**	**0.2 - 3.1**	**4.0 - 26.4**	**1 - 121**	**0.3 - 13.4**
MW4	20/10/2022	4.5	110	100	69	20	1000	40	780	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.2	130	340	16	10	7000	<100	130	2.6	4.8	1.1	22	30	5
	14/12/2022	4.2	140	140	60	<10	3000	<100	<50	<5	<5	<5	21	23	7.8
	18/01/2023	3.9	170	110	170	20	2400	<50	160	<5	<5	<5	20	26	6.6
MW4 Baseline		**3.97 - 5.84**	**102 - 890**	**69 – 605**	**126 - 1220**	**80 - 430**	**1680 - 4360**	**7 – 185**	**112 – 1392**	**1.7 - 11.3**	**2.6 - 15.6**	**0.6 - 5.4**	**10.3 - 146.3**	**24 – 199**	**<0.3 - 19.2**
MW5	20/10/2022	4.4	75	82	92	20	500	20	100	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.6	120	270	150	80	7800	<100	520	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.5	150	150	230	20	11000	<50	<60	<5	<5	<5	24	29	9.7
	18/01/2023	2.8	1600	1100	480	50	5700	<50	1700	90	72	<5	49	43	6.6
MW5 Baseline		**4.31 - 5.53**	**107 - 191**	**73 - 130**	**11 - 3003**	**70 - 970**	**1280 - 13400**	**25 - 117**	**117 - 863**	**0.4 - 6.0**	**0.8 - 8.4**	**0.7 - 5.4**	**9.3 - 27.2**	**19 - 82**	**1.0 - 8.3**
MW7	20/10/2022	4.5	86	70	120	10	2900	40	400	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.5	44	170	<100	30	<2000	<100	10	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.6	56	92	23	40	11000	<200	<100	<5	<5	<5	8.7	7.5	2.5
	18/01/2023	4.6	63	32	390	90	2000	<25	<50	<5	<5	<5	11	7.5	31
MW7 Baseline		**4.65 - 5.62**	**39 - 147**	**27 - 100**	**20 - 3140**	**60 - 710**	**670 - 4150**	**5 - 48**	**23 - 471**	**0.5 - 3.4**	**1.0 - 2.2**	**0.3 - 3.1**	**3.4 - 31.0**	**3 - 172**	**0.3 - 7.3**
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Monthly Surface Water Sampling Event (6 Sites)

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 3. Select photos of the surface water sampling programme are presented in Attachment 3.

Table 3: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

Monthly surface water sampling of pH, Electrical conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 4, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following;

SW01

- Total Dissolved solids (TDS) exceeded the maximum baseline concentration of 291 mg/L (380 mg/L)
- Total Suspended solids exceeded the maximum baseline concentration of 75 mg/L (120 mg/L)
- Sulfur (S) exceeded the maximum baseline concentration 9 mg/L (120 mg/L)

SW02

- Total Dissolved solids (TDS) exceeded the maximum baseline concentration of 199 mg/L (220 mg/L)
- Magnesium (Mg) exceeded the maximum baseline concentration of 5 mg/L (6.2 mg/L)

Sample locations SW01 and SW02 are both located ‘upstream’ of the site. As such, elevated physicochemical and nutrient exceedances at these locations are attributed to by extraneous sources.

SW03

- Sulfur (S) exceeded the maximum baseline concentration of 6 mg/L (17 mg/L)
- Magnesium (Mg) exceeded the maximum baseline concentration off 5 mg/L (6.2 mg/L)

SW03 is directly downstream from SW02, with elevated S and Mg at this location attributed to flow on effects from extraneous sources.

SW05

- Total Nitrogen (TN) exceeded the maximum baseline concentration of 2227 µg N L^{-1} (3380 µg N L^{-1})
- Sulfur (S) exceeded the maximum baseline concentration of 6 mg/L (17 mg/L)

Sample location SW05 is considered an ‘upstream’ location. As such elevated TN and S at this location are likely attributed to extraneous sources.

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 5, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

SW01

- Iron (Fe) exceeded the maximum baseline concentration of 1223 µg/L (3200 µg/L)
- Aluminium (Al) exceeded the maximum baseline concentration of 496 µg/L (700 µg/L)

SW02

- Copper (Cu) exceeded the maximum baseline concentration of 12 µg/L (15 µg/L)
- Zinc (Zn) exceeded the maximum baseline concentration of 90 µg/L (150 µg/L)

Sample locations SW01 and SW02 are both located 'upstream' of the site. As such, the metals exceedances noted at these locations are likely attributed to by extraneous sources.

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 6, these required hydrocarbon parameters of all surface water sampling locations can be summarised as in line with the historic baseline values, the exception of the following;

SW02

- C10-C14 exceeded the maximum baseline concentration 0.05 mg/L (0.06 mg/L)
- C15-C28 exceeded the maximum baseline concentration of 0.01 mg/L (0.03 mg/L)
- C10-C16 exceeded the maximum baseline concentration of 0.06 mg/L (0.18 mg/L)
- C16-C34 exceeded the maximum baseline concentration of 0.22 mg/L (0.3 mg/L)

SW05

- C10-C14 exceeded the maximum baseline concentration 0.05 mg/L (0.06 mg/L)
- C10-C16 exceeded the maximum allowable concentration 0.06 mg/L (0.07 mg/L)

SW02 and SW05 are both considered 'upstream' of the site. As such, Total Recoverable Hydrocarbon exceedances at these locations are likely attributed to by extraneous sources.

During this monitoring period (14/12/2022-18/01/2023), 62.4mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology.

Table 4: Monthly Surface Water Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg P L^{1})	TN (µg N L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl- (mg/L)	S (mg/L)	Chlorophyll a (µg/L^{-1})	DO (mg/L)
SW01	14/11/2022	6.0	920	780	4900	3100	14000	<20	6900	280	73	<50	200	25	3.7	67	0.2
	14/12/2022	4.5	1100	800	210	150	23 270	<100	50	180	43	6.8	54	24	560	88	3.6
	18/01/2023	6.3	25	380	120	47	5200	<20	87	<2	13	<5	40	24	180	25	4.7
SW01 Baseline		**6.2 – 7.0**	**134 - 428**	**91 - 291**	**1 – 73**	**70 - 3520**	**640 - 3520**	**5 – 39**	**19 - 164**	**9 – 22**	**3 - 16**	**0 – 6**	**12 -51**	**1 - 118**	**2 – 9**	**10 - 768**	-
SW02	14/11/2022	6.4	190	150	210	180	13000	<20	<10	47	11	<5	62	54	18	24	0.1
	14/12/2022	6.3	200	110	870	270	2700	<100	50	38	5.9	5.1	25	26	29	14	0.1
	18/01/2023	6.6	61	220	190	79	21000	<20	49	<2	5.8	<5	27	31	6.2	61	0.1
SW02 Baseline		**6.3 – 7.0**	**97 - 292**	**66 - 199**	**3 - 495**	**50 - 1880**	**410 - 8550**	**5 – 60**	**5 - 261**	**7 - 17**	**2 – 5**	**1 -6**	**8 - 32**	**10 - 161**	**0 - 10**	**1 - 182**	-
SW03	14/11/2022	6.5	160	140	260	130	7400	<100	<50	18	5.7	<5	36	27	9	<5	2.6
	14/12/2022	6.5	160	110	11	10	3900	<100	50	13	<5	<5	18	23	11	<5	4.4
	18/01/2023	6.5	<5	160	8.5	20	1300	<20	<10	<2	6.2	<5	26	31	17	<5	5.1
SW03 Baseline		**6.1 - 6.7**	**85 - 281**	**58 - 191**	**1 - 1005**	**40 - 2140**	**360 - 4310**	**7 – 41**	**14 - 155**	**6 - 21**	**2 – 5**	**0 – 4**	**8 - 30**	**13 - 111**	**0 - 6**	**5 - 86**	-
SW04	14/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14/12/2022	3.2	280	190	<5	10	32000	<100	50	<5	<5	<5	20	42	<2	<5	2
	18/01/2023	-	-	-	-	-	-	-	-	--	-	-	-	--	-	-	-
SW04 Baseline		**4.2 – 4.5**	**77 - 165**	**52 - 112**	**1 - 293**	**40 - 500**	**1150 - 4470**	**5 – 52**	**27 - 693**	**1 - 3**	**1 – 3**	**1 – 3**	**10 - 20**	**17 -90**	**0 - 3**	**14 - 86**	-
SW05	14/11/2022	6.2	1000	820	13	60	8100	<100	<50	18	27	11	260	310	100	<5	4.7
	14/12/2022	6.2	1100	830	16	50	3100	<100	50	16	21	13	240	330	40	<5	7.5
	18/01/2023	6.3	<5	2800	33	90	3380	<20	90	<2	96	41	820	1300	160	<5	7
SW05 Baseline		**5.1 – 7.2**	**410 - 6927**	**279 - 4710**	**5 - 136**	**40 - 210**	**10 - 2227**	**8 – 52**	**68 - 592**	**3 - 57**	**7 - 130**	**2 - 58**	**46 - 1667**	**84 -1980**	**6 - 115**	**9 - 63**	-
SW06	14/11/2022	6.2	1000	840	13	40	1100	<100	360	18	29	12	270	310	100	<5	<5
	14/12/2022	6.3	1200	840	16	100	5800	<100	50	16	21	13	240	340	44	<5	8.3
	18/01/2023	6.4	5400	3700	31.47	70	2500	<20	40	<2	120	47	1000	1800	200	<5	6.8
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 - 2200**	-	**<50**	**50**	**500**	-	-	-	-	-	-	-	-	**5**	

Table 5: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Fe (total) (µg/L)	Al (total) (µg/L)	Hg (µg/L)
SW01	14/11/2022	1.3	<20	<100	1000	300	100	4700	130 000	130 000	<10
	14/12/2022	16	<2	14	200	77	15	680	1600	22000	<1
	18/01/2023	<10	<2	<10	<10	<10	<10	<50	3200	700	<10
SW01 Baseline		**1 – 3**	**1**	**1 – 2**	**2 – 41**	**2 – 6**	**1**	**3 – 58**	**423 - 1223**	**59 – 496**	**0.5**
SW02	14/11/2022	37	<2	<1	15	<10	<10	96	53 000	1800	<1
	14/12/2022	66	<2	34	94	13	71	1000	9700	13000	<1
	18/01/2023	23	<2	<10	15	<10	14	150	45000	3300	<1
SW02 Baseline		**1 - 45**	**1**	**1 – 7**	**1 - 12**	**1 – 5**	**1 - 20**	**7 - 90**	**473 – 71 893**	**154 - 3821**	**0.5**
SW03	14/11/2022	<1	<2	<1	4	<10	<10	240	1900	1100	<1
	14/12/2022	<1	<2	<10	<10	<10	<10	53	1300	630	<1
	18/01/2023	10	<2	<10	<10	<10	<10	<50	500	500	<1
SW03 Baseline		**1 - 58**	**1**	**1 – 8**	**1 - 28**	**1 – 6**	**1 - 28**	**11 - 260**	**512 – 85 520**	**109 - 7949**	**0.5**
SW04	14/11/2022	-	-	-	-	-	-	-	-	-	-
	14/12/2022	<1	<2	<10	<10	<10	<10	84	3200	1200	<1
	18/01/2023	-	-	-	-	-	-	-	-	-	-
SW04 Baseline		**1 - 2**	**1**	**2 – 7**	**1 – 2**	**1 – 5**	**1 – 2**	**8 - 28**	**358 - 2827**	**578 – 1402**	**0.5**
SW05	14/11/2022	<1	<2	<1	20	<10	<10	120	5400	750	<1
	14/12/2022	<1	<2	<10	<10	<10	<10	<50	6100	930	<1
	18/01/2023	<10	<2	<10	<10	<10	<10	<50	6200	730	<1
SW05 Baseline		**1 – 2**	**1**	**1 - 2**	**1 - 3**	**1 - 11**	**1**	**2 - 26**	**280 - 12 306**	**97 - 2073**	**0.5**
SW06	14/11/2022	<1	<2	<1	12	<10	<10	110	5300	680	<1
	14/12/2022	<1	<2	<10	<10	<10	<10	<50	5400	750	<1
	18/01/2023	<10	<1	<10	<10	<10	<10	<50	10	630	<1
SW06 Baseline		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
ANZG (2018)(Freshwater)		**13**	**0.2**	**3.3**	**1.8**	**11**	**3.4**	**8**	**300**	**50**	**0.6**

Table 6: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	0.1	0.1	<0.05	<0.01	<0.05	0.2		
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.17	0.3	0.1	0.18	<0.01	0.18	0.3		
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	<0.05	<0.1	0.1	<0.05	<0.01	<0.05	0.2		
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	14/11/2022	-	-	-	-	-	-	-	-	-	-
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	-	-	-	-	-	-	-	-	-	-
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<0.02	0.06	0.1		0.07	<0.01	0.7			
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW06	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	18/01/2023	<.002	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05			
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

On the basis of results presented in this WQMR, **no recommendations or modifications to current construction activities and associated water quality management methodologies identified within the Planit CEMP are required.**

Should you have any queries about this Water Quality Monitoring Report, please do not hesitate to contact me directly. The next monthly monitoring event is scheduled for the 14th of February 2023.

Yours sincerely

Robert Todhunter

Environmental Scientist

ENV Solutions Pty Ltd

Attachment 1 – Locality

Attachment 2 – Analytical Results

Attachment 3: Photolog

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

MONTHLY WATER QUALITY REPORT

Harvest Estate Urban Development

Harvest Estate

Ewingsdale Road, Byron Bay, NSW 2481

December 2022

ENV217140_Harvest Estate_WQ_20230112

December 2022

Monitoring Period: 14th November – 14th December 2022

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this water quality report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Bulk fill and general earthworks associated with progressive construction of Stage 1 of the development.

Fortnightly Acid Frog Habitat Groundwater Quality Monitoring (First 6 months of Construction)

Fortnightly water quality monitoring of Standing Water level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6, MW7 & MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 1, SWL's and pH of all groundwater wells are outside the ANZG (2018) default ranges (freshwater: 95% species protection), however SWL's and pH for all groundwater wells were within historic baseline water quality values with the exception of MW6 and MW8, where no baseline data has been collected. EC was within historic baseline values at all locations.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	16/09/22	2.50	4.11	48
	29/09/22	3.01	4.20	53
	11/10/22	2.96	4.25	46
	20/10/22	2.98	4.10	64
	03/11/22	3.04	4.91	340
	14/11/22	2.84	4.60	34
	07/12/22	2.81	4.30	43
	14/12/22	2.71	4.30	56
MW3 Baseline		**2.79**	**4.29**	**38 - 206**
MW4	16/09/22	2.47	5.09	98
	29/09/22	2.57	4.50	100
	11/10/22	2.56	4.42	85
	20/10/22	2.70	4.5	110
	03/11/22	2.29	4.47	270
	14/11/22	2.30	4.20	130
	07/12/22	2.48	4.46	140
	14/12/22	2.43	4.20	124
MW4 Baseline		**2.51**	**4.58**	**102 - 890**
MW6	16/09/22	1.42	5.84	828
	29/09/22	1.56	5.96	1280
	11/10/22	1.43	4.39	80
	20/10/22	1.41	4.66	75
	03/11/22	1.39	5.89	1250
	14/11/22	1.34	4.47	70
	07/12/22	1.34	6.97	1300
	14/12/22	1.31	5.86	760
MW6 Baseline		**1.34**	**-**	**-**
MW7	16/09/22	1.65	4.74	54
	29/09/22	1.68	4.60	26
	11/10/22	1.66	4.82	85
	20/10/22	1.88	4.50	86
	03/11/22	1.62	4.24	161
	14/11/22	1.46	4.50	44
	07/12/22	1.51	4.80	105
	14/12/22	1.46	4.60	56
MW7 Baseline		**1.53**	**5.0**	**39 - 147**
MW8	16/09/22	2.63	4.30	100
	29/09/22	2.62	3.80	129
	11/10/22	2.52	4.01	46
	20/10/22	2.54	4.07	117
	03/11/22	2.29	3.92	290
	14/11/22	2.08	3.51	227
	07/12/22	2.38	4.12	533
	14/12/22	2.40	3.88	201
MW8 Baseline		**2.26**	**-**	**-**
ANZECC (2000) / ANZG (2018) (Freshwater)		**-**	**6.5 – 8.0**	**125 - 2200**

Monthly Groundwater Sampling Event (5 Sites)

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2, 3, 4, 5 & 7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Table 2, the required parameters of all groundwater wells can be summarised as predominantly within historic baseline range values with the exception of;

- Total dissolved solids (TDS) (150 mg/L) at MW5.

This exceedance of the baseline value for TDS at MW5 follows a trend from the previous month, however the level appears to be decreasing when compared with previous elevated TDS concentrations at this location. MW5 is considered to be up gradient of the site, therefore the elevated TDS levels are likely attributed to extraneous sources.

Table 2: Monthly Groundwater Quality Analytical Monitoring

Site	Date	pH	EC (μδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (μg/ L^{-1})	TN (μg/L^{-1})	Nitrite (μg/L)	NH_3 (μg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	S (mg/L)
MW2	29/09/2022	5.8	54	92	<5	120	500	20	510	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.6	100	110	<5	90	2000	20	240	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.0	100	240	<5	70	<200	<100	240	1.3	1.4	2.4	30	19	< 2
	14/12/2022	5.6	110	170	<5	20	3100	<100	<50	<5	<5	<5	29	15	5
MW2 Baseline		**4.22 - 5.70**	**109 - 152**	**74 – 103**	**3 - 483**	**80 - 450**	**780 - 2030**	**6 – 70**	**128 - 338**	**0.2 - 0.7**	**0.7 - 1.4**	**1.0 - 4.2**	**13.8 - 29.7**	**19 – 189**	**<0.2 - 9.8**
MW3	29/09/2022	4.2	53	40	370	90	500	20	50	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.1	64	62	130	10	500	20	200	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.6	57	84	170	30	<200	<20	270	0.8	0.6	<0.5	7.1	7.4	<2
	14/12/2022	4.3	43	32	280	<10	1100	<20	<10	<5	<5	<5	6	5.2	<2
MW3 Baseline		**3.99 - 5.33**	**38 - 206**	**26 – 140**	**45 - 5223**	**60 - 1570**	**430 - 41400**	**5 - 167**	**5 - 294**	**0.1 - 3.8**	**0.7 - 5.3**	**0.2 - 3.1**	**4.0 - 26.4**	**1 - 121**	**0.3 - 13.4**
MW4	29/09/2022	4.5	100	88	350	30	1500	100	160	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.5	110	100	69	20	1000	40	780	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.2	130	340	16	10	7000	<100	130	2.6	4.8	1.1	22	30	5
	14/12/2022	4.2	140	140	60	<10	3000	<100	<50	<5	<5	<5	21	23	7.8
MW4 Baseline		**3.97 - 5.84**	**102 - 890**	**69 – 605**	**126 - 1220**	**80 - 430**	**1680 - 4360**	**7 – 185**	**112 - 1392**	**1.7 - 11.3**	**2.6 - 15.6**	**0.6 - 5.4**	**10.3 - 146.3**	**24 – 199**	**<0.3 - 19.2**
MW5	29/09/2022	4.5	59	68	630	130	6330	20	410	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.4	75	82	92	20	500	20	100	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.6	120	270	150	80	7800	<100	520	5.2	5.7	1.4	26	29	<2
	14/12/2022	4.5	150	150	230	20	11000	<50	<60	<5	<5	<5	24	29	9.7
MW5 Baseline		**4.31 - 5.53**	**107 - 191**	**73 - 130**	**11 - 3003**	**70 - 970**	**1280 - 13400**	**25 - 117**	**117 - 863**	**0.4 - 6.0**	**0.8 - 8.4**	**0.7 - 5.4**	**9.3 - 27.2**	**19 - 82**	**1.0 - 8.3**
MW7	29/09/2022	4.6	26	40	190	100	2500	20	300	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.5	86	70	120	10	2900	40	400	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.5	44	170	<100	30	<2000	<100	10	1.9	1.4	1.4	9.7	9.7	<2
	14/12/2022	4.6	56	92	23	40	11000	<200	<100	<5	<5	<5	8.7	7.5	2.5
MW7 Baseline		**4.65 - 5.62**	**39 - 147**	**27 - 100**	**20 - 3140**	**60 - 710**	**670 - 4150**	**5 - 48**	**23 - 471**	**0.5 - 3.4**	**1.0 - 2.2**	**0.3 - 3.1**	**3.4 - 31.0**	**3 - 172**	**0.3 - 7.3**
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 – 2200**	**-**	**<50**	**<50**	**<500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Monthly Surface Water Sampling Event (6 Sites)

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 3. Select photos of the surface water sampling programme are presented in Attachment 3.

Table 3: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

Monthly surface water sampling of pH, Electrical conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sodium (Na), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 4, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following;

SW01;

- pH fell below baseline value of 6.2 (4.5)
- Electrical conductivity (EC) at SW01 exceeded maximum baseline concentration of 428 µδ/cm (110 (µδ/cm)
- Total dissolved solids (TDS) exceeded the maximum baseline concentration of 291 mg/L (800 mg/L)
- Total suspended solids (TSS) exceeded the maximum baseline concentration of 73 mg/L (210 mg/L)
- Total nitrogen (TN) exceeded the maximum baseline value of 3520 µg N L-1 (2370 µg N L-1)
- Sodium (NA) exceeded the maximum baseline concentration of 51 mg/L (54 mg/L)

SW02;

- Total suspended solids TSS exceeded the maximum baseline concentration of 495 mg/L (870 mg/L)
- Sulfur (S) exceeded the maximum baseline concentration of 10 mg/L (29 mg/L).

Sample locations SW01 and SW02 are both located ‘upstream’ of the site. As such, elevated physicochemical and nutrient exceedances at these locations are likely attributed to by extraneous sources.

SW03

- Sulfur (S) exceeded the maximum baseline concentration of 6 mg/L (11 mg/L)

SW03 is directly downstream from SW02, with elevated S at this location likely attributed to flow on effects from extraneous sources.

SW04

- pH below the minimum baseline value of 4.2 (3.2)

- Electrical conductivity (EC) exceeded the maximum baseline concentration 165 µδ/cm (280 µδ/cm)
- Total nitrogen (TN) exceeded the maximum baseline concentration 4470 mg/L (32000 mg/L)

SW04 is located downstream from monitoring location SW01, with elevated EC and TN noted at this location indicative of a flow on effect of extraneous impacts noted at SW01. SW04 has consistently been recorded as an acidic environment (pH 4.2 – 4.5), however the elevated acidity (pH 3.2) recorded during this monitoring round falls below this range. As such, the pH at this location will be closely assessed over future monitoring rounds to determine whether this result is anomalous, or representative of an ongoing trend in surface water acidification at this location.

Monthly surface water sampling of Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 5, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following exceedances as outlined below;

SW01;

- Arsenic (As) exceeded maximum baseline concentration of 3 µg/L (16 µg/L)
- Chromium (Cr) exceeded maximum baseline concentration of 2 µg/L (14 µg/L)
- Nickel (Ni) exceeded maximum baseline concentration of 6 µg/L (77 µg/L)
- Zinc (Zn) exceeded maximum baseline concentration of 58 µg/L (680 µg/L)

SW02

- Copper (Cu) exceeded the maximum concentration of 12 mg/L (94 mg/L)
- Nickel (Ni) exceeded the maximum baseline concentration of 5 mg/L (13 mg/L)
- Lead (Pb) exceeded the maximum baseline concentration of 20 mg/L (71 mg/L)
- Zinc (Zn) exceeded the maximum baseline concentration of 90 mg/L (1000 mg/L)
- Aluminium (Al) exceeded the maximum baseline concentration 3821 mg/L (13000 mg/L)

Sample locations SW01 and SW02 are both located ‘upstream’ of the site. As such, elevated physicochemical and nutrient exceedances are expected to be attributed to by extraneous sources.

SW04 exceeded the maximum baseline concentration for Zinc (Zn) of 28 mg/L (84 mg/L). SW04 is directly downstream from SW01, and therefore elevated Zn at this location is also likely attributed to flow on effects from extraneous sources.

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 6, these required hydrocarbon parameters of all surface water sampling locations can be summarised as in line with the historic baseline values.

During this monitoring period (14/11/2022-14/12/2022), 148.6mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology.

Table 4: Monthly Surface Water Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg P L^{1})	TN (µg N L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/)	K (mg/)	Na (mg/L)	Cl- (mg/L)	S (mg/L)	Chlorophyll a (µg/L^{-1})	DO (mg/L)
SW01	20/10/2022	6.6	400	320	30	30	<200	<20	30	24	9.1	2.9	31	22	33	43	4.7
	14/11/2022	6.0	920	780	4900	3100	14000	<20	6900	280	73	<50	200	25	3.7	67	0.2
	14/12/2022	4.5	1100	800	210	150	23 270	<100	50	180	43	6.8	54	24	560	88	3.6
SW01 Baseline		**6.2 – 7.0**	**134 - 428**	**91 - 291**	**1 – 73**	**70 - 3520**	**640 - 3520**	**5 - 39**	**19 - 164**	**9 – 22**	**3 - 16**	**0 – 6**	**12 -51**	**1 - 118**	**2 – 9**	**10 - 768**	-
SW02	20/10/2022	6.5	140	120	6.2	20	<200	<20	10	12	3.4	1.7	16	17	2.9	<5	8.7
	14/11/2022	6.4	190	150	210	180	13000	<20	<10	47	11	<5	62	54	18	24	0.1
	14/12/2022	6.3	200	110	870	270	2700	<100	50	38	5.9	5.1	25	26	29	14	0.1
SW02 Baseline		**6.3 – 7.0**	**97 - 292**	**66 - 199**	**3 - 495**	**50 - 1880**	**410 - 8550**	**5 - 60**	**5 - 261**	**7 - 17**	**2 – 5**	**1 -6**	**8 - 32**	**10 - 161**	**0 - 10**	**1 - 182**	-
SW03	20/10/2022	5.9	870	650	26	30	<200	<20	<10	7.6	2.3	1	12	270	13	<5	7.5
	14/11/2022	6.5	160	140	260	130	7400	<100	<50	18	5.7	<5	36	27	9	<5	2.6
	14/12/2022	6.5	160	110	11	10	3900	<100	50	13	<5	<5	18	23	11	<5	4.4
SW03 Baseline		**6.1 - 6.7**	**85 - 281**	**58 - 191**	**1 - 1005**	**40 - 2140**	**360 - 4310**	**7 - 41**	**14 - 155**	**6 - 21**	**2 – 5**	**0 – 4**	**8 - 30**	**13 - 111**	**0 - 6**	**5 - 86**	-
SW04	20/10/2022	4.2	110	90	<5	10	300	<200	<100	1.3	2.3	1	16	20	<2	<5	7.5
	14/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14/12/2022	3.2	280	190	<5	10	32000	<100	50	<5	<5	<5	20	42	<2	<5	2
SW04 Baseline		**4.2 – 4.5**	**77 - 165**	**52 - 112**	**1 - 293**	**40 - 500**	**1150 - 4470**	**5 - 52**	**27 - 693**	**1 - 3**	**1 – 3**	**1 – 3**	**10 - 20**	**17 -90**	**0 - 3**	**14 - 86**	-
SW05	20/10/2022	6.2	690	650	7.2	60	500	<200	240	11	19	7.9	160	180	8.6	<5	8.9
	14/11/2022	6.2	1000	820	13	60	8100	<100	<50	18	27	11	260	310	100	<5	4.7
	14/12/2022	6.2	1100	830	16	50	3100	<100	50	16	21	13	240	330	40	<5	7.5
SW05 Baseline		**5.1 – 7.2**	**410 - 6927**	**279 - 4710**	**5 - 136**	**40 - 210**	**10 - 2227**	**8 - 52**	**68 - 592**	**3 - 57**	**7 - 130**	**2 - 58**	**46 - 1667**	**84 -1980**	**6 - 115**	**9 - 63**	-
SW06	20/10/2022	6.3	730	580	16	50	500	<200	190	9.1	13	5.8	110	330	7.5	6.2	8.7
	14/11/2022	6.2	1000	840	13	40	1100	<100	360	18	29	12	270	310	100	<5	<5
	14/12/2022	6.3	1200	840	16	100	5800	<100	50	16	21	13	240	340	44	<5	8.3
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 - 2200**	-	**<50**	**50**	**500**	-	-	-	-	-	-	-	-	**5**	

Table 5: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Fe (total) (µg/L)	Al (total) (µg/L)	Hg (µg/L)
SW01	20/10/2022	2	<0.2	2	16	9	3	42	2400	660	<0.1
	14/11/2022	1.3	<20	<100	1000	300	100	4700	130 000	130 000	<10
	14/12/2022	16	<2	14	200	77	15	680	1600	22000	<1
SW01 Baseline		**1 – 3**	**1**	**1 – 2**	**2 – 41**	**2 - 6**	**1**	**3 – 58**	**423 - 1223**	**59 – 496**	**0.5**
SW02	20/10/2022	1	<0.2	1	3	1	<1	32	620	220	<0.1
	14/11/2022	37	<2	<1	15	<10	<10	96	53 000	1800	<1
	14/12/2022	66	<2	34	94	13	71	1000	9700	13000	<1
SW02 Baseline		**1 - 45**	**1**	**1 - 7**	**1 - 12**	**1 – 5**	**1 - 20**	**7 - 90**	**473 – 71 893**	**154 - 3821**	**0.5**
SW03	20/10/2022	2	<0.2	2	3	1	2	30	860	490	<0.1
	14/11/2022	<1	<2	<1	4	<10	<10	240	1900	1100	<1
	14/12/2022	<1	<2	<10	<10	<10	<10	53	1300	630	<1
SW03 Baseline		**1 - 58**	**1**	**1 - 8**	**1 - 28**	**1 – 6**	**1 - 28**	**11 - 260**	**512 – 85 520**	**109 - 7949**	**0.5**
SW04	20/10/2022	<1	<0.2	4	1	2	1	24	2400	1100	<0.1
	14/11/2022	-	-	-	-	-	-	-	-	-	-
	14/12/2022	<1	<2	<10	<10	<10	<10	84	3200	1200	<1
SW04 Baseline		**1 - 2**	**1**	**2 - 7**	**1 - 2**	**1 – 5**	**1 - 2**	**8 - 28**	**358 - 2827**	**578 – 1402**	**0.5**
SW05	20/10/2022	<1	<0.2	1	<1	2	1	7	3500	660	<0.1
	14/11/2022	<1	<2	<1	20	<10	<10	120	5400	750	<1
	14/12/2022	<1	<2	<10	<10	<10	<10	<50	6100	930	<1
SW05 Baseline		**1 - 2**	**1**	**1 - 2**	**1 - 3**	**1 - 11**	**1**	**2 - 26**	**280 - 12 306**	**97 - 2073**	**0.5**
SW06	20/10/2022	<1	<0.2	1	<1	2	1	12	2700	540	<0.1
	14/11/2022	<1	<2	<1	12	<10	<10	110	5300	680	<1
	14/12/2022	<1	<2	<10	<10	<10	<10	<50	5400	750	<1
SW06 Baseline		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
ANZG (2018)(Freshwater)		**13**	**0.2**	**3.3**	**1.8**	**11**	**3.4**	**8**	**300**	**50**	**0.6**

Table 6: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	-	-	-	-	-	-	-	-	-	-
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	<0.1
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
		<0.2	<0.05	<0.1		<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW06	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/12/2022	<0.2	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

On the basis of results presented in this WQMR, no recommendations or modifications to current construction activities and associated water quality management methodologies identified within the Planit CEMP are required.

Should you have any queries about this Water Quality Monitoring Report, please do not hesitate to contact me directly. The next monthly monitoring event is scheduled for the 17th of January 2023.

Yours sincerely

Robert Todhunter

Environmental Scientist

ENV Solutions Pty Ltd

Attachment 1 – Locality

Legend

Site Location

0 0.5 1km

Figure 1 – Site Location
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

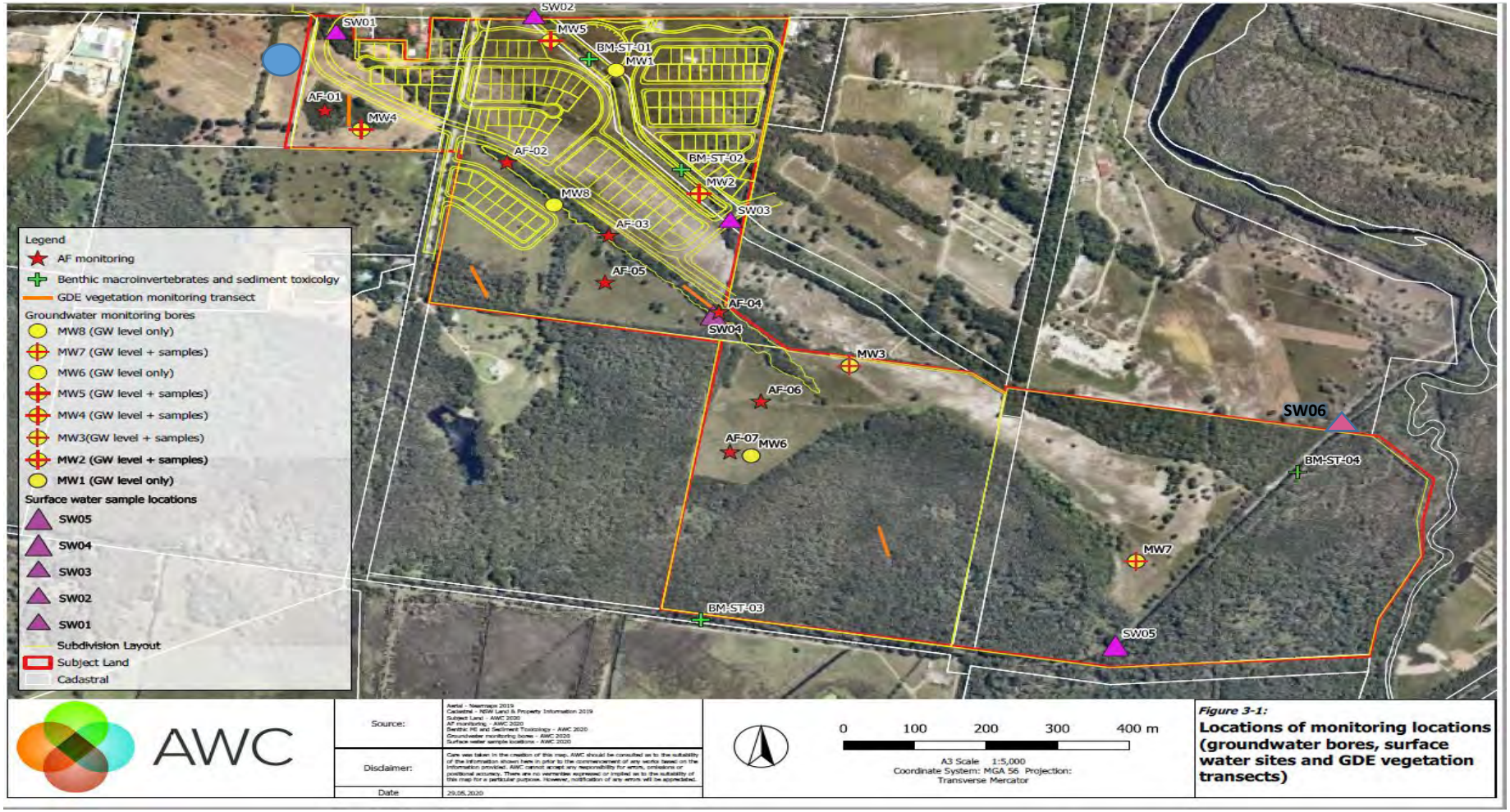

Figure 2 – AWC Surface Water Monitoring Locations
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
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Attachment 2 – Analytical Results

eurofins | Environment Testing

Certificate of Analysis

ENV Services Pty Ltd
313 River Street
Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Robert Todhunter**

Report **951546-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Dec 19, 2022

Client Sample ID			G01 **MW2**	**MW3**	G01 **MW4**	**MW5**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-De0043520**	**S22-De0043521**	**S22-De0043522**	**S22-De0043523**
Date Sampled			**Dec 14, 2022**	**Dec 14, 2022**	**Dec 14, 2022**	**Dec 14, 2022**
Test/Reference	LOR	Unit				
Ammonia (as N)	0.01	mg/L	< 0.05	< 0.01	< 0.05	0.06
Chloride	1	mg/L	15	5.2	23	29
Conductivity (at 25 °C)	10	uS/cm	110	43	140	150
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25	< 0.05	< 0.25	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.25	< 0.02	< 0.1	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.1	< 0.02	< 0.1	< 0.05
pH (at 25 °C)	0.1	pH Units	5.6	4.3	4.2	4.5
Phosphate total (as P)	0.01	mg/L	0.02	< 0.01	< 0.01	0.02
Sulphate (as S)	2	mg/L	5.0	< 2	7.8	9.7
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	170	32	140	150
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.1	1.1	3.0	11
Total Nitrogen (as N)*	0.2	mg/L	3.1	1.1	3	11
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5	280	60	230
Alkali Metals						
Calcium	0.5	mg/L	< 5	< 5	< 5	< 5
Magnesium	0.5	mg/L	< 5	< 5	< 5	< 5
Potassium	0.5	mg/L	< 5	< 5	< 5	< 5
Sodium	0.5	mg/L	29	6.0	21	24

Client Sample ID			G01 **MW7**
Sample Matrix			**Water**
Eurofins Sample No.			**S22-De0043524**
Date Sampled			**Dec 14, 2022**
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	< 0.1
Chloride	1	mg/L	7.5
Conductivity (at 25 °C)	10	uS/cm	56
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5
Nitrate (as N)	0.02	mg/L	< 0.5
Nitrite (as N)	0.02	mg/L	< 0.2
pH (at 25 °C)	0.1	pH Units	4.6
Phosphate total (as P)	0.01	mg/L	0.04

Client Sample ID			[G01]MW7
Sample Matrix			Water
Eurofins Sample No.			S22-De0043524
Date Sampled			Dec 14, 2022
Test/Reference	LOR	Unit	
Sulphate (as S)	2	mg/L	2.5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	92
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	11
Total Nitrogen (as N)*	0.2	mg/L	11
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	23
Alkali Metals			
Calcium	0.5	mg/L	< 5
Magnesium	0.5	mg/L	< 5
Potassium	0.5	mg/L	< 5
Sodium	0.5	mg/L	8.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Dec 20, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Sydney	Dec 21, 2022	28 Days
- Method: E052 Total Phosphate (as P)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Dec 21, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Conductivity (at 25 °C)	Sydney	Dec 21, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
pH (at 25 °C)	Sydney	Dec 21, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Dec 21, 2022	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Dec 21, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Dec 21, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Dec 21, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Christchurch 7675
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IANZ# 1290

Company Name: ENV Services Pty Ltd
Address: 313 River Street
Ballina
NSW 2478

Order No.:
Report #: 951546
Phone: 1300 861 325
Fax:

Received: Dec 19, 2022 9:30 AM
Due: Dec 22, 2022
Priority: 3 Day
Contact Name: Robert Todhunter

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Chloride	Conductivity (at 25 °C)	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254											X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	MW2	Dec 14, 2022		Water	S22-De0043520	X	X	X	X	X	X	X	X
2	MW3	Dec 14, 2022		Water	S22-De0043521	X	X	X	X	X	X	X	X
3	MW4	Dec 14, 2022		Water	S22-De0043522	X	X	X	X	X	X	X	X
4	MW5	Dec 14, 2022		Water	S22-De0043523	X	X	X	X	X	X	X	X
5	MW7	Dec 14, 2022		Water	S22-De0043524	X	X	X	X	X	X	X	X
Test Counts						5	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as S)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Ammonia (as N)	%	97			70-130	Pass	
Chloride	%	104			70-130	Pass	
Conductivity (at 25 °C)	%	89			70-130	Pass	
Nitrate & Nitrite (as N)	%	100			70-130	Pass	
Nitrate (as N)	%	100			70-130	Pass	
Nitrite (as N)	%	98			70-130	Pass	
Phosphate total (as P)	%	94			70-130	Pass	
Sulphate (as S)	%	104			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	86			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	88			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	104			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	98			80-120	Pass	
Magnesium	%	91			80-120	Pass	
Potassium	%	110			80-120	Pass	
Sodium	%	115			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B22-De0039662	NCP	%	83			70-130	Pass	
Chloride	S22-De0043514	NCP	%	104			70-130	Pass	
Nitrate & Nitrite (as N)	B22-De0039662	NCP	%	86			70-130	Pass	
Nitrate (as N)	B22-De0039662	NCP	%	86			70-130	Pass	
Phosphate total (as P)	S22-De0043513	NCP	%	85			70-130	Pass	
Sulphate (as S)	S22-De0043514	NCP	%	102			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	B22-De0039799	NCP	%	80			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-De0031542	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-De0038379	NCP	%	100			75-125	Pass	
Magnesium	N22-De0046519	NCP	%	90			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Potassium	N22-De0046519	NCP	%	111			75-125	Pass	
Sodium	N22-De0046519	NCP	%	87			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S22-De0043515	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Conductivity (at 25 °C)	S22-De0043520	CP	uS/cm	110	110	1.3	30%	Pass	
Nitrate & Nitrite (as N)	S22-De0043515	NCP	mg/L	< 0.25	< 0.25	<1	30%	Pass	
Nitrate (as N)	S22-De0043515	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Nitrite (as N)	S22-De0043515	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phosphate total (as P)	S22-De0043512	NCP	mg/L	0.15	0.14	3.8	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-De0039051	NCP	mg/L	120	110	1.7	30%	Pass	
Total Kjeldahl Nitrogen (as N)	B22-De0036621	NCP	mg/L	110	95	15	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-De0039051	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-De0043513	NCP	mg/L	38	36	5.3	30%	Pass	
Magnesium	S22-De0043513	NCP	mg/L	5.9	5.8	1.9	30%	Pass	
Potassium	S22-De0043512	NCP	mg/L	6.8	6.6	3.0	30%	Pass	
Sodium	S22-De0043513	NCP	mg/L	25	24	4.1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S22-De0043524	CP	mg/L	7.5	5.8	26	30%	Pass	
Sulphate (as S)	S22-De0043524	CP	mg/L	2.5	2.1	20	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference

Authorised by:

Bonnie Pu	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ENV Services Pty Ltd
313 River Street
Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Robert Todhunter**

Report **951543-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Dec 19, 2022

Client Sample ID			G01SW01	G01SW02	G01SW03	G01SW04
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-De0043512**	**S22-De0043513**	**S22-De0043514**	**S22-De0043515**
Date Sampled			**Dec 14, 2022**	**Dec 14, 2022**	**Dec 14, 2022**	**Dec 14, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.2	< 0.2	< 0.2	< 0.2
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.2	< 0.2	< 0.2	< 0.2
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.2	< 0.2	< 0.2	< 0.2
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Chloride	1	mg/L	24	26	23	42
Chlorophyll a	5	ug/L	88	14	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	1100	200	160	280
Dissolved Oxygen	0.1	mg/L	3.6	0.1	4.4	2.0
Nitrate & Nitrite (as N)	0.05	mg/L	0.27	< 0.25	< 0.25	< 0.25
Nitrate (as N)	0.02	mg/L	0.27	< 0.25	< 0.25	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
pH (at 25 °C)	0.1	pH Units	4.5	6.3	6.5	3.2
Phosphate total (as P)	0.01	mg/L	0.15	0.27	< 0.01	< 0.01
Sulphate (as SO4)	2	mg/L	560	29	11	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	800	110	110	190
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	23	2.7	3.9	32
Total Nitrogen (as N)*	0.2	mg/L	23.27	2.7	3.9	32
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	210	870	11	< 5
Heavy Metals						
Aluminium	0.05	mg/L	22	13	0.63	1.2
Arsenic	0.001	mg/L	0.016	0.066	< 0.01	< 0.01
Cadmium	0.0002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Chromium	0.001	mg/L	0.014	0.034	< 0.01	< 0.01

Client Sample ID			G01SW01	G01SW02	G01SW03	G01SW04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-De0043512	S22-De0043513	S22-De0043514	S22-De0043515
Date Sampled			Dec 14, 2022	Dec 14, 2022	Dec 14, 2022	Dec 14, 2022
Test/Reference	LOR	Unit				
Heavy Metals						
Copper	0.001	mg/L	0.20	0.094	< 0.01	< 0.01
Iron	0.05	mg/L	16	97	1.3	3.2
Lead	0.001	mg/L	0.015	0.071	< 0.01	< 0.01
Mercury	0.0001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Nickel	0.001	mg/L	0.077	0.013	< 0.01	< 0.01
Zinc	0.005	mg/L	0.68	1.0	0.053	0.084
Alkali Metals						
Calcium	0.5	mg/L	180	38	13	< 5
Magnesium	0.5	mg/L	43	5.9	< 5	< 5
Potassium	0.5	mg/L	6.8	5.1	< 5	< 5
Sodium	0.5	mg/L	54	25	18	20

Client Sample ID			G01SW05	G01SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S22-De0043516	S22-De0043517
Date Sampled			Dec 14, 2022	Dec 14, 2022
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 0.2	< 0.2
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.2	< 0.2
TRH C6-C10 less BTEX (F1)N04	0.02	mg/L	< 0.2	< 0.2
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)N01	0.05	mg/L	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
NaphthaleneN02	0.01	mg/L	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	< 0.05	< 0.05
Chloride	1	mg/L	330	340
Chlorophyll a	5	ug/L	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	1100	1200
Dissolved Oxygen	0.1	mg/L	7.5	8.3
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.1	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.1	< 0.1
pH (at 25 °C)	0.1	pH Units	6.2	6.3
Phosphate total (as P)	0.01	mg/L	0.05	0.10
Sulphate (as SO4)	2	mg/L	40	44
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	830	840
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.1	5.8
Total Nitrogen (as N)*	0.2	mg/L	3.1	5.8
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	16	16

Client Sample ID			G01SW05	G01SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S22-De0043516	S22-De0043517
Date Sampled			Dec 14, 2022	Dec 14, 2022
Test/Reference	LOR	Unit		
Heavy Metals				
Aluminium	0.05	mg/L	0.93	0.75
Arsenic	0.001	mg/L	< 0.01	< 0.01
Cadmium	0.0002	mg/L	< 0.002	< 0.002
Chromium	0.001	mg/L	< 0.01	< 0.01
Copper	0.001	mg/L	< 0.01	< 0.01
Iron	0.05	mg/L	6.1	5.4
Lead	0.001	mg/L	< 0.01	< 0.01
Mercury	0.0001	mg/L	< 0.001	< 0.001
Nickel	0.001	mg/L	< 0.01	< 0.01
Zinc	0.005	mg/L	< 0.05	< 0.05
Alkali Metals				
Calcium	0.5	mg/L	16	16
Magnesium	0.5	mg/L	21	21
Potassium	0.5	mg/L	13	13
Sodium	0.5	mg/L	240	240

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Dec 21, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 21, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 21, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Dec 20, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Sydney	Dec 21, 2022	28 Days
- Method: E052 Total Phosphate (as P)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 20, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Dec 21, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Chlorophyll a	Melbourne	Dec 20, 2022	28 Days
- Method: LTM-INO-4340 Chlorophyll a in Waters			
Conductivity (at 25 °C)	Sydney	Dec 21, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Sydney	Dec 21, 2022	1 Days
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25 °C)	Sydney	Dec 21, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as SO4)	Sydney	Dec 21, 2022	28 Days
- Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Dec 21, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Sydney	Dec 21, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Dec 19, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Dec 21, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Dec 21, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Company Name: ENV Services Pty Ltd
Address: 313 River Street
Ballina
NSW 2478

Order No.:
Report #: 951543
Phone: 1300 861 325
Fax:

Received: Dec 19, 2022 9:30 AM
Due: Dec 22, 2022
Priority: 3 Day
Contact Name: Robert Todhunter

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Aluminium	Chloride	Chlorophyll a	Conductivity (at 25 °C)	Dissolved Oxygen	Iron	pH (at 25 °C)	Sulphate (as SO4)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Total Recoverable Hydrocarbons	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254								X									X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X	X	X	X	X	X
External Laboratory																			
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**														
1	SW01	Dec 14, 2022		Water	S22-De0043512	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	SW02	Dec 14, 2022		Water	S22-De0043513	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	SW03	Dec 14, 2022		Water	S22-De0043514	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	SW04	Dec 14, 2022		Water	S22-De0043515	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	SW05	Dec 14, 2022		Water	S22-De0043516	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	SW06	Dec 14, 2022		Water	S22-De0043517	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						6	6	6	6	6	6	6	6	6	6	6	6	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Chlorophyll a	ug/L	< 5			5	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	84			70-130	Pass	
TRH C10-C14	%	117			70-130	Pass	
TRH C6-C10	%	85			70-130	Pass	
TRH >C10-C16	%	113			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	%	87			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	99			70-130	Pass	
Chloride	%	104			70-130	Pass	
Conductivity (at 25 °C)	%	89			70-130	Pass	
Nitrate & Nitrite (as N)	%	98			70-130	Pass	
Nitrate (as N)	%	98			70-130	Pass	
Nitrite (as N)	%	99			70-130	Pass	
Phosphate total (as P)	%	94			70-130	Pass	
Sulphate (as SO4)	%	104			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	86			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	78			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	104			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	93			80-120	Pass	
Arsenic	%	91			80-120	Pass	
Cadmium	%	91			80-120	Pass	
Chromium	%	93			80-120	Pass	
Copper	%	89			80-120	Pass	
Iron	%	92			80-120	Pass	
Lead	%	92			80-120	Pass	
Mercury	%	96			80-120	Pass	
Nickel	%	92			80-120	Pass	
Zinc	%	90			80-120	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	98			80-120	Pass	
Magnesium	%	91			80-120	Pass	
Potassium	%	110			80-120	Pass	
Sodium	%	115			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B22-De0039662	NCP	%	83			70-130	Pass	
Nitrate & Nitrite (as N)	B22-De0039662	NCP	%	86			70-130	Pass	
Nitrate (as N)	B22-De0039662	NCP	%	86			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	B22-De0039799	NCP	%	80			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-De0031542	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	N22-De0046519	NCP	%	96			75-125	Pass	
Arsenic	N22-De0046519	NCP	%	97			75-125	Pass	
Cadmium	N22-De0046519	NCP	%	91			75-125	Pass	
Chromium	N22-De0046519	NCP	%	93			75-125	Pass	
Copper	N22-De0046519	NCP	%	86			75-125	Pass	
Iron	N22-De0046519	NCP	%	91			75-125	Pass	
Lead	N22-De0046519	NCP	%	89			75-125	Pass	
Mercury	N22-De0046519	NCP	%	99			75-125	Pass	
Nickel	N22-De0046519	NCP	%	90			75-125	Pass	
Zinc	N22-De0046519	NCP	%	87			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Calcium	S22-De0038379	NCP	%	100			75-125	Pass	
Magnesium	N22-De0046519	NCP	%	90			75-125	Pass	
Potassium	N22-De0046519	NCP	%	111			75-125	Pass	
Sodium	N22-De0046519	NCP	%	87			75-125	Pass	
Spike - % Recovery									
				Result 1					
Phosphate total (as P)	S22-De0043513	CP	%	85			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S22-De0043514	CP	%	104			70-130	Pass	
Sulphate (as SO4)	S22-De0043514	CP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S22-De0043515	CP	%	91			70-130	Pass	
TRH >C10-C16	S22-De0043515	CP	%	86			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S22-De0043629	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S22-De0043512	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S22-De0043512	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S22-De0043512	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C6-C10	S22-De0043629	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	S22-De0043512	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S22-De0043512	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S22-De0043512	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S22-De0043629	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S22-De0043512	CP	mg/L	24	24	<1	30%	Pass	
Chlorophyll a	S22-De0043512	CP	ug/L	88	60	38	30%	Fail	Q15
Phosphate total (as P)	S22-De0043512	CP	mg/L	0.15	0.14	3.8	30%	Pass	
Sulphate (as SO4)	S22-De0043512	CP	mg/L	560	570	2.0	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-De0043512	CP	mg/L	800	770	3.8	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M22-De0050910	NCP	mg/L	< 0.2	0.3	160	30%	Fail	Q15
Total Suspended Solids Dried at 103 °C to 105 °C	S22-De0039051	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S22-De0043512	CP	mg/L	22	23	<1	30%	Pass	
Arsenic	S22-De0043512	CP	mg/L	0.016	0.017	9.6	30%	Pass	
Cadmium	S22-De0038345	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S22-De0043512	CP	mg/L	0.014	0.012	17	30%	Pass	
Copper	S22-De0043512	CP	mg/L	0.20	0.20	4.6	30%	Pass	
Iron	S22-De0043512	CP	mg/L	16	17	1.5	30%	Pass	
Lead	S22-De0043512	CP	mg/L	0.015	0.014	5.0	30%	Pass	
Mercury	S22-De0038345	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S22-De0043512	CP	mg/L	0.077	0.079	3.1	30%	Pass	
Zinc	S22-De0043512	CP	mg/L	0.68	0.71	3.8	30%	Pass	

Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-De0043512	CP	mg/L	180	180	2.2	30%	Pass	
Magnesium	S22-De0043512	CP	mg/L	43	45	2.5	30%	Pass	
Potassium	S22-De0043512	CP	mg/L	6.8	6.6	3.0	30%	Pass	
Sodium	S22-De0043512	CP	mg/L	54	53	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S22-De0043513	CP	mg/L	13	12	12	30%	Pass	
Arsenic	S22-De0043513	CP	mg/L	0.066	0.063	4.4	30%	Pass	
Chromium	S22-De0043513	CP	mg/L	0.034	0.029	17	30%	Pass	
Copper	S22-De0043513	CP	mg/L	0.094	0.084	11	30%	Pass	
Iron	S22-De0043513	CP	mg/L	97	92	5.2	30%	Pass	
Lead	S22-De0043513	CP	mg/L	0.071	0.063	11	30%	Pass	
Nickel	S22-De0043513	CP	mg/L	0.013	0.012	12	30%	Pass	
Zinc	S22-De0043513	CP	mg/L	1.0	0.90	12	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-De0043513	CP	mg/L	38	36	5.3	30%	Pass	
Magnesium	S22-De0043513	CP	mg/L	5.9	5.8	1.9	30%	Pass	
Sodium	S22-De0043513	CP	mg/L	25	24	4.1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S22-De0043515	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nitrate & Nitrite (as N)	S22-De0043515	CP	mg/L	< 0.25	< 0.25	<1	30%	Pass	
Nitrate (as N)	S22-De0043515	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Nitrite (as N)	S22-De0043515	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25 °C)	S22-De0043517	CP	uS/cm	1200	1100	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Bonnie Pu	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Attachment 3: Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	14/12/2022

Description

Surface water monitoring location SW01.

Photo No.	Date
2	14/12/2022

Description

Surface water monitoring location SW02

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	14/12/2022

Description

Surface water monitoring location SW03

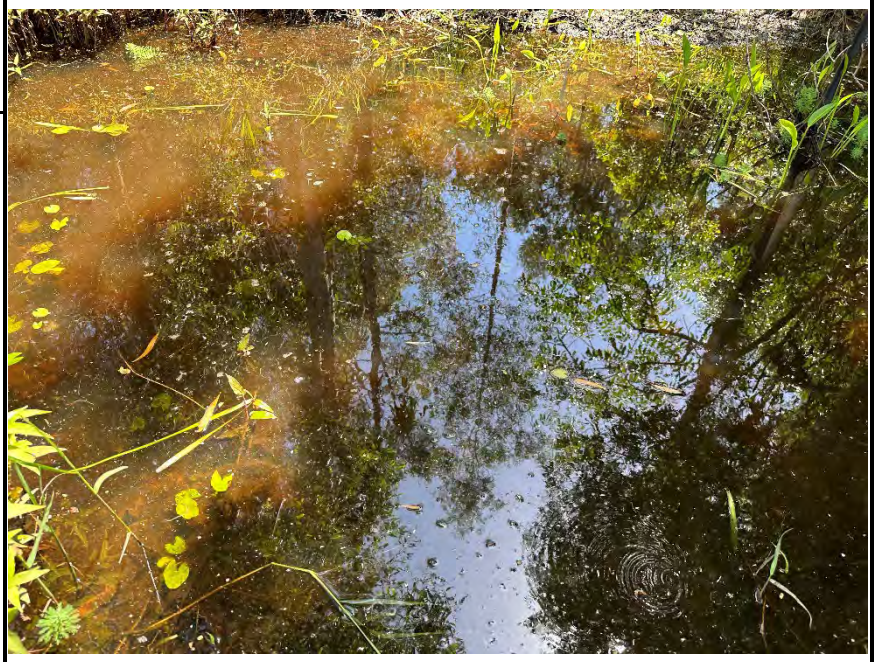

Photo No.	Date
4	14/12/2022

Description

Surface water monitoring location SW04.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date	
5	14/12/2022	
Description		
Surface water monitoring location SW05		

Photo No.	Date	
6	14/12/2022	
Description		
Surface water monitoring location SW06		

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MONTHLY WATER QUALITY REPORT

Harvest Estate Urban Development

Harvest Estate

Ewingsdale Road, Byron Bay, NSW 2481

November 2022

ENV217140_Harvest Estate_WQ_20221205

December 2022

Monitoring Period: - 20th October - 14th November 2022

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this water quality report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Bulk fill and general earthworks associated with progressive construction of Stage 1 of the development.

Fortnightly Acid Frog Habitat Groundwater Quality Monitoring (First 6 months of Construction)

Fortnightly water quality monitoring of Standing Water level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6, MW7 & MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 1, SWL's and pH of all groundwater wells are outside the ANZG (2018) default ranges (freshwater: 95% species protection), however SWL's and pH for all groundwater wells were within historic baseline water quality values with the exception of MW6 and MW8, where no baseline data has been collected.

EC was within historic baseline values at all locations, with the exception of MW3 on the 03/11 (340 µδ/cm). This result is within the ANZG (2018) freshwater:95% species protection default range, and as such is not considered to be detrimental to water quality at the monitoring location.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	16/09/22	2.50	4.11	48
	29/09/22	3.01	4.20	53
	11/10/22	2.96	4.25	46
	20/10/22	2.98	4.1	64
	03/11/22	3.04	4.91	340
	14/11/22	2.84	4.60	34
MW3 Baseline		**2.79**	**4.29**	**38 - 206**
MW4	16/09/22	2.47	5.09	98
	29/09/22	2.57	4.50	100
	11/10/22	2.56	4.42	85
	20/10/22	2.70	4.5	110
	03/11/22	2.29	4.47	270
	14/11/22	2.30	4.20	130
MW4 Baseline		**2.51**	**4.58**	**102 - 890**
MW6	16/09/22	1.42	5.84	828
	29/09/22	1.56	5.96	1280
	11/10/22	1.43	4.39	80
	20/10/22	1.41	4.66	75
	03/11/22	1.39	5.89	1250
	14/11/22	1.34	4.47	70
MW6 Baseline		**1.34**	**-**	**-**
MW7	16/09/22	1.65	4.74	54
	29/09/22	1.68	4.6	26
	11/10/22	1.66	4.82	85
	20/10/22	1.88	4.5	86
	03/11/22	1.62	4.24	161
	14/11/22	1.46	4.50	44
MW7 Baseline		**1.53**	**5.0**	**39 - 147**
MW8	16/09/22	2.63	4.30	100
	29/09/22	2.62	3.80	129
	11/10/22	2.52	4.01	46
	20/10/22	2.54	4.07	117
	03/11/22	2.29	3.92	290
	14/11/22	2.08	3.51	227
MW8 Baseline		**2.26**	**-**	**-**
ANZECC (2000) / ANZG (2018) (Freshwater)		**-**	**6.5 – 8.0**	**125 - 2200**

Monthly Groundwater Sampling Event (5 Sites)

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of five (5) groundwater wells (MW2, 3, 4, 5 & 7) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Table 2, the required parameters of all groundwater wells can be summarised as predominantly within historic baseline range values, with the exception of the following exceedances as outlined below;

- Total Dissolved Solids (TDS) (240 mg/L), MW5 130mg/L (270 mg/L) and MW7 100 mg/L (170 mg/L);
- Total Nitrogen (TN) at MW4 (7000 µg/L[1]) and
- Calcium (Ca) at MW2 (1.3 mg/L).

MW5 is located 'up gradient' of current active works at the site, with TDS concentrations decreasing in MW2 and MW7 as groundwater travels downgradient through the site. On this basis, elevated TDS in groundwater is likely attributed to an aquifer wide increase in TDS concentrations. Furthermore, TDS concentrations at the levels recorded during this monitoring round are unlikely to contribute to adverse impacts to biota within localised waterways. Slightly elevated Calcium at MW2 is most likely associated with aquifer wide increase in TDS (and associated anions and cations) and is not considered detrimental to groundwater quality beneath the site.

Elevated TN above baseline range values at MW4 is considered an anomalous result, associated with catchment wide Nitrogen increases identified at 'upstream' surface water monitoring locations (Table 4). As such it is likely attributed to extraneous sources.

Table 2: Monthly Groundwater Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg/ L^{-1})	TN (µg/L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	S (mg/L)
MW2	29/09/2022	5.8	54	92	<5	120	500	20	510	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.6	100	110	<5	90	2000	20	240	<0.5	0.8	2.2	28	13	< 2
	14/11/2022	6.0	100	240	<5	70	<200	<100	240	1.3	1.4	2.4	30	19	< 2
MW2 Baseline		**4.22 - 5.70**	**109 - 152**	**74 - 103**	**3 - 483**	**80 - 450**	**780 - 2030**	**6 – 70**	**128 - 338**	**0.2 - 0.7**	**0.7 - 1.4**	**1.0 - 4.2**	**13.8 - 29.7**	**19 - 189**	**<0.2 - 9.8**
MW3	29/09/2022	4.2	53	40	370	90	500	20	50	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.1	64	62	130	10	500	20	200	0.5	0.9	<0.5	7.0	8	<2
	14/11/2022	4.6	57	84	170	30	<200	<20	270	0.8	0.6	<0.5	7.1	7.4	<2
MW3 Baseline		**3.99 - 5.33**	**38 - 206**	**26 - 140**	**45 - 5223**	**60 - 1570**	**430 - 41400**	**5 - 167**	**5 - 294**	**0.1 - 3.8**	**0.7 - 5.3**	**0.2 - 3.1**	**4.0 - 26.4**	**1 - 121**	**0.3 - 13.4**
MW4	29/09/2022	4.5	100	88	350	30	1500	100	160	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.5	110	100	69	20	1000	40	780	3.9	2.1	<0.5	14	20	<2
	14/11/2022	4.2	130	340	16	10	7000	<100	130	2.6	4.8	1.1	22	30	5
MW4 Baseline		**3.97 - 5.84**	**102 - 890**	**69 - 605**	**126 - 1220**	**80 - 430**	**1680 - 4360**	**7 – 185**	**112 - 1392**	**1.7 - 11.3**	**2.6 - 15.6**	**0.6 - 5.4**	**10.3 - 146.3**	**24 - 199**	**<0.3 - 19.2**
MW5	29/09/2022	4.5	59	68	630	130	6330	20	410	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.4	75	82	92	20	500	20	100	2.0	2.3	0.5	12	15	<2
	14/11/2022	4.6	120	270	150	80	7800	<100	520	5.2	5.7	1.4	26	29	<2
MW5 Baseline		**4.31 - 5.53**	**107 - 191**	**73 - 130**	**11 - 3003**	**70 - 970**	**1280 - 13400**	**25 - 117**	**117 - 863**	**0.4 - 6.0**	**0.8 - 8.4**	**0.7 - 5.4**	**9.3 - 27.2**	**19 - 82**	**1.0 - 8.3**
MW7	29/09/2022	4.6	26	40	190	100	2500	20	300	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.5	86	70	120	10	2900	40	400	1.7	1.7	0.5	8.5	12	<2
	14/11/2022	4.5	44	170	<100	30	<2000	<100	10	1.9	1.4	1.4	9.7	9.7	<2
MW7 Baseline		**4.65 - 5.62**	**39 - 147**	**27 - 100**	**20 - 3140**	**60 - 710**	**670 - 4150**	**5 - 48**	**23 - 471**	**0.5 - 3.4**	**1.0 - 2.2**	**0.3 - 3.1**	**3.4 - 31.0**	**3 - 172**	**0.3 - 7.3**
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 – 2200**	**-**	**<50**	**50**	**500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Monthly Surface Water Sampling Event (6 Sites)

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 3. Select photos of the surface water sampling programme are presented in Attachment 3.

Table 3: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

Monthly surface water sampling of pH, Electrical conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring location SW04 was dry at the time of sampling, and as such no results have been provided for this location.

Presented in Table 4, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of Total Nitrogen exceeding baseline maximum concentrations at SW01 (14000 µg L^{-1}), SW02 (13000 µg L^{-1}), SW03 (7400 µg L^{-1}) and SW05 (8100 µg L^{-1}).

SW01 and SW05 are both located 'upstream' of the site, and as such nutrient levels are expected to be attributed to extraneous sources. Elevated TN levels trend downwards with the gradient of the site, indicating that the elevated TN levels are not attributed to current site works and are representative of a catchment wide increase in TN levels.

The following physiochemical and nutrient exceedances of baseline range values were also recorded at SW01 & SW02.

- Electrical conductivity (EC) at SW01 exceeded the baseline maximum concentration 428 µg L^{-1} (920 µg L^{-1});
- Total suspended solids (TSS) at SW01 exceeded the baseline maximum concentration 73 µg L^{-1} (4900 µg L^{-1});
- Ammonia (NH_3) levels at SW01 exceeded the baseline maximum concentration 164 µg L^{-1} (6900 µg L^{-1});
- Sodium (Na) levels exceeded the baseline maximum concentration 51 µg L^{-1} at SW01 (200 µg L^{-1}) and 32 µg L^{-1} at SW02 (62 µg L^{-1}).
- Calcium (Ca) levels exceeded the baseline maximum concentration at SW01 22 µg L^{-1} (280 µg L^{-1}) and SW02 17 µg L^{-1} (47 µg L^{-1}).

Sample locations SW01 and SW02 are both located 'upstream' of the site. As such, elevated physicochemical and nutrient exceedances are expected to be attributed to by extraneous sources.

Monthly surface water sampling of Arsenic (As), Cadmium (Ca), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in

chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 5, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of the following exceedances as outlined below;

- Copper (Cu) at SW01 (1000 µg L-1), SW02 (15 µg L-1) and SW05 (20 µg L^{-1});
- Iron (Fe) at SW01 (130 000 µg L-1);
- Aluminium (Al) at SW01 (130 000 µg L^{-1});
- Magnesium (Pb) SW01 (100 µg L^{-1});
- Sulfate (S) at SW02 (18 µg L-1).
- Zinc (Zn) at SW01 (4700 µg L-1) and SW05 (120 µg L-1).

Sample locations SW01, SW02 and SW05 are all located 'upstream' of the site, as such, elevated metal concentrations are expected to be contributed to by extraneous sources.

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 6, these required hydrocarbon parameters of all surface water sampling locations can be summarised as in line with the historic baseline values with the exception of the following;

- C10-C14 at SW01 (0.25 mg/l);
- C10-C16 at SW01 (0.22 mg/L);
- C10-C36 at SW01 (0.25 mg/L);
- C15- C28 at SW02 (0.6 mg/L) and
- C29-C36 at SW02 (0.3 mg/L).

Sample locations SW01 and SW02 are both considered 'upstream' of the site, and as such elevated concentration of Total Recoverable Hydrocarbons are likely attributed to extraneous sources.

During this monitoring period (20/10/2022-14/11/2022), 254.8mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

Table 4: Monthly Surface Water Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg P L^{1})	TN (µg N L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/)	K (mg/)	Na (mg/L)	Cl- (mg/L)	S (mg/L)	Chlorophyll a (µg/L^{-1})	DO (mg/L)
SW01	29/09/2022	6.9	140	180	11	470	5200	<20	<10	22	14	3	30	14	3.4	450	3.1
	20/10/2022	6.6	400	320	30	30	<200	<20	30	24	9.1	2.9	31	22	33	43	4.7
	14/11/2022	6.0	920	780	4900	3100	14000	<20	6900	280	73	<50	200	25	3.7	67	0.2
SW01 Baseline		**6.2 – 7.0**	**134 - 428**	**91 - 291**	**1 - 73**	**70 - 3520**	**640 - 3520**	**5 - 39**	**19 - 164**	**9 – 22**	**3 - 16**	**0 – 6**	**12 -51**	**1 - 118**	**2 – 9**	**10 - 768**	-
SW02	29/09/2022	6.9	160	170	8.8	40	1300	<20	30	19	5.8	1.9	27	29	2.8	22	8.0
	20/10/2022	6.5	140	120	6.2	20	<200	<20	10	12	3.4	1.7	16	17	2.9	<5	8.7
	14/11/2022	6.4	190	150	210	180	13000	<20	<10	47	11	<5	62	54	18	24	0.1
SW02 Baseline		**6.3 – 7.0**	**97 - 292**	**66 - 199**	**3 - 495**	**50 - 1880**	**410 - 8550**	**5 - 60**	**5 - 261**	**7 - 17**	**2 – 5**	**1 -6**	**8 - 32**	**10 - 161**	**0 - 10**	**1 - 182**	-
SW03	29/09/2022	6.8	100	120	<5	20	1100	<20	<10	13	4.4	1	23	24	2.4	<5	9.3
	20/10/2022	5.9	870	650	26	30	<200	<20	<10	7.6	2.3	1	12	270	13	<5	7.5
	14/11/2022	6.5	160	140	260	130	7400	<100	<50	18	5.7	<5	36	27	9	<5	2.6
SW03 Baseline		**6.1 - 6.7**	**85 - 281**	**58 - 191**	**1 - 1005**	**40 - 2140**	**360 - 4310**	**7 - 41**	**14 - 155**	**6 - 21**	**2 – 5**	**0 - 4**	**8 - 30**	**13 - 111**	**0 - 6**	**5 - 86**	-
SW04	29/09/2022	4.5	52	68	<5	10	5100	<200	180	1.6	2.6	1	17	20	<2	<5	4.8
	20/10/2022	4.2	110	90	<5	10	300	<200	<100	1.3	2.3	1	16	20	<2	<5	7.5
	14/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW04 Baseline		**4.2 – 4.5**	**77 - 165**	**52 - 112**	**1 - 293**	**40 - 500**	**1150 - 4470**	**5 - 52**	**27 - 693**	**1 - 3**	**1 – 3**	**1 - 3**	**10 - 20**	**17 -90**	**0 - 3**	**14 - 86**	-
SW05	29/09/2022	5.9	510	480	5.2	120	3000	<200	170	9.4	17	7.7	140	220	11	<5	7.7
	20/10/2022	6.2	690	650	7.2	60	500	<200	240	11	19	7.9	160	180	8.6	<5	8.9
	14/11/2022	6.2	1000	820	13	60	8100	<100	<50	18	27	11	260	310	100	<5	4.7
SW05 Baseline		**5.1 – 7.2**	**410 - 6927**	**279 - 4710**	**5 - 136**	**40 - 210**	**10 - 2227**	**8 - 52**	**68 - 592**	**3 - 57**	**7 - 130**	**2 - 58**	**46 - 1667**	**84 -1980**	**6 - 115**	**9 - 63**	-
SW06	29/09/2022	6.0	580	480	<5	130	8600	<20	160	9.4	18	7.7	140	220	11	5.1	7.8
	20/10/2022	6.3	730	580	16	50	500	<200	190	9.1	13	5.8	110	330	7.5	6.2	8.7
	14/11/2022	6.2	1000	840	13	40	1100	<100	360	18	29	12	270	310	100	<5	<5
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 - 2200**	-	**<50**	**50**	**500**	-	-	-	-	-	-	-	-	**5**	

Table 5: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Fe (total) (µg/L)	Al (total) (µg/L)	Hg (µg/L)
SW01	29/09/2022	3	<0.2	2	320	15	5	71	2700	1500	<0.1
	20/10/2022	2	<0.2	2	16	9	3	42	2400	660	<0.1
	14/11/2022	1.3	<20	<100	1000	300	100	4700	130 000	130 000	<10
SW01 Baseline		**1 – 3**	**1**	**1 – 2**	**2 – 41**	**2 - 6**	**1**	**3 – 58**	**423 - 1223**	**59 – 496**	**0.5**
SW02	29/09/2022	3	<0.2	2	4	2	1	57	1500	420	<0.1
	20/10/2022	1	<0.2	1	3	1	<1	32	620	220	<0.1
	14/11/2022	37	<2	<1	15	<10	<10	96	53 000	1800	<1
SW02 Baseline		**1 - 45**	**1**	**1 - 7**	**1 - 12**	**1 – 5**	**1 - 20**	**7 - 90**	**473 – 71 893**	**154 - 3821**	**0.5**
SW03	29/09/2022	2	<0.2	2	3	2	<1	34	800	420	<0.1
	20/10/2022	2	<0.2	2	3	1	2	30	860	490	<0.1
	14/11/2022	<1	<2	<1	4	<10	<10	240	1900	1100	<1
SW03 Baseline		**1 - 58**	**1**	**1 - 8**	**1 - 28**	**1 – 6**	**1 - 28**	**11 - 260**	**512 – 85 520**	**109 - 7949**	**0.5**
SW04	29/09/2022	1	<0.2	5	1	2	1	27	2700	1300	<0.1
	20/10/2022	<1	<0.2	4	1	2	1	24	2400	1100	<0.1
	14/11/2022	-	-	-	-	-	-	-	-	-	-
SW04 Baseline		**1 - 2**	**1**	**2 - 7**	**1 - 2**	**1 – 5**	**1 - 2**	**8 - 28**	**358 - 2827**	**578 – 1402**	**0.5**
SW05	29/09/2022	<1	<0.2	2	<1	2	<1	8	4600	830	<0.1
	20/10/2022	<1	<0.2	1	<1	2	1	7	3500	660	<0.1
	14/11/2022	<1	<2	<1	20	<10	<10	120	5400	750	<1
SW05 Baseline		**1 - 2**	**1**	**1 - 2**	**1 - 3**	**1 - 11**	**1**	**2 - 26**	**280 - 12 306**	**97 - 2073**	**0.5**
SW06	29/09/2022	<1	<0.2	2	<1	2	<1	8	4500	780	<0.1
	20/10/2022	<1	<0.2	1	<1	2	1	12	2700	540	<0.1
	14/11/2022	<1	<2	<1	12	<10	<10	110	5300	680	<1
SW06 Baseline		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
ANZG (2018)(Freshwater)		**13**	**0.2**	**3.3**	**1.8**	**11**	**3.4**	**8**	**300**	**50**	**0.6**

Table 6: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	0.25	<0.1	<0.1	0.22	<0.01	0.22	<0.1	<0.1	0.25
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	0.6	0.3	<0.05	<0.01	<0.05	0.9	<0.1	0.9
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	-	-	-	-	-	-	-	-	-	-
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW06	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.152
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
	14/11/2022	<0.02	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

On the basis of results presented in this WQMR, no recommendations or modifications to current construction activities and associated water quality management methodologies identified within the Planit CEMP are required.

Should you have any queries about this Water Quality Monitoring Report, please do not hesitate to contact me directly. The next monthly monitoring event is scheduled for the 14th of December 2022.

Yours sincerely

Robert Todhunter

Environmental Scientist

ENV Solutions Pty Ltd

Attachment 1 – Locality

Legend

Site Location

0 0.5 1km

Figure 1 – Site Location
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

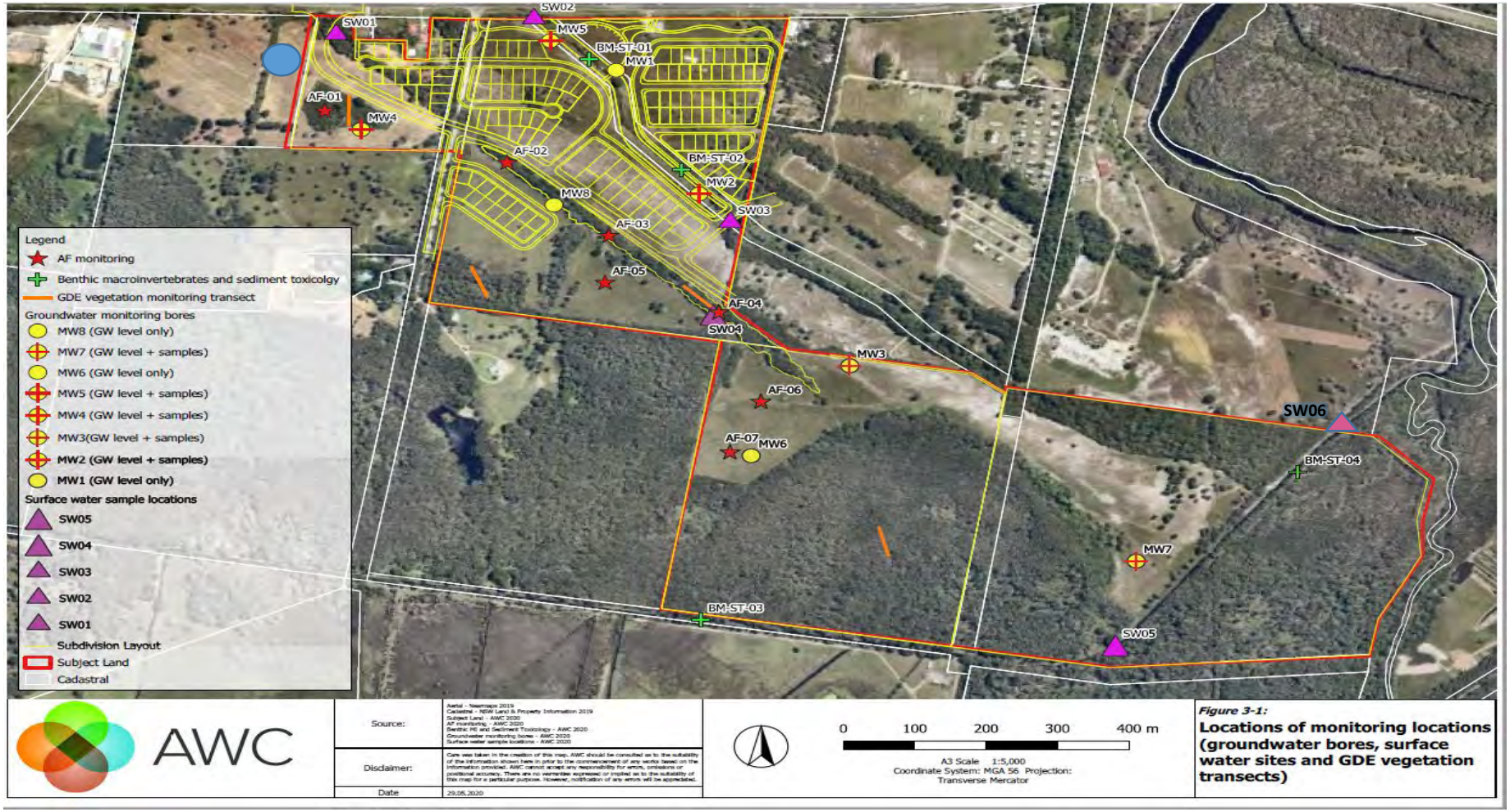

Figure 2 – AWC Surface Water Monitoring Locations
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

Attachment 2 – Analytical Results

ENV Services Pty Ltd
313 River Street
Ballina
NSW 2478

Attention: **Robert Todhunter**

Report **942147-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Nov 16, 2022

Client Sample ID			**MW2**	**MW3**	**MW4**	**MW5**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-No0042069**	**S22-No0042070**	**S22-No0042071**	**S22-No0042072**
Date Sampled			**Nov 14, 2022**	**Nov 14, 2022**	**Nov 14, 2022**	**Nov 14, 2022**
Test/Reference	LOR	Unit				
Ammonia (as N)	0.01	mg/L	0.24	[R09]0.27	0.13	0.52
Chloride	1	mg/L	19	7.4	30	29
Conductivity (at 25 °C)	10	uS/cm	100	34	130	120
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25	0.10	< 0.25	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.1	0.09	< 0.25	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.1	< 0.02	< 0.1	< 0.1
pH (at 25 °C)	0.1	pH Units	6.0	4.6	4.2	4.6
Phosphate total (as P)	0.01	mg/L	0.07	0.03	0.01	0.08
Sulphate (as SO4)	2	mg/L	< 2	< 2	5.0	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	240	84	340	270
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	[G01]< 2	[R09]< 0.2	7.0	7.8
Total Nitrogen (as N)*	0.2	mg/L	< 2	< 0.2	7	7.8
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5	170	16	150
Alkali Metals						
Calcium	0.5	mg/L	1.3	0.8	2.6	5.2
Magnesium	0.5	mg/L	1.4	0.6	4.8	5.7
Potassium	0.5	mg/L	2.4	< 0.5	1.1	1.4
Sodium	0.5	mg/L	30	7.1	22	26

Client Sample ID			**MW7**
Sample Matrix			**Water**
Eurofins Sample No.			**S22-No0042073**
Date Sampled			**Nov 14, 2022**
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.01
Chloride	1	mg/L	9.7
Conductivity (at 25 °C)	10	uS/cm	44
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.1
pH (at 25 °C)	0.1	pH Units	4.5
Phosphate total (as P)	0.01	mg/L	0.03

Client Sample ID			MW7
Sample Matrix			Water
Eurofins Sample No.			S22-No0042073
Date Sampled			Nov 14, 2022
Test/Reference	LOR	Unit	
Sulphate (as SO4)	2	mg/L	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	170
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	[G01]< 2
Total Nitrogen (as N)*	0.2	mg/L	< 2
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	13
Alkali Metals			
Calcium	0.5	mg/L	1.9
Magnesium	0.5	mg/L	1.4
Potassium	0.5	mg/L	< 0.5
Sodium	0.5	mg/L	9.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Sydney	Nov 23, 2022	28 Days
- Method: LTM-INO-4200 Ammonia by Discrete Analyser			
Nitrate & Nitrite (as N)	Melbourne	Nov 25, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Nov 25, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Nov 25, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Sydney	Nov 23, 2022	28 Days
- Method: E052 Total Phosphate (as P)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Nov 22, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Nov 23, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Conductivity (at 25 °C)	Sydney	Nov 23, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
pH (at 25 °C)	Sydney	Nov 23, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as SO4)	Sydney	Nov 23, 2022	28 Days
- Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Nov 23, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Nov 23, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Nov 23, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: ENV Services Pty Ltd
Address: 313 River Street
Ballina
NSW 2478

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Order No.:
Report #: 942147
Phone: 1300 861 325
Fax:

Received: Nov 16, 2022 9:30 AM
Due: Nov 23, 2022
Priority: 5 Day
Contact Name: Robert Todhunter

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Chloride	Conductivity (at 25 °C)	pH (at 25 °C)	Sulphate (as SO4)	Total Suspended Solids Dried at 103 °C to 105 °C	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254											X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	MW2	Nov 14, 2022		Water	S22-No0042069	X	X	X	X	X	X	X	X
2	MW3	Nov 14, 2022		Water	S22-No0042070	X	X	X	X	X	X	X	X
3	MW4	Nov 14, 2022		Water	S22-No0042071	X	X	X	X	X	X	X	X
4	MW5	Nov 14, 2022		Water	S22-No0042072	X	X	X	X	X	X	X	X
5	MW7	Nov 14, 2022		Water	S22-No0042073	X	X	X	X	X	X	X	X
Test Counts						5	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Ammonia (as N)	%	107			70-130	Pass	
Chloride	%	110			70-130	Pass	
Conductivity (at 25 °C)	%	91			70-130	Pass	
Phosphate total (as P)	%	100			70-130	Pass	
Sulphate (as SO4)	%	102			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	110			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	90			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	97			80-120	Pass	
Magnesium	%	109			80-120	Pass	
Potassium	%	95			80-120	Pass	
Sodium	%	111			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Phosphate total (as P)	S22-No0038537	NCP	%	91			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	S22-No0042070	CP	%	88			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S22-No0042071	CP	%	100			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-No0042073	CP	%	119			75-125	Pass	
Magnesium	S22-No0042073	CP	%	115			75-125	Pass	
Potassium	S22-No0042073	CP	%	108			75-125	Pass	
Sodium	S22-No0042073	CP	%	119			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S22-No0042069	CP	mg/L	0.24	0.25	3.3	30%	Pass	
Conductivity (at 25 °C)	S22-No0042069	CP	uS/cm	100	98	2.5	30%	Pass	
Phosphate total (as P)	N22-No0040506	NCP	mg/L	0.07	0.08	2.8	30%	Pass	

Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-No0042069	CP	mg/L	1.3	1.1	18	30%	Pass	
Magnesium	S22-No0042069	CP	mg/L	1.4	1.1	23	30%	Pass	
Potassium	S22-No0042069	CP	mg/L	2.4	1.6	38	30%	Fail	Q15
Sodium	S22-No0042069	CP	mg/L	30	28	4.2	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S22-No0042071	CP	mg/L	16	16	5.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-No0042073	CP	mg/L	170	170	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.
R09	Theoretically the TKN result should be greater or equal to the ammonia concentration. However the difference reported is within the measurement uncertainty of the individual tests

Authorised by:

Bonnie Pu	Analytical Services Manager
Charl Du Preez	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ENV Services Pty Ltd
313 River Street
Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **All Invoices & Statements - Gayle Evtushenko**

Report **942362-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEARS)
Project ID 217140
Received Date Nov 18, 2022

Client Sample ID			**SW01**	**SW02**	[G01]**SW03**	[G01]**SW05**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-No0044080**	**S22-No0044081**	**S22-No0044082**	**S22-No0044083**
Date Sampled			**Nov 16, 2022**	**Nov 16, 2022**	**Nov 16, 2022**	**Nov 16, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	0.25	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	0.6	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	0.3	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.25	0.9	< 0.1	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	0.22	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.22	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	0.9	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.22	0.9	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	6.9	< 0.01	< 0.05	< 0.05
Chloride	1	mg/L	25	54	27	310
Chlorophyll a	5	ug/L	67	24	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	920	190	160	1000
Dissolved Oxygen	0.1	mg/L	0.2	0.1	2.6	4.7
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.25	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.1	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.1	< 0.1
pH (at 25 °C)	0.1	pH Units	6.0	6.4	6.5	6.2
Phosphate total (as P)	0.01	mg/L	3.1	0.18	0.13	0.06
Sulphate (as S)	2	mg/L	3.7	18	9.0	100
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	780	150	140	820
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	14	13	7.4	8.1
Total Nitrogen (as N)*	0.2	mg/L	14	13	7.4	8.1
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	4900	210	260	13
Heavy Metals						
Aluminium	0.05	mg/L	130	1.8	1.1	0.75
Arsenic	0.001	mg/L	0.13	0.037	< 0.01	< 0.01
Cadmium	0.0002	mg/L	< 0.02	< 0.002	< 0.002	< 0.002
Chromium	0.001	mg/L	< 0.1	< 0.01	< 0.01	< 0.01
Copper	0.001	mg/L	1.0	0.015	0.050	0.020

Client Sample ID			SW01	SW02	[G01]SW03	[G01]SW05
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-No0044080	S22-No0044081	S22-No0044082	S22-No0044083
Date Sampled			Nov 16, 2022	Nov 16, 2022	Nov 16, 2022	Nov 16, 2022
Test/Reference	LOR	Unit				
Heavy Metals						
Iron	0.05	mg/L	130	53	1.9	5.4
Lead	0.001	mg/L	0.10	< 0.01	< 0.01	< 0.01
Mercury	0.0001	mg/L	< 0.01	< 0.001	< 0.001	< 0.001
Nickel	0.001	mg/L	0.30	< 0.01	< 0.01	< 0.01
Zinc	0.005	mg/L	4.7	0.096	0.24	0.12
Alkali Metals						
Calcium	0.5	mg/L	280	47	18	18
Magnesium	0.5	mg/L	73	11	5.7	27
Potassium	0.5	mg/L	< 50	< 5	< 5	11
Sodium	0.5	mg/L	200	62	36	260

Client Sample ID			[G01]SW06
Sample Matrix			Water
Eurofins Sample No.			S22-No0044084
Date Sampled			Nov 16, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
Ammonia (as N)	0.01	mg/L	0.36
Chloride	1	mg/L	310
Chlorophyll a	5	ug/L	< 5
Conductivity (at 25 °C)	10	uS/cm	1000
Dissolved Oxygen	0.1	mg/L	5.5
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.1
Nitrite (as N)	0.02	mg/L	< 0.1
pH (at 25 °C)	0.1	pH Units	6.2
Phosphate total (as P)	0.01	mg/L	0.04
Sulphate (as S)	2	mg/L	100
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	840
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.1
Total Nitrogen (as N)*	0.2	mg/L	1.1
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	13

Client Sample ID			[G01]SW06
Sample Matrix			**Water**
Eurofins Sample No.			**S22-No0044084**
Date Sampled			**Nov 16, 2022**
Test/Reference	LOR	Unit	
Heavy Metals			
Aluminium	0.05	mg/L	0.68
Arsenic	0.001	mg/L	< 0.01
Cadmium	0.0002	mg/L	< 0.002
Chromium	0.001	mg/L	< 0.01
Copper	0.001	mg/L	0.012
Iron	0.05	mg/L	5.3
Lead	0.001	mg/L	< 0.01
Mercury	0.0001	mg/L	< 0.001
Nickel	0.001	mg/L	< 0.01
Zinc	0.005	mg/L	0.11
Alkali Metals			
Calcium	0.5	mg/L	18
Magnesium	0.5	mg/L	29
Potassium	0.5	mg/L	12
Sodium	0.5	mg/L	270

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Nov 18, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Nov 18, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Nov 25, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Nov 22, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Nov 22, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Nov 22, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Nov 22, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Nov 22, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Nov 22, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Nov 25, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Chlorophyll a	Melbourne	Nov 22, 2022	28 Days
- Method: LTM-INO-4340 Chlorophyll a in Waters			
Conductivity (at 25 °C)	Sydney	Nov 25, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Sydney	Nov 25, 2022	1 Days
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25 °C)	Sydney	Nov 25, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Nov 18, 2022	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Nov 25, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Sydney	Nov 25, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Nov 25, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Nov 25, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Nov 25, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Company Name: ENV Solutions Pty Ltd PLEASE USE NEW ENV
Address: 1/35 North Creek Road
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NSW 2478

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEARS)
Project ID: 217140

Order No.:
Report #: 942362
Phone: 0421 519 354
Fax:

Received: Nov 18, 2022 9:30 AM
Due: Nov 25, 2022
Priority: 5 Day
Contact Name: Robert Todhunter

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Aluminium	Chloride	Chlorophyll a	Conductivity (at 25 °C)	Dissolved Oxygen	Iron	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Total Recoverable Hydrocarbons	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254								X									X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X	X	X		X	X
External Laboratory																			
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**														
1	SW01	Nov 16, 2022		Water	S22-No0044080	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	SW02	Nov 16, 2022		Water	S22-No0044081	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	SW03	Nov 16, 2022		Water	S22-No0044082	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	SW05	Nov 16, 2022		Water	S22-No0044083	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	SW06	Nov 16, 2022		Water	S22-No0044084	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						5	5	5	5	5	5	5	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as S)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	75			70-130	Pass	
TRH C10-C14	%	100			70-130	Pass	
Naphthalene	%	79			70-130	Pass	
TRH C6-C10	%	74			70-130	Pass	
TRH >C10-C16	%	93			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	96			70-130	Pass	
Chloride	%	100			70-130	Pass	
Conductivity (at 25 °C)	%	84			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nitrate & Nitrite (as N)	%	101			70-130	Pass	
Nitrate (as N)	%	101			70-130	Pass	
Nitrite (as N)	%	98			70-130	Pass	
Phosphate total (as P)	%	96			70-130	Pass	
Sulphate (as S)	%	95			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	94			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	117			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	94			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	88			80-120	Pass	
Arsenic	%	98			80-120	Pass	
Cadmium	%	93			80-120	Pass	
Chromium	%	98			80-120	Pass	
Copper	%	95			80-120	Pass	
Iron	%	84			80-120	Pass	
Lead	%	93			80-120	Pass	
Mercury	%	82			80-120	Pass	
Nickel	%	96			80-120	Pass	
Zinc	%	105			80-120	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	104			80-120	Pass	
Magnesium	%	96			80-120	Pass	
Potassium	%	105			80-120	Pass	
Sodium	%	96			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	S22-No0048529	NCP	%	75			70-130	Pass	
TRH C10-C14	R22-No0039942	NCP	%	108			70-130	Pass	
Naphthalene	S22-No0048529	NCP	%	85			70-130	Pass	
TRH C6-C10	S22-No0048529	NCP	%	74			70-130	Pass	
TRH >C10-C16	R22-No0039942	NCP	%	103			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S22-No0043716	NCP	%	115			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	N22-No0051484	NCP	%	100			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-No0041846	NCP	%	86			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S22-Jl0002211	NCP	%	117			75-125	Pass	
Cadmium	N22-No0031978	NCP	%	86			75-125	Pass	
Chromium	N22-No0031978	NCP	%	81			75-125	Pass	
Iron	N22-No0031978	NCP	%	81			75-125	Pass	
Lead	N22-No0031978	NCP	%	80			75-125	Pass	
Mercury	N22-No0031978	NCP	%	100			75-125	Pass	
Nickel	N22-No0031978	NCP	%	81			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-No0058056	NCP	%	87			75-125	Pass	
Potassium	S22-No0058056	NCP	%	92			75-125	Pass	
Sodium	S22-No0042073	NCP	%	119			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-No0044081	CP	%	89			75-125	Pass	
Copper	S22-No0044081	CP	%	83			75-125	Pass	
Zinc	S22-No0044081	CP	%	109			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Magnesium	S22-No0044081	CP	%	84			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	N22-No0040189	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S22-No0050586	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S22-No0050586	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S22-No0050586	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	N22-No0040189	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	N22-No0040189	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	S22-No0050586	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S22-No0050586	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S22-No0050586	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M22-No0050403	NCP	mg/L	14	14	1.1	30%	Pass	
Chloride	S22-No0043724	NCP	mg/L	75	75	<1	30%	Pass	
Chlorophyll a	S22-No0044080	CP	ug/L	67	< 10	100	30%	Fail	Q15
Conductivity (at 25 °C)	R22-No0040176	NCP	uS/cm	24	25	2.1	30%	Pass	
Nitrate & Nitrite (as N)	M22-No0050403	NCP	mg/L	0.44	0.43	2.5	30%	Pass	
Nitrate (as N)	M22-No0050403	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Nitrite (as N)	M22-No0050403	NCP	mg/L	0.43	0.42	2.4	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M22-No0053813	NCP	mg/L	60	65	7.2	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-No0044080	CP	mg/L	4900	3700	28	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	N22-No0031879	NCP	mg/L	0.006	0.005	9.0	30%	Pass	
Cadmium	N22-No0031879	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	N22-No0031879	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	N22-No0031879	NCP	mg/L	0.003	0.003	2.4	30%	Pass	
Lead	N22-No0031879	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	N22-No0031879	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	N22-No0031879	NCP	mg/L	0.017	0.017	3.3	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Potassium	S22-No0048942	NCP	mg/L	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chlorophyll a	S22-No0044082	CP	ug/L	< 5	< 5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S22-No0044082	CP	mg/L	1.1	0.93	18	30%	Pass	
Iron	S22-No0044082	CP	mg/L	1.9	1.8	5.6	30%	Pass	
Zinc	S22-No0044082	CP	mg/L	0.24	0.19	22	30%	Pass	

Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-No0044082	CP	mg/L	18	17	2.8	30%	Pass	
Magnesium	S22-No0044082	CP	mg/L	5.7	5.3	7.0	30%	Pass	
Sodium	S22-No0044082	CP	mg/L	36	33	7.4	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphate total (as P)	S22-No0044084	CP	mg/L	0.04	0.02	45	30%	Fail	Q15
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-No0044084	CP	mg/L	840	840	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Bonnie Pu	Analytical Services Manager
Charl Du Preez	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Attachment 3: Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	14/11/2022

Description

Surface water monitoring location SW01.

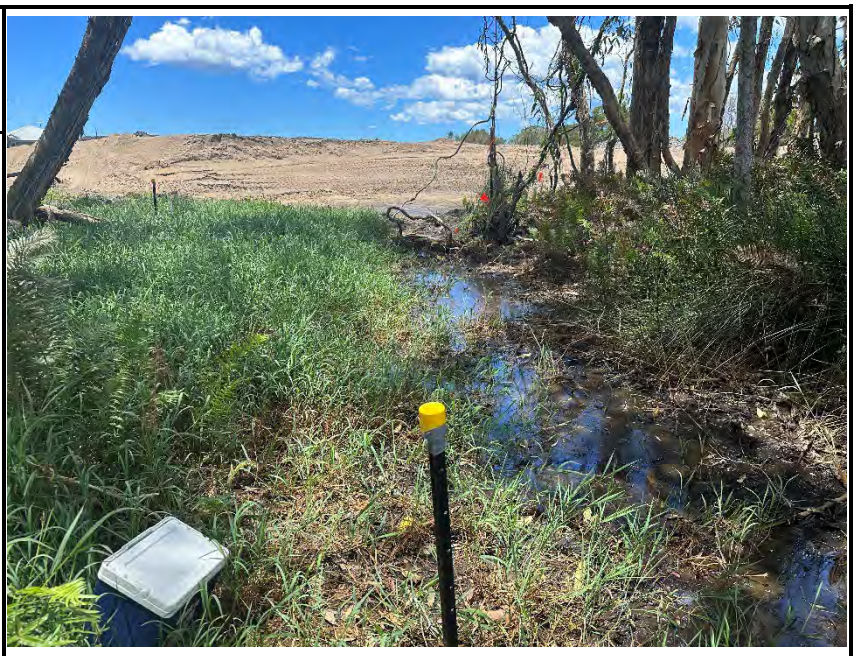

Photo No.	Date
2	14/11/2022

Description

Surface water monitoring location SW02

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	14/11/2022

Description

Surface water monitoring location SW03

Photo No.	Date
4	14/11/2022

Description

Surface water monitoring location SW04. Location was dry.

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	14/11/2022

Description

Surface water monitoring location SW05

Photo No.	Date
6	14/11/2022

Description

Surface water monitoring location SW06

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

MONTHLY WATER QUALITY REPORT

Harvest Estate Urban Development

Harvest Estate

Ewingsdale Road, Byron Bay, NSW 2481

October 2022

ENV217140_Harvest Estate_WQ_20221109

November 2022

Monitoring Period: - 30th September - 20th October 2022

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report (MWQR) to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this water quality report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Bulk fill and general earthworks associated with progressive construction of Stage 1 of the development.

Fortnightly Acid Frog Habitat Groundwater Quality Monitoring (First 6 months of Construction)

Fortnightly water quality monitoring of Standing Water level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6, MW7 & MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP).

Presented in Table 1, SWL's, pH and EC of all groundwater wells are outside the ANZG (2018) default ranges (freshwater: 95% species protection) for pH and electrical conductivity however all readings are in-line with historic baseline water quality values with the exception of MW6 and MW8, where no baseline data has been collected.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	16/09/22	2.50	4.11	48
	29/09/22	3.01	4.20	53
	11/10/22	2.96	4.25	46
	20/10/22	2.98	4.1	64
MW3 Baseline		**2.79**	**4.29**	**106**
MW4	16/09/22	2.47	5.09	98
	29/09/22	2.57	4.50	100
	11/10/22	2.56	4.42	85
	20/10/22	2.70	4.5	110
MW4 Baseline		**2.51**	**4.58**	**243**
MW6	16/09/22	1.42	5.84	828
	29/09/22	1.56	5.96	1280
	11/10/22	1.43	4.39	80
	20/10/22	1.41	4.66	75
MW6 Baseline		**1.34**	-	-
MW7	16/09/22	1.65	4.74	54
	29/09/22	1.68	4.6	26
	11/10/22	1.66	4.82	85
	20/10/22	1.88	4.5	86
MW7 Baseline		**1.53**	**5.0**	**102**
MW8	16/09/22	2.63	4.30	100
	29/09/22	2.62	3.80	129
	11/10/22	2.52	4.01	46
	20/10/22	2.54	4.07	117
MW8 Baseline		**2.26**	-	-
ANZECC (2000) / ANZG (2018) (Freshwater)		**-**	**6.5 – 8.0**	**125 - 2200**

Monthly Groundwater Sampling Event (5 Sites)

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of all the groundwater wells (MW1 – MW8) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Table 2, the required parameters of all groundwater wells can be summarised as within historic baseline values with the exception of TDS at MW2 (110 mg/L). This result is slightly higher than baseline maximum value at MW2 (103 mg/L), and as such further monitoring rounds will establish whether TDS (and/or specific cation & anion) concentrations are trending upwards at this location. TDS values at these concentrations are unlikely to contribute to adverse impacts to biota within localised waterways.

Table 2: Monthly Groundwater Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg/ L^{-1})	TN (µg/L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	S (mg/L)
MW2	29/09/2022	5.8	54	92	<5	120	500	20	510	< 0.5	0.8	2.4	30	14	< 2
	20/10/2022	5.6	100	110	<5	90	2000	20	240	<0.5	0.8	2.2	28	13	< 2
MW2 Baseline		**4.22 - 5.70**	**109 - 152**	**74 - 103**	**3 - 483**	**80 - 450**	**780 - 2030**	**6 - 70**	**128 - 338**	**0.2 - 0.7**	**0.7 - 1.4**	**1.0 - 4.2**	**13.8 - 29.7**	**19 - 189**	**<0.2 - 9.8**
MW3	29/09/2022	4.2	53	40	370	90	500	20	50	< 0.5	1	0.6	7	8.8	<2
	20/10/2022	4.1	64	62	130	10	500	20	200	0.5	0.9	<0.5	7.0	8	<2
MW3 Baseline		**3.99 - 5.33**	**38 - 206**	**26 - 140**	**45 - 5223**	**60 - 1570**	**430 - 41400**	**5 - 167**	**5 - 294**	**0.1 - 3.8**	**0.7 - 5.3**	**0.2 - 3.1**	**4.0 - 26.4**	**1 - 121**	**0.3 - 13.4**
MW4	29/09/2022	4.5	100	88	350	30	1500	100	160	3.6	3.7	0.9	19	22	<2
	20/10/2022	4.5	110	100	69	20	1000	40	780	3.9	2.1	<0.5	14	20	<2
MW4 Baseline		**3.97 - 5.84**	**102 - 890**	**69 - 605**	**126 - 1220**	**80 - 430**	**1680 - 4360**	**7 - 185**	**112 - 1392**	**1.7 - 11.3**	**2.6 - 15.6**	**0.6 - 5.4**	**10.3 - 146.3**	**24 - 199**	**<0.3 - 19.2**
MW5	29/09/2022	4.5	59	68	630	130	6330	20	410	2.3	2.6	0.6	14	18	<2
	20/10/2022	4.4	75	82	92	20	500	20	100	2.0	2.3	0.5	12	15	<2
MW5 Baseline		**4.31 - 5.53**	**107 - 191**	**73 - 130**	**11 - 3003**	**70 - 970**	**1280 - 13400**	**25 - 117**	**117 - 863**	**0.4 - 6.0**	**0.8 - 8.4**	**0.7 - 5.4**	**9.3 - 27.2**	**19 - 82**	**1.0 - 8.3**
MW7	29/09/2022	4.6	26	40	190	100	2500	20	300	1.0	0.9	0.6	8.5	8.5	<2
	20/10/2022	4.5	86	70	120	10	2900	40	400	1.7	1.7	0.5	8.5	12	<2
MW7 Baseline		**4.65 - 5.62**	**39 - 147**	**27 - 100**	**20 - 3140**	**60 - 710**	**670 - 4150**	**5 - 48**	**23 - 471**	**0.5 - 3.4**	**1.0 - 2.2**	**0.3 - 3.1**	**3.4 - 31.0**	**3 - 172**	**0.3 - 7.3**
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 – 2200**	**-**	**<50**	**50**	**500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Monthly Surface Water Sampling Event (6 Sites)

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 3. Select photos of the surface water sampling programme are presented in Attachment 3.

Table 3: Surface Water Monitoring Coordinates

Monitoring Location	Location	Easting	Northing
SW01	Upstream	556852	6831954
SW02	Upstream	557145	6831963
SW03	Downstream	557411	6831604
SW04	Downstream	557397	6831429
SW05	Upstream	557992	6830881
SW06	Downstream	558257	6831214

Monthly surface water sampling of pH, Electrical conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 4, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of Total Dissolved Solids (TDS) at sampling locations SW1 (320 mg/L) and SW3 (650 mg/L), as well as Electrical Conductivity (EC) at sampling location SW3 (870µδ/cm). SW01 is an 'upstream' location, and as such elevated TDS at this location is expected to be contributed to extraneous sources.

Monthly surface water sampling of Arsenic (As), Cadmium (Ca), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 5, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of elevated Nickel (9 µg L^{-1}), Iron (2400 µg L^{-1}) and Aluminium (660 µg L^{-1}) at sampling location SW01. SW01 is located 'upstream' of the site, with these metals' concentrations decreasing down gradient of the site. As such, elevated metals concentrations at location SW01 are expected to be contributed to extraneous sources.

SW03 supported elevated Chloride (CL-) (270 mg/L), which is associated with elevated TDS (650 mg/L) and EC (870 µδ/cm) levels at this location. Further monitoring rounds will establish whether TDS (and/or specific cation & anion) concentrations are trending upwards at this location. TDS (and Cl-) values at these concentrations are unlikely to contribute to adverse impacts to biota within localised waterways.

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 6, these required hydrocarbon parameters of all surface water sampling locations can be summarised as in line with the historic baseline values.

During this monitoring period (30/09/2022-20/10/2022), 245.4mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

Table 4: Monthly Surface Water Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg P L^{1})	TN (µg N L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/)	K (mg/)	Na (mg/L)	Cl- (mg/L)	S (mg/L)	Chlorophyll a (µg/L^{-1})	DO (mg/L)
SW01	29/09/2022	6.9	140	180	11	470	5200	<20	<10	22	14	3	30	14	3.4	450	3.1
	20/10/2022	6.6	400	320	30	30	<200	<20	30	24	9.1	2.9	31	22	33	43	4.7
SW01 Baseline		**6.2 – 7.0**	**134 - 428**	**91 - 291**	**1 - 73**	**70 - 3520**	**640 - 3520**	**5 - 39**	**19 - 164**	**9 - 22**	**3 - 16**	**0 - 6**	**12 -51**	**1 - 118**	**2 - 9**	**10 - 768**	-
SW02	29/09/2022	6.9	160	170	8.8	40	1300	<20	30	19	5.8	1.9	27	29	2.8	22	8.0
	20/10/2022	6.5	140	120	6.2	20	<200	<20	10	12	3.4	1.7	16	17	2.9	<5	8.7
SW02 Baseline		**6.3 – 7.0**	**97 - 292**	**66 - 199**	**3 - 495**	**50 - 1880**	**410 - 8550**	**5 - 60**	**5 - 261**	**7 - 17**	**2 - 5**	**1 -6**	**8 - 32**	**10 - 161**	**0 - 10**	**1 - 182**	-
SW03	29/09/2022	6.8	100	120	<5	20	1100	<20	<10	13	4.4	1	23	24	2.4	<5	9.3
	20/10/2022	5.9	870	650	26	30	<200	<20	<10	7.6	2.3	1	12	270	13	<5	7.5
SW03 Baseline		**6.1 - 6.7**	**85 - 281**	**58 - 191**	**1 - 1005**	**40 - 2140**	**360 - 4310**	**7 - 41**	**14 - 155**	**6 - 21**	**2 - 5**	**0 - 4**	**8 - 30**	**13 - 111**	**0 - 6**	**5 - 86**	-
SW04	29/09/2022	4.5	52	68	<5	10	5100	<200	180	1.6	2.6	1	17	20	<2	<5	4.8
	20/10/2022	4.2	110	90	<5	10	300	<200	<100	1.3	2.3	1	16	20	<2	<5	7.5
SW04 Baseline		**4.2 – 4.5**	**77 - 165**	**52 - 112**	**1 - 293**	**40 - 500**	**1150 - 4470**	**5 - 52**	**27 - 693**	**1 - 3**	**1 - 3**	**1 - 3**	**10 - 20**	**17 -90**	**0 - 3**	**14 - 86**	-
SW05	29/09/2022	5.9	510	480	5.2	120	3000	<200	170	9.4	17	7.7	140	220	11	<5	7.7
	20/10/2022	6.2	690	650	7.2	60	500	<200	240	11	19	7.9	160	180	8.6	<5	8.9
SW05 Baseline		**5.1 – 7.2**	**410 - 6927**	**279 - 4710**	**5 - 136**	**40 - 210**	**10 - 2227**	**8 - 52**	**68 - 592**	**3 - 57**	**7 - 130**	**2 - 58**	**46 - 1667**	**84 -1980**	**6 - 115**	**9 - 63**	-
SW06	29/09/2022	6.0	580	480	<5	130	8600	<20	160	9.4	18	7.7	140	220	11	5.1	7.8
	20/10/2022	6.3	730	580	16	50	500	<200	190	9.1	13	5.8	110	330	7.5	6.2	8.7
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 - 2200**	-	**<50**	**50**	**500**	-	-	-	-	-	-	-	-	**5**	

Table 5: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Fe (total) (µg/L)	Al (total) (µg/L)	Hg (µg/L)
SW01	29/09/2022	3	<0.2	2	320	15	5	71	2700	1500	<0.1
	20/10/2022	2	<0.2	2	16	9	3	42	2400	660	<0.1
SW01 Baseline		**1 - 3**	**1**	**1 - 2**	**2 - 41**	**2 - 6**	**1**	**3 - 58**	**423 - 1223**	**59 - 496**	**0.5**
SW02	29/09/2022	3	<0.2	2	4	2	1	57	1500	420	<0.1
	20/10/2022	1	<0.2	1	3	1	<1	32	620	220	<0.1
SW02 Baseline		**1 - 45**	**1**	**1 - 7**	**1 - 12**	**1 - 5**	**1 - 20**	**7 - 90**	**473 – 71 893**	**154 - 3821**	**0.5**
SW03	29/09/2022	2	<0.2	2	3	2	<1	34	800	420	<0.1
	20/10/2022	2	<0.2	2	3	1	2	30	860	490	<0.1
SW03 Baseline		**1 - 58**	**1**	**1 - 8**	**1 - 28**	**1 - 6**	**1 - 28**	**11 - 260**	**512 – 85 520**	**109 - 7949**	**0.5**
SW04	29/09/2022	1	<0.2	5	1	2	1	27	2700	1300	<0.1
	20/10/2022	<1	<0.2	4	1	2	1	24	2400	1100	<0.1
SW04 Baseline		**1 - 2**	**1**	**2 - 7**	**1 - 2**	**1 - 5**	**1 - 2**	**8 - 28**	**358 - 2827**	**578 – 1402**	**0.5**
SW05	29/09/2022	<1	<0.2	2	<1	2	<1	8	4600	830	<0.1
	20/10/2022	<1	<0.2	1	<1	2	1	7	3500	660	<0.1
SW05 Baseline		**1 - 2**	**1**	**1 - 2**	**1 - 3**	**1 - 11**	**1**	**2 - 26**	**280 - 12 306**	**97 - 2073**	**0.5**
SW06	29/09/2022	<1	<0.2	2	<1	2	<1	8	4500	780	<0.1
	20/10/2022	<1	<0.2	1	<1	2	1	12	2700	540	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018)(Freshwater)		**13**	**0.2**	**3.3**	**1.8**	**11**	**3.4**	**8**	**300**	**50**	**0.6**

Table 6: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW06	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.152
	20/10/2022	<0.02	0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

On the basis of results presented in this WQMR, no recommendations or modifications to current construction activities and associated water quality management methodologies identified within the Planit CEMP are required.

Should you have any queries about this Water Quality Monitoring Report, please do not hesitate to contact me directly. The next monthly monitoring event is scheduled for the 14th of November 2022.

Yours sincerely

Robert Todhunter

Environmental Scientist

ENV Solutions Pty Ltd

Attachment 1 – Locality

Legend

Site Location

0 0.5 1km

Figure 1 – Site Location
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

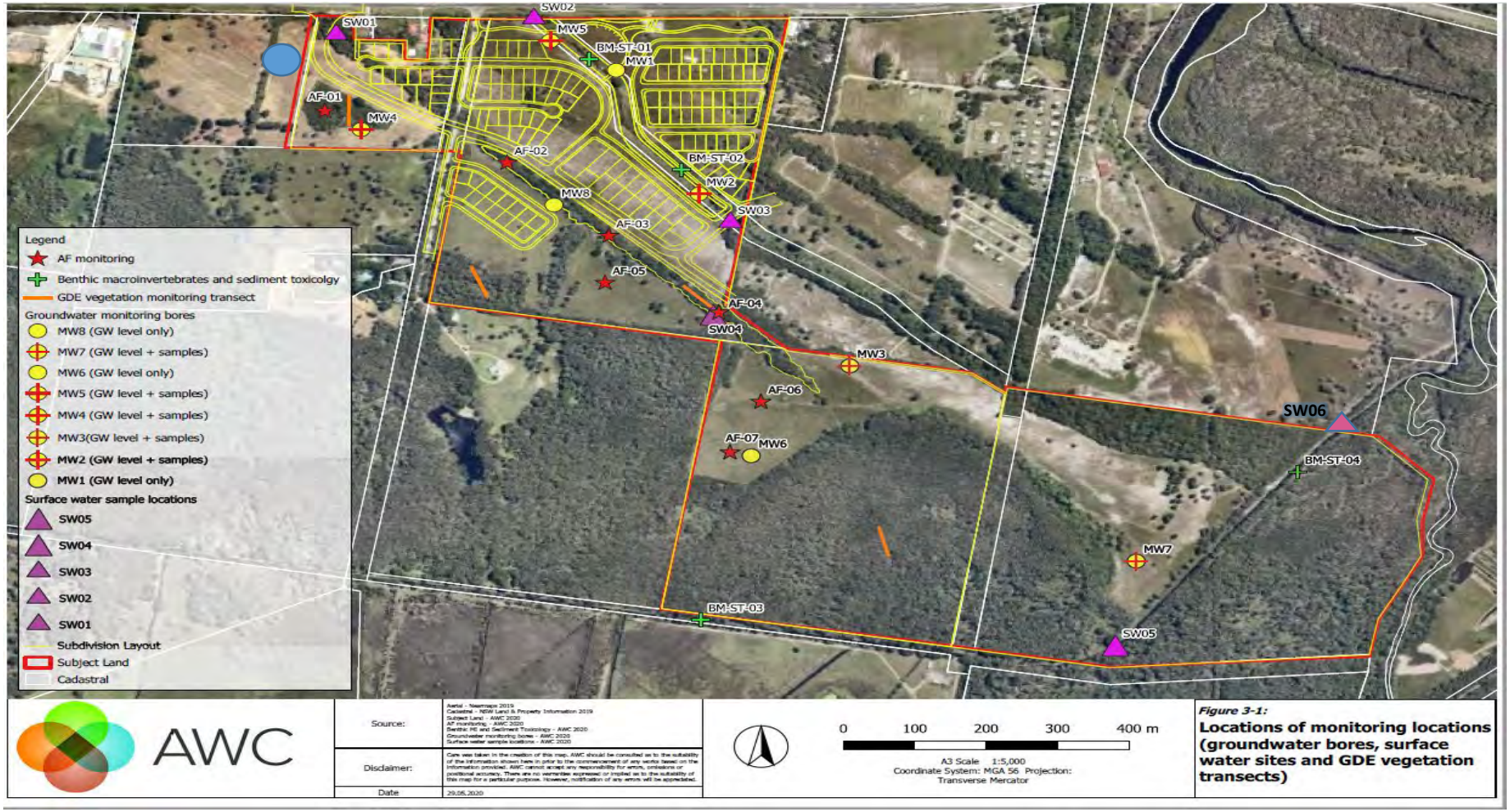

Figure 2 – AWC Surface Water Monitoring Locations
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

ENV Solutions
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Attachment 2 – Analytical Results

ENV Solutions Pty Ltd
1/35 North Creek Road
Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Lab Results**

Report **934603-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEARS)
Project ID 217140
Received Date Oct 25, 2022

Client Sample ID			**MW2**	[G01]**MW3**	[G01]**MW4**	[G01]**MW5**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-Oc0050621**	**S22-Oc0050622**	**S22-Oc0050623**	**S22-Oc0050624**
Date Sampled			**Oct 20, 2022**	**Oct 20, 2022**	**Oct 20, 2022**	**Oct 20, 2022**
Test/Reference	LOR	Unit				
Ammonia (as N)	0.01	mg/L	0.24	0.20	0.78	< 0.1
Chloride	1	mg/L	13	8.0	20	15
Conductivity (at 25 °C)	10	uS/cm	100	64	110	75
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5	< 0.5	< 1	< 0.5
Nitrate (as N)	0.02	mg/L	< 0.2	< 0.2	< 0.4	< 0.5
Nitrite (as N)	0.02	mg/L	< 0.2	< 0.2	< 0.4	< 0.2
pH (at 25 °C)	0.1	pH Units	5.6	4.1	4.5	4.4
Phosphate total (as P)	0.01	mg/L	0.09	< 0.01	0.02	0.02
Sulphate (as S)	2	mg/L	< 2	< 2	< 2	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	110	62	100	82
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.0	< 0.2	0.9	< 0.2
Total Nitrogen (as N)*	0.2	mg/L	2	< 0.5	< 1	< 0.5
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5	130	69	92
Alkali Metals						
Calcium	0.5	mg/L	< 0.5	< 0.5	3.9	2.0
Magnesium	0.5	mg/L	0.8	0.9	2.1	2.3
Potassium	0.5	mg/L	2.2	< 0.5	< 0.5	0.5
Sodium	0.5	mg/L	28	7.0	14	12

Client Sample ID			[G01]**MW7**
Sample Matrix			**Water**
Eurofins Sample No.			**S22-Oc0050625**
Date Sampled			**Oct 20, 2022**
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.40
Chloride	1	mg/L	12
Conductivity (at 25 °C)	10	uS/cm	86
Nitrate & Nitrite (as N)	0.05	mg/L	< 1
Nitrate (as N)	0.02	mg/L	< 1
Nitrite (as N)	0.02	mg/L	< 0.4
pH (at 25 °C)	0.1	pH Units	4.5
Phosphate total (as P)	0.01	mg/L	< 0.01

Client Sample ID			[G01]MW7
Sample Matrix			**Water**
Eurofins Sample No.			**S22-Oc0050625**
Date Sampled			**Oct 20, 2022**
Test/Reference	LOR	Unit	
Sulphate (as S)	2	mg/L	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	70
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.9
Total Nitrogen (as N)*	0.2	mg/L	2.9
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	120
Alkali Metals			
Calcium	0.5	mg/L	1.7
Magnesium	0.5	mg/L	1.7
Potassium	0.5	mg/L	0.5
Sodium	0.5	mg/L	8.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Oct 26, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Oct 28, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Conductivity (at 25 °C)	Sydney	Oct 28, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
pH (at 25 °C)	Sydney	Oct 28, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Oct 28, 2022	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Oct 28, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Oct 28, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Oct 28, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Order No.:
Report #: 934603
Phone: 0421 519 354
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Received: Oct 25, 2022 9:30 AM
Due: Oct 28, 2022
Priority: 3 Day
Contact Name: Lab Results

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEARS)
Project ID: 217140

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Chloride	Conductivity (at 25 °C)	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254											X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X		X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	MW2	Oct 20, 2022		Water	S22-Oc0050621	X	X	X	X	X	X	X	X
2	MW3	Oct 20, 2022		Water	S22-Oc0050622	X	X	X	X	X	X	X	X
3	MW4	Oct 20, 2022		Water	S22-Oc0050623	X	X	X	X	X	X	X	X
4	MW5	Oct 20, 2022		Water	S22-Oc0050624	X	X	X	X	X	X	X	X
5	MW7	Oct 20, 2022		Water	S22-Oc0050625	X	X	X	X	X	X	X	X
Test Counts						5	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Ammonia (as N)	%	102			70-130	Pass	
Conductivity (at 25 °C)	%	93			70-130	Pass	
Nitrate & Nitrite (as N)	%	104			70-130	Pass	
Nitrate (as N)	%	104			70-130	Pass	
Nitrite (as N)	%	108			70-130	Pass	
Phosphate total (as P)	%	94			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	97			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	123			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	102			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	98			80-120	Pass	
Magnesium	%	106			80-120	Pass	
Potassium	%	99			80-120	Pass	
Sodium	%	106			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B22-Oc0038756	NCP	%	89			70-130	Pass	
Nitrate & Nitrite (as N)	B22-Oc0038756	NCP	%	97			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0058377	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-Oc0051794	NCP	%	98			75-125	Pass	
Magnesium	S22-Oc0051794	NCP	%	113			75-125	Pass	
Potassium	S22-Oc0051794	NCP	%	107			75-125	Pass	
Sodium	S22-Oc0051794	NCP	%	89			75-125	Pass	
Spike - % Recovery									
				Result 1					
Phosphate total (as P)	S22-Oc0050625	CP	%	96			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	S22-Oc0050625	CP	%	115			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M22-Oc0049100	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Chloride	S22-Oc0050621	CP	mg/L	13	13	1.5	30%	Pass	
Conductivity (at 25 °C)	S22-Se0051572	NCP	uS/cm	350	340	<1	30%	Pass	
Sulphate (as S)	S22-Oc0050621	CP	mg/L	< 2	< 2	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-Oc0050621	CP	mg/L	110	100	3.8	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-Oc0050622	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass	
Magnesium	S22-Oc0050622	CP	mg/L	0.9	0.9	4.9	30%	Pass	
Potassium	S22-Oc0050622	CP	mg/L	< 0.5	0.6	22	30%	Pass	
Sodium	S22-Oc0050622	CP	mg/L	7.0	7.3	4.6	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Nitrate & Nitrite (as N)	S22-Oc0050623	CP	mg/L	< 1	< 1	<1	30%	Pass	
Nitrate (as N)	S22-Oc0050623	CP	mg/L	< 0.4	< 0.4	<1	30%	Pass	
Nitrite (as N)	S22-Oc0050623	CP	mg/L	< 0.4	< 0.4	<1	30%	Pass	
Phosphate total (as P)	S22-Oc0050623	CP	mg/L	0.02	0.02	6.1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	S22-Oc0050623	CP	mg/L	0.9	< 0.2	200	30%	Fail	Q15
Duplicate									
				Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0050624	CP	mg/L	92	89	2.7	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Robert Biviano	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Dilani Samarakoon	Senior Analyst-Inorganic
Gabriele Cordero	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

ENV Solutions Pty Ltd
1/35 North Creek Road
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NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Lab Results**

Report **934613-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEARS)
Project ID 217140
Received Date Oct 25, 2022

Client Sample ID			**SW01**	**SW02**	**SW03**	**SW04**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-Oc0050702**	**S22-Oc0050703**	**S22-Oc0050704**	**S22-Oc0050705**
Date Sampled			**Oct 20, 2022**	**Oct 20, 2022**	**Oct 20, 2022**	**Oct 20, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	0.03	0.01	< 0.01	< 0.1
Chloride	1	mg/L	22	17	270	20
Chlorophyll a	5	ug/L	43	< 5	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	400	140	870	110
Dissolved Oxygen	0.1	mg/L	4.7	8.7	7.5	7.5
Nitrate & Nitrite (as N)	0.05	mg/L	0.19	0.11	< 0.05	< 0.5
Nitrate (as N)	0.02	mg/L	0.19	0.11	< 0.02	< 0.5
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.2
pH (at 25 °C)	0.1	pH Units	6.6	6.5	5.9	4.2
Phosphate total (as P)	0.01	mg/L	0.03	0.02	0.03	0.01
Sulphate (as S)	2	mg/L	33	2.9	13	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	320	120	650	90
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	< 0.2	< 0.2	< 0.2	0.3
Total Nitrogen (as N)*	0.2	mg/L	< 0.2	< 0.2	< 0.2	< 0.5
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	30	6.2	26	< 5
Heavy Metals						
Aluminium	0.05	mg/L	0.66	0.22	0.49	1.1
Arsenic	0.001	mg/L	0.002	0.001	0.002	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.002	0.001	0.002	0.004
Copper	0.001	mg/L	0.016	0.003	0.003	0.001

Client Sample ID			SW01	SW02	SW03	SW04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-Oc0050702	S22-Oc0050703	S22-Oc0050704	S22-Oc0050705
Date Sampled			Oct 20, 2022	Oct 20, 2022	Oct 20, 2022	Oct 20, 2022
Test/Reference	LOR	Unit				
Heavy Metals						
Iron	0.05	mg/L	2.4	0.62	0.86	2.4
Lead	0.001	mg/L	0.003	< 0.001	0.002	0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.009	0.001	0.001	0.002
Zinc	0.005	mg/L	0.042	0.032	0.030	0.024
Alkali Metals						
Calcium	0.5	mg/L	24	12	7.6	1.3
Magnesium	0.5	mg/L	9.1	3.4	2.3	2.3
Potassium	0.5	mg/L	2.9	1.7	1.0	1.0
Sodium	0.5	mg/L	31	16	12	16

Client Sample ID			SW05	SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S22-Oc0050706	S22-Oc0050707
Date Sampled			Oct 20, 2022	Oct 20, 2022
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	0.24	0.19
Chloride	1	mg/L	180	330
Chlorophyll a	5	ug/L	< 5	6.2
Conductivity (at 25 °C)	10	uS/cm	960	730
Dissolved Oxygen	0.1	mg/L	8.9	8.7
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5	< 0.5
Nitrate (as N)	0.02	mg/L	< 0.5	< 0.5
Nitrite (as N)	0.02	mg/L	< 0.2	< 0.2
pH (at 25 °C)	0.1	pH Units	6.2	6.3
Phosphate total (as P)	0.01	mg/L	0.06	0.05
Sulphate (as S)	2	mg/L	8.6	7.5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	650	580
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	< 0.2	< 0.2
Total Nitrogen (as N)*	0.2	mg/L	< 0.5	< 0.5
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	7.2	16

Client Sample ID			SW05	SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S22-Oc0050706	S22-Oc0050707
Date Sampled			Oct 20, 2022	Oct 20, 2022
Test/Reference	LOR	Unit		
Heavy Metals				
Aluminium	0.05	mg/L	0.66	0.54
Arsenic	0.001	mg/L	< 0.001	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.001	0.001
Copper	0.001	mg/L	< 0.001	< 0.001
Iron	0.05	mg/L	3.5	2.7
Lead	0.001	mg/L	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.002	0.002
Zinc	0.005	mg/L	0.007	0.012
Alkali Metals				
Calcium	0.5	mg/L	11	9.1
Magnesium	0.5	mg/L	19	13
Potassium	0.5	mg/L	7.9	5.8
Sodium	0.5	mg/L	160	110

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Oct 28, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 28, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 28, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Oct 26, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 26, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Oct 28, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Chlorophyll a	Melbourne	Oct 26, 2022	28 Days
- Method: LTM-INO-4340 Chlorophyll a in Waters			
Conductivity (at 25 °C)	Sydney	Oct 28, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Sydney	Oct 28, 2022	1 Days
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25 °C)	Sydney	Oct 28, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Oct 28, 2022	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Oct 28, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Sydney	Oct 28, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Oct 25, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Oct 28, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Oct 28, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

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Ballina
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Order No.:
Report #: 934613
Phone: 0421 519 354
Fax:

Received: Oct 25, 2022 9:30 AM
Due: Oct 28, 2022
Priority: 3 Day
Contact Name: Lab Results

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEARS)
Project ID: 217140

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Aluminium	Chloride	Chlorophyll a	Conductivity (at 25 °C)	Dissolved Oxygen	Iron	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Total Recoverable Hydrocarbons	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254								X									X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X	X	X		X	X
External Laboratory																			
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**														
1	SW01	Oct 20, 2022		Water	S22-Oc0050702	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	SW02	Oct 20, 2022		Water	S22-Oc0050703	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	SW03	Oct 20, 2022		Water	S22-Oc0050704	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	SW04	Oct 20, 2022		Water	S22-Oc0050705	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	SW05	Oct 20, 2022		Water	S22-Oc0050706	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	SW06	Oct 20, 2022		Water	S22-Oc0050707	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						6	6	6	6	6	6	6	6	6	6	6	6	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chlorophyll a	ug/L	< 5			5	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Aluminium	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	89			70-130	Pass	
TRH C10-C14	%	101			70-130	Pass	
Naphthalene	%	85			70-130	Pass	
TRH C6-C10	%	91			70-130	Pass	
TRH >C10-C16	%	98			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	100			70-130	Pass	
Conductivity (at 25 °C)	%	93			70-130	Pass	
Nitrate & Nitrite (as N)	%	106			70-130	Pass	
Nitrate (as N)	%	95			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nitrite (as N)	%	108			70-130	Pass	
Phosphate total (as P)	%	95			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	97			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	80			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	102			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	100			80-120	Pass	
Arsenic	%	103			80-120	Pass	
Cadmium	%	102			80-120	Pass	
Chromium	%	99			80-120	Pass	
Copper	%	94			80-120	Pass	
Iron	%	95			80-120	Pass	
Lead	%	101			80-120	Pass	
Mercury	%	101			80-120	Pass	
Nickel	%	96			80-120	Pass	
Zinc	%	98			80-120	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	98			80-120	Pass	
Magnesium	%	106			80-120	Pass	
Potassium	%	99			80-120	Pass	
Sodium	%	106			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	S22-Oc0046558	NCP	%	86			70-130	Pass	
TRH C10-C14	W22-Oc0050710	NCP	%	97			70-130	Pass	
Naphthalene	S22-Oc0046558	NCP	%	112			70-130	Pass	
TRH C6-C10	S22-Oc0046558	NCP	%	87			70-130	Pass	
TRH >C10-C16	W22-Oc0050710	NCP	%	96			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B22-Oc0038756	NCP	%	89			70-130	Pass	
Nitrate & Nitrite (as N)	B22-Oc0038756	NCP	%	97			70-130	Pass	
Phosphate total (as P)	S22-Oc0050625	NCP	%	96			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M22-Oc0055730	NCP	%	87			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0058377	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S22-Oc0051794	NCP	%	103			75-125	Pass	
Arsenic	R22-Oc0032826	NCP	%	112			75-125	Pass	
Cadmium	R22-Oc0032826	NCP	%	112			75-125	Pass	
Chromium	R22-Oc0032826	NCP	%	101			75-125	Pass	
Copper	R22-Oc0032826	NCP	%	96			75-125	Pass	
Iron	S22-Oc0051794	NCP	%	103			75-125	Pass	
Lead	R22-Oc0032826	NCP	%	106			75-125	Pass	
Mercury	R22-Oc0032826	NCP	%	107			75-125	Pass	
Nickel	R22-Oc0032826	NCP	%	95			75-125	Pass	
Zinc	R22-Oc0032826	NCP	%	101			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-Oc0051794	NCP	%	98			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Magnesium	S22-Oc0051794	NCP	%	113			75-125	Pass	
Potassium	S22-Oc0051794	NCP	%	107			75-125	Pass	
Sodium	S22-Oc0051794	NCP	%	89			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S22-Oc0046556	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S22-Oc0058377	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S22-Oc0058377	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S22-Oc0058377	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	S22-Oc0046556	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S22-Oc0046556	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	S22-Oc0058377	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S22-Oc0058377	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S22-Oc0058377	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M22-Oc0055708	NCP	mg/L	290	DIL x100	<1	30%	Pass	
Chloride	S22-Oc0050621	NCP	mg/L	13	13	1.5	30%	Pass	
Chlorophyll a	B22-Oc0040695	NCP	ug/L	< 10	< 10	<1	30%	Pass	
Nitrate & Nitrite (as N)	M22-Oc0055708	NCP	mg/L	< 1	< 1	<1	30%	Pass	
Nitrate (as N)	M22-Oc0055708	NCP	mg/L	< 0.4	< 1	<1	30%	Pass	
Nitrite (as N)	M22-Oc0055708	NCP	mg/L	< 0.4	< 0.4	<1	30%	Pass	
Phosphate total (as P)	S22-Oc0050623	NCP	mg/L	0.02	0.02	6.1	30%	Pass	
Sulphate (as S)	S22-Oc0050621	NCP	mg/L	< 2	< 2	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-Oc0058377	NCP	mg/L	400	400	1.0	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M22-Oc0055693	NCP	mg/L	140	160	14	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0058377	NCP	mg/L	67	60	10	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S22-Oc0060104	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Arsenic	S22-Oc0050622	NCP	mg/L	0.001	0.002	40	30%	Fail	Q15
Cadmium	S22-Oc0050622	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S22-Oc0050622	NCP	mg/L	0.002	0.004	60	30%	Fail	Q15
Copper	S22-Oc0050622	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron	S22-Oc0050622	NCP	mg/L	0.22	0.34	43	30%	Fail	Q15
Lead	S22-Oc0050622	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S22-Oc0050622	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S22-Oc0050622	NCP	mg/L	0.003	0.004	31	30%	Fail	Q15
Zinc	S22-Oc0050622	NCP	mg/L	0.012	0.012	1.6	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-Oc0050622	NCP	mg/L	< 0.5	< 0.5	<1	30%	Pass	
Magnesium	S22-Oc0050622	NCP	mg/L	0.9	0.9	4.9	30%	Pass	
Potassium	S22-Oc0050622	NCP	mg/L	< 0.5	0.6	22	30%	Pass	
Sodium	S22-Oc0050622	NCP	mg/L	7.0	7.3	4.6	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25 °C)	S22-Oc0050706	CP	uS/cm	960	880	8.4	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Robert Biviano	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Dilani Samarakoon	Senior Analyst-Inorganic
Gabriele Cordero	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Raymond Siu	Senior Analyst-Volatile
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Attachment 3: Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	20/10/2022

Description

Surface water sampling location SW01.

Photo No.	Date
2	20/10/2022

Description

Surface water sampling location SW02

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	20/10/2022

Description

Surface water sampling location SW03

Photo No.	Date
4	20/10/2022

Description

Surface water sample location SW04

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	20/10/2022

Description

Surface water sample location SW05

Photo No.	Date
6	20/10/2022

Description

Surface water sampling location SW06

ENV Solutions
ENVIRONMENTAL | ASBESTOS | REMEDIATION | RESOURCE RECOVERY

MONTHLY WATER QUALITY REPORT

Harvest Estate Urban Development

Harvest Estate

Ewingsdale Road, Byron Bay, NSW 2481

October 2022

ENV217140_Harvest Estate_WQ_20221010

10 October 2022

Monitoring Period: - 29th August - 29th September 2022

ENV Services Pty Ltd (ENV) was engaged by Planit Consulting to prepare a Monthly Water Quality Report to meet requirements outlined in Harvest Estate Development Conditions of Consent (11b - d, 32, 33 & 78) and Section 6.2 and 6.4 of the Planit Construction Environmental Management Plan (CEMP). Monitoring has been undertaken in accordance with the following approved plans.

- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate Groundwater Management Plan.* Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Belongil Creek Plan of Management*. Dated August 2020.
- Australian Wetlands Consulting Pty Ltd (AWC) (2020). *Harvest Estate West Byron Urban Release Area; Acid Frog Management Plan.* Dated August 2020.

Baseline water quality parameters outlined in this report have been derived from mean or range values calculated over a 12-month sampling period undertaken between 25 May 2020 and 17 May 2021. This baseline water quality monitoring was undertaken in accordance with the Harvest Estate Groundwater Management Plan (AWC 2020) and the Harvest Estate – Belongil Creek Plan of Management (AWC 2020).

Guideline water quality trigger values have been derived from the ANZG (2018) Water Quality Guidelines and ANZECC (2000) guidelines for Fresh and Marine Water Quality. These guidelines define Belongil Creek as a lowland river of South-Eastern Australia, with trigger values chosen to reflect this. In assessing human disturbance, this water quality report recognises Belongil Creek as being slight to moderately disturbed. On this basis, for toxicants in water, 95% species protection default guideline values have been presented for assessed toxicants.

The construction works being undertaken during this monitoring period included the following:

- Clearing/Mulching
- Bulk Fill Earthworks – Stage 1

Fortnightly Acid Frog Habitat Groundwater Quality Monitoring (First 6 months of Construction)

Fortnightly water quality monitoring of Standing Water level (SWL), pH and Electrical Conductivity (EC) of all groundwater wells (MW3, MW4, MW6 - MW8) in proximity of retained acid frog habitat is required to meet the sites Conditions of Consent, along with monitoring requirements outlined in Section 6.2 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 1, SWL's, pH and EC of all groundwater wells are outside the ANZG (2018) default ranges (freshwater: 95% species protection) for pH and electrical conductivity however all readings are in-line with historic baseline water quality values with the exception of MW6 and MW8 where no baseline data has been collected. Elevated pH and electrical conductivity values were observed within MW6 when compared to the other sites. These anomalous values are within the ranges specified within the ANZG water quality guidelines (2018) and are likely attributed to surface water - groundwater interactions as the standing water level is located at or near surface depending on the saturation of the localised catchment.

Table 1: Fortnightly Acid Frog Habitat Ground Water Quality Monitoring

Site	Date	SWL (mAHD)	pH	EC (µδ/cm)
MW3	16/09/22	2.50	4.11	48
	29/09/22	3.01	4.20	53
MW3 Baseline		**2.79**	**4.29**	**106**
MW4	16/09/22	2.47	5.09	98
	29/09/22	2.57	4.50	100
MW4 Baseline		**2.51**	**4.58**	**243**
MW6	16/09/22	1.42	5.84	828
	29/09/22	1.56	5.96	1280
MW6 Baseline		**1.34**	-	-
MW7	16/09/22	1.65	4.74	54
	29/09/22	1.68	4.6	26
MW7 Baseline		**1.53**	**5.0**	**102**
MW8	16/09/22	2.63	4.30	100
	29/09/22	2.62	3.80	129
MW8 Baseline		**2.26**	-	-
ANZECC (2000) / ANZG (2018) (Freshwater)		-	**6.5 – 8.0**	**125 - 2200**

Monthly Groundwater Sampling Event (5 Sites)

Monthly groundwater monitoring of pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Sodium (Na), Chlorine (Cl) and Sulfur (S) of all the groundwater wells (MW1 – MW8) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.2 of the Planit Construction Environmental Management Plan (CEMP). Groundwater monitoring locations are presented in Attachment 1. Presented in Table 2, the required parameters of all groundwater wells can be summarised as in line with the historic baseline values.

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Table 2: Monthly Groundwater Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg/ L^{-1})	TN (µg/L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl (mg/L)	S (mg/L)
MW2	29/09/2022	5.8	54	92	<5	120	500	20	510	< 0.5	0.8	2.4	30		< 2
MW2 Baseline		**5.43**	**135**	**89**	**92**	**190**	**1530**	**46**	**232**	**0.4**	**0.9**	**2.8**	**26.4**	**44**	**3.4**
MW3	29/09/2022	4.2	53	40	370	90	500	20	50	< 0.5	1	0.6	7		<2
MW3 Baseline		**4.29**	**106**	**72**	**1309**	**420**	**1580**	**27**	**99**	**0.7**	**1.4**	**1.5**	**12.1**	**30**	**2.8**
MW4	29/09/2022	4.5	100	88	350	30	1500	100	160	3.6	3.7	0.9	19		<2
MW4 Baseline		**4.58**	**243**	**165**	**598**	**270**	**2890**	**63**	**365**	**4.7**	**5.3**	**2.2**	**32.2**	**64**	**4.5**
MW5	29/09/2022	4.5	59	68	630	130	6330	20	410	2.3	2.6	0.6	14		<2
MW5 Baseline		**4.64**	**144**	**98**	**761**	**380**	**4600**	**50**	**384**	**3.0**	**3.6**	**2.2**	**19.2**	**47**	**2.9**
MW7	29/09/2022	4.6	26	40	190	100	2500	20	300	1.0	0.9	0.6	8.5		<2
MW7 Baseline		**5.0**	**102**	**69**	**361**	**190**	**1630**	**30**	**210**	**2.0**	**1.6**	**1.6**	**14.1**	**39**	**3.4**
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 - 2200**	**-**	**<50**	**50**	**500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Monthly Surface Water Sampling Event (6 Sites)

Surface water monitoring locations are presented in Attachment 1 and the coordinates (GDA94) of all locations tabulated and presented in Table 3. Select photos of the surface water sampling programme are presented in Attachment 3.

Table 3: Surface Water Monitoring Coordinates

Monitoring Location	Easting	Northing
SW01	556852	6831954
SW02	557145	6831963
SW03	557411	6831604
SW04	557397	6831429
SW05	557992	6830881
SW06	558257	6831214

Monthly surface water sampling of pH, Electrical conductivity (EC), Total Dissolved Solids (TDS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrite, Ammonia (NH_3), Calcium (Ca), Magnesium (Mg), Potassium (K), Chlorine (Cl), Sulfur (S) and Chlorophyll-a of all the surface water sampling locations (SW1 – SW6) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 4, these required parameters at all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of Total Nitrogen (TN) at sampling locations SW01 (5200 µg N L^{-1}), SW04 (5100 µg N L^{-1}), SW05 (3000 µg N L^{-1}), and SW06 (8600 µg N L^{-1}). Both SW01 and SW05 are considered 'upstream' surface water sampling locations, and as such elevated nutrient (TN) levels across sample locations SW01, SW04, SW05 and SW06 are expected to be contributed to localised high rainfall and catchment wide elevated nutrient (TN) levels, with no active nutrient generating construction activities (e.g. landscaping, sewage runoff) observed at the site during the site inspection/sampling programme.

Monthly surface water sampling of Arsenic (As), Cadmium (Ca), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn), Iron (Fe), Aluminium (Al) and Mercury (Hg) at all surface water sample locations (SW01 – SW06) is required to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 5, these required metals parameters of all surface water sampling locations can be summarised as in line with the historic baseline values, with the exception of elevated Copper (320 µg L^{-1}), Nickel (15 µg L^{-1}), Lead (5 µg L^{-1}), Zinc (71 µg L^{-1}), Iron (2700 µg L^{-1}) and Aluminium (1500 µg L^{-1}) at sampling location SW01. SW01 is located 'upstream' of the site, with these metals' concentrations decreasing down gradient of the site. As such, elevated metals concentrations at location SW01 are expected to be contributed to extraneous sources.

Monthly surface water sampling of Total Recoverable Hydrocarbons C6 – C9, C10 – C14, C15 – C28, C29 – C366, C10 – C16, Naphthalene, C10 – C16 less Naphthalene, C16 – C334, C34 – C40 and Sum C10 – C36 is required at all surface water sampling locations (SW01 – SW06) to meet the sites conditions of consent, along with monitoring requirements outlined in chapter 6.4 of the Planit Construction Environmental Management Plan (CEMP). Presented in Table 6, these required hydrocarbon parameters of all surface water sampling locations can be summarised as in line with the historic baseline values.

During this monitoring period (29/08/2022-29/9/2022), 197mm of rain was recorded in the area (Byron Bay, Cape Byron Lighthouse, Bureau of Meteorology).

Table 4: Monthly Surface Water Quality Analytical Monitoring

Site	Date	pH	EC (µδ/cm)	TDS (mg/L)	TSS (mg/L)	TP (µg P L^{-1})	TN (µg N L^{-1})	Nitrite (µg/L)	NH_3 (µg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	Cl- (mg/L)	S (mg/L)	Chlorophyll a (µg/L^{-1})
SW01	29/09/2022	6.9	140	180	11	470	5200	<20	<10	22	14	3	30	14	3.4	450
SW01 Baseline		**6.2 – 7.0**	**134 - 428**	**91 - 291**	**1 - 73**	**70 - 3520**	**640 - 3520**	**5 - 39**	**19 - 164**	**9 - 22**	**3 - 16**	**0 - 6**	**12 -51**	**1 - 118**	**2 - 9**	**10 - 768**
SW02	29/09/2022	6.9	160	170	8.8	40	1300	<20	30	19	5.8	1.9	27	29	2.8	22
SW02 Baseline		**6.3 – 7.0**	**97 - 292**	**66 - 199**	**3 - 495**	**50 - 1880**	**410 - 8550**	**5 - 60**	**5 - 261**	**7 - 17**	**2 - 5**	**1 -6**	**8 - 32**	**10 - 161**	**0 - 10**	**1 - 182**
SW03	29/09/2022	6.8	100	120	<5	20	1100	<20	<10	13	4.4	1	23	24	2.4	<5
SW03 Baseline		**6.1 – 6.7**	**85 - 281**	**58 - 191**	**1 - 1005**	**40 - 2140**	**360 - 4310**	**7 - 41**	**14 - 155**	**6 - 21**	**2 - 5**	**0 - 4**	**8 - 30**	**13 - 111**	**0 - 6**	**5 - 86**
SW04	29/09/2022	4.5	52	68	<5	10	5100	<200	180	1.6	2.6	1	17	20	<2	<5
SW04 Baseline		**4.2 – 4.5**	**77 - 165**	**52 - 112**	**1 - 293**	**40 - 500**	**1150 - 4470**	**5 - 52**	**27 - 693**	**1 - 3**	**1 - 3**	**1 - 3**	**10 - 20**	**17 -90**	**0 - 3**	**14 - 86**
SW05	29/09/2022	5.9	510	480	5.2	120	3000	<200	170	9.4	17	7.7	140	220	11	<5
SW05 Baseline		**5.1 – 7.2**	**410 - 6927**	**279 - 4710**	**5 - 136**	**40 - 210**	**10 - 2227**	**8 - 52**	**68 - 592**	**3 - 57**	**7 - 130**	**2 - 58**	**46 - 1667**	**84 - 1980**	**6 - 115**	**9 - 63**
SW06	29/09/2022	6.0	580	480	<5	130	8600	<20	160	9.4	18	7.7	140	220	11	5.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		**6.5 – 8.0**	**125 - 2200**	-	**<50**	**50**	**500**	-	-	-	-	-	-	-	-	**5**

Table 5: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Fe (total) (µg/L)	Al (total) (µg/L)	Hg (µg/L)
SW01	29/09/2022	3	<0.2	2	320	15	5	71	2700	1500	<0.1
SW01 Baseline		**1 - 3**	**1**	**1 - 2**	**2 - 41**	**2 - 6**	**1**	**3 - 58**	**423 - 1223**	**59 - 496**	**0.5**
SW02	29/09/2022	3	<0.2	2	4	2	1	57	1500	420	<0.1
SW02 Baseline		**1 - 45**	**1**	**1 - 7**	**1 - 12**	**1 - 5**	**1 - 20**	**7 - 90**	**473 – 71, 893**	**154 - 3821**	**0.5**
SW03	29/09/2022	2	<0.2	2	3	2	<1	34	800	420	<0.1
SW03 Baseline		**1 - 58**	**1**	**1 - 8**	**1 - 28**	**1 - 6**	**1 - 28**	**11 - 260**	**512 – 85, 520**	**109 - 7949**	**0.5**
SW04	29/09/2022	1	<0.2	5	1	2	1	27	2700	1300	<0.1
SW04 Baseline		**1 - 2**	**1**	**2 - 7**	**1 - 2**	**1 - 5**	**1 - 2**	**8 - 28**	**358 - 2827**	**578 – 1402**	**0.5**
SW05	29/09/2022	<1	<0.2	2	<1	2	<1	8	4600	830	<0.1
SW05 Baseline		**1 - 2**	**1**	**1 - 2**	**1 - 3**	**1 - 11**	**1**	**2 - 26**	**280 – 12, 306**	**97 - 2073**	**0.5**
SW06	**29/09/2022**	<1	<0.2	2	<1	2	<1	8	4500	780	<0.1
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018)(Freshwater)		**13**	**0.2**	**3.3**	**1.8**	**11**	**3.4**	**8**	**300**	**50**	**0.6**

Table 6: Monthly Surface Water Quality Analytical Monitoring (analytes continued)

Site	Date	Total Recoverable Hydrocarbons (TRH) (mg/L)									
		C6 – C9	C10 – C14	C15 – C28	C29 – C36	C10 – C16	Naphthalene	C10 – C16 less Naphthalene	C16 – C34	C34 – C40	C10 – C36 Sum
SW01	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
SW01 Baseline		-	**0.05**	**0.13**	**0.09**	**0.06**	-	-	**0.24**	**0.10**	**0.17**
SW02	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
SW02 Baseline		-	**0.05**	**0.10**	**0.05**	**0.06**	-	-	**0.22**	**0.10**	**0.14**
SW03	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
SW03 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.12**
SW04	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
SW04 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW05	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.15
SW05 Baseline		-	**0.05**	**0.10**	**0.06**	**0.06**	-	-	**0.20**	**0.10**	**0.10**
SW06	29/09/2022	<0.2	0.05	<0.1	<0.1	<0.1	<0.01	<0.05	<0.1	<0.1	0.152
SW06 Baseline		-	-	-	-	-	-	-	-	-	-
ANZG (2018) (Freshwater)		-	-	-	-	-	-	-	-	-	-

Should you have any queries about this Water Quality Monitoring Report, please do not hesitate to contact me directly. The next monthly monitoring event is scheduled for the 20th of October 2022.

Yours sincerely

Robert Todhunter

Environmental Scientist

ENV Solutions Pty Ltd

Attachment 1 – Locality

Legend

Site Location

0 0.5 1km

Figure 1 – Site Location
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

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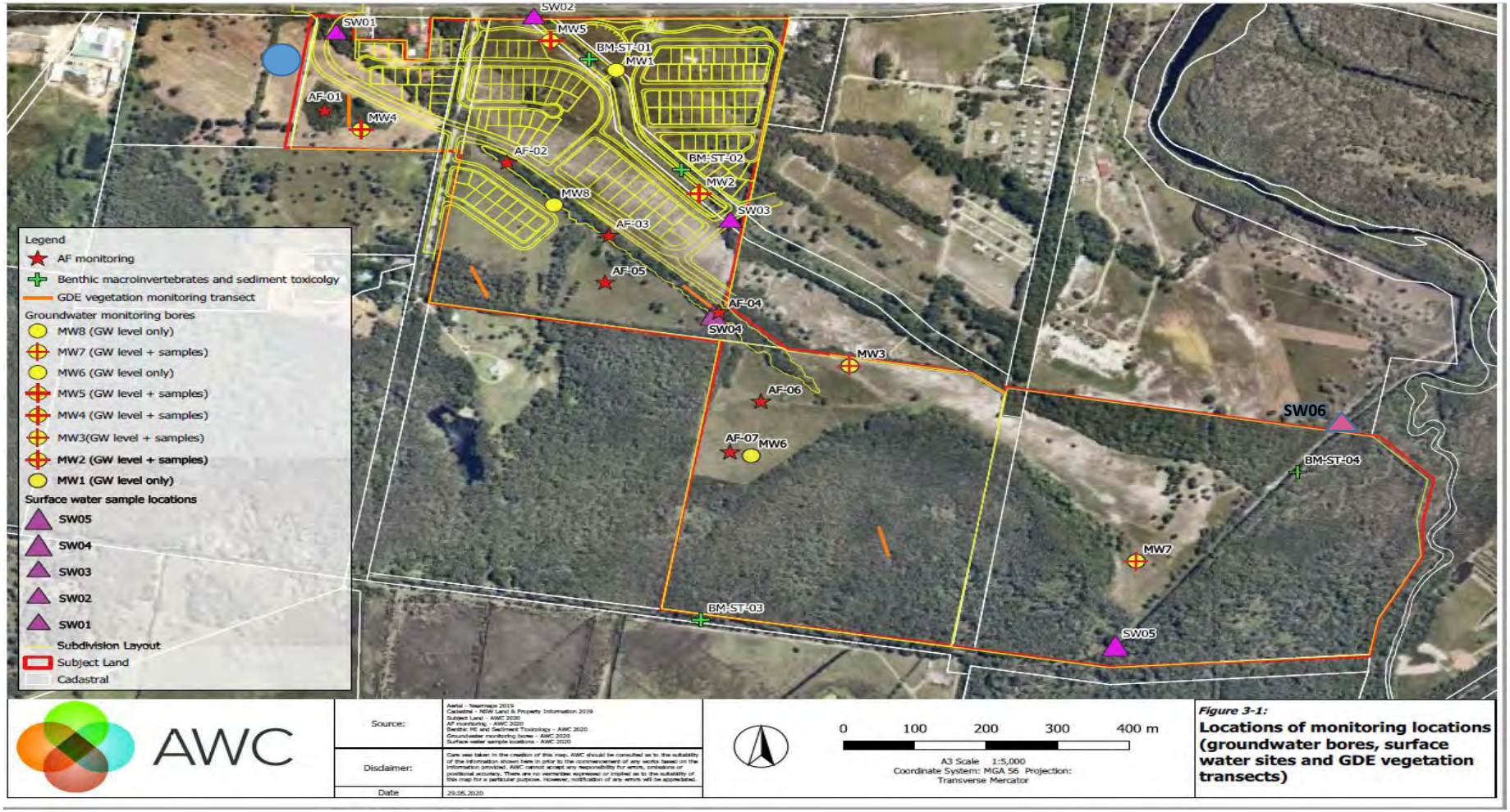

Figure 2 – AWC Surface Water Monitoring Locations
342 Ewingsdale Road, Byron Bay, NSW, 2481

Project: Monthly Water Quality Monitoring
Client: Planit
ENV Project Number: 217140

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Attachment 2 – Analytical Results

ENV Solutions Pty Ltd
1/35 North Creek Road
Ballina
NSW 2478

Attention: **Robert Todhunter**

Report **928813-W**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Oct 05, 2022

Client Sample ID			**SW01**	**SW02**	**SW03**	**SW04**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-Oc0005667**	**S22-Oc0005668**	**S22-Oc0005669**	**S22-Oc0005670**
Date Sampled			**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	< 0.01	0.03	< 0.01	0.18
Chloride	1	mg/L	14	29	24	20
Chlorophyll a	5	ug/L	450	22	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	140	160	100	52
Dissolved Oxygen	0.1	mg/L	3.1	8.0	9.3	4.8
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.40	< 0.05	< 0.5
Nitrate (as N)	0.02	mg/L	< 0.02	0.39	< 0.02	< 0.5
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.2
pH (at 25 °C)	0.1	pH Units	6.9	6.9	6.8	4.5
Phosphate total (as P)	0.01	mg/L	0.47	0.04	0.02	0.01
Sulphate (as S)	2	mg/L	3.4	2.8	2.4	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	180	170	120	68
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	5.2	0.9	1.1	5.1
Total Nitrogen (as N)*	0.2	mg/L	5.2	1.3	1.1	5.1
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	11	8.8	< 5	< 5
Heavy Metals						
Arsenic	0.001	mg/L	0.003	0.003	0.002	0.001
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.002	0.002	0.002	0.005
Copper	0.001	mg/L	0.32	0.004	0.003	0.001
Lead	0.001	mg/L	0.005	0.001	< 0.001	0.001

Client Sample ID			SW01	SW02	SW03	SW04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-Oc0005667	S22-Oc0005668	S22-Oc0005669	S22-Oc0005670
Date Sampled			Sep 29, 2022	Sep 29, 2022	Sep 29, 2022	Sep 29, 2022
Test/Reference	LOR	Unit				
Heavy Metals						
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.015	0.002	0.002	0.002
Zinc	0.005	mg/L	0.071	0.057	0.034	0.027
Alkali Metals						
Calcium	0.5	mg/L	22	19	13	1.6
Magnesium	0.5	mg/L	14	5.8	4.4	2.6
Potassium	0.5	mg/L	3.0	1.9	1.0	1.0
Sodium	0.5	mg/L	30	27	23	17

Client Sample ID			SW05	SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S22-Oc0005671	S22-Oc0005672
Date Sampled			Sep 29, 2022	Sep 29, 2022
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	0.17	0.16
Chloride	1	mg/L	220	220
Chlorophyll a	5	ug/L	< 5	5.1
Conductivity (at 25 °C)	10	uS/cm	510	580
Dissolved Oxygen	0.1	mg/L	7.7	7.8
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.2	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.2	< 0.02
pH (at 25 °C)	0.1	pH Units	5.9	6.0
Phosphate total (as P)	0.01	mg/L	0.12	0.13
Sulphate (as S)	2	mg/L	11	11
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	480	480
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.0	8.6
Total Nitrogen (as N)*	0.2	mg/L	3	8.6
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	5.2	< 5

Client Sample ID			SW05	SW06
Sample Matrix			Water	Water
Eurofins Sample No.			S22-Oc0005671	S22-Oc0005672
Date Sampled			Sep 29, 2022	Sep 29, 2022
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.001	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.002	0.002
Copper	0.001	mg/L	< 0.001	< 0.001
Lead	0.001	mg/L	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.002	0.002
Zinc	0.005	mg/L	0.008	0.008
Alkali Metals				
Calcium	0.5	mg/L	9.4	9.4
Magnesium	0.5	mg/L	17	18
Potassium	0.5	mg/L	7.7	7.7
Sodium	0.5	mg/L	140	140

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Oct 10, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 05, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 10, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Oct 06, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Oct 06, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Oct 06, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Oct 06, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Sydney	Oct 10, 2022	28 Days
- Method: E052 Total Phosphate (as P)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 06, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Oct 10, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Chlorophyll a	Melbourne	Oct 06, 2022	28 Days
- Method: LTM-INO-4340 Chlorophyll a in Waters			
Conductivity (at 25 °C)	Sydney	Oct 10, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Sydney	Oct 10, 2022	1 Days
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25 °C)	Sydney	Oct 10, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Oct 10, 2022	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Oct 10, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Metals M8	Sydney	Oct 10, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Oct 10, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Oct 10, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Company Name: ENV Solutions Pty Ltd
Address: 1/35 North Creek Road
Ballina
NSW 2478

Order No.:
Report #: 928813
Phone: 0421 519 354
Fax:

Received: Oct 5, 2022 9:30 AM
Due: Oct 12, 2022
Priority: 5 Day
Contact Name: Robert Todhunter

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Chloride	Chlorophyll a	Conductivity (at 25 °C)	Dissolved Oxygen	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Total Recoverable Hydrocarbons	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254							X								X		
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X	X	X	X	X	X	X
External Laboratory																	
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**												
1	SW01	Sep 29, 2022		Water	S22-Oc0005667	X	X	X	X	X	X	X	X	X	X	X	X
2	SW02	Sep 29, 2022		Water	S22-Oc0005668	X	X	X	X	X	X	X	X	X	X	X	X
3	SW03	Sep 29, 2022		Water	S22-Oc0005669	X	X	X	X	X	X	X	X	X	X	X	X
4	SW04	Sep 29, 2022		Water	S22-Oc0005670	X	X	X	X	X	X	X	X	X	X	X	X
5	SW05	Sep 29, 2022		Water	S22-Oc0005671	X	X	X	X	X	X	X	X	X	X	X	X
6	SW06	Sep 29, 2022		Water	S22-Oc0005672	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						6	6	6	6	6	6	6	6	6	6	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Chlorophyll a	ug/L	< 5			5	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Sulphate (as S)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	107			70-130	Pass	
TRH C10-C14	%	124			70-130	Pass	
Naphthalene	%	99			70-130	Pass	
TRH C6-C10	%	108			70-130	Pass	
TRH >C10-C16	%	119			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	101			70-130	Pass	
Chloride	%	94			70-130	Pass	
Conductivity (at 25 °C)	%	98			70-130	Pass	
Nitrate & Nitrite (as N)	%	108			70-130	Pass	
Nitrate (as N)	%	108			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nitrite (as N)	%	107			70-130	Pass	
Sulphate (as S)	%	95			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	101			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	114			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	94			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	94			80-120	Pass	
Cadmium	%	94			80-120	Pass	
Chromium	%	94			80-120	Pass	
Copper	%	94			80-120	Pass	
Lead	%	97			80-120	Pass	
Mercury	%	105			80-120	Pass	
Nickel	%	95			80-120	Pass	
Zinc	%	93			80-120	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	99			80-120	Pass	
Magnesium	%	87			80-120	Pass	
Potassium	%	107			80-120	Pass	
Sodium	%	88			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	S22-Oc0008233	NCP	%	91			70-130	Pass	
Naphthalene	S22-Oc0008233	NCP	%	97			70-130	Pass	
TRH C6-C10	S22-Oc0008233	NCP	%	89			70-130	Pass	
TRH >C10-C16	S22-Oc0007730	NCP	%	118			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M22-Oc0013121	NCP	%	100			70-130	Pass	
Chloride	S22-Oc0005667	CP	%	106			70-130	Pass	
Nitrate & Nitrite (as N)	M22-Oc0013121	NCP	%	99			70-130	Pass	
Nitrate (as N)	M22-Oc0013121	NCP	%	99			70-130	Pass	
Sulphate (as S)	S22-Oc0005667	CP	%	104			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	R22-Oc0004923	NCP	%	98			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-Oc0005581	NCP	%	94			75-125	Pass	
Cadmium	S22-Oc0005581	NCP	%	92			75-125	Pass	
Chromium	S22-Oc0005581	NCP	%	95			75-125	Pass	
Copper	S22-Oc0005581	NCP	%	93			75-125	Pass	
Lead	S22-Oc0005581	NCP	%	94			75-125	Pass	
Mercury	S22-Oc0005581	NCP	%	102			75-125	Pass	
Nickel	S22-Oc0005581	NCP	%	94			75-125	Pass	
Zinc	S22-Oc0005581	NCP	%	88			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-Oc0005581	NCP	%	95			75-125	Pass	
Magnesium	S22-Oc0005581	NCP	%	110			75-125	Pass	
Potassium	S22-Oc0005581	NCP	%	103			75-125	Pass	
Sodium	S22-Oc0005581	NCP	%	108			75-125	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S22-Oc0005671	CP	%	72			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	S22-Oc0005672	CP	%	95			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S22-Oc0010383	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Naphthalene	S22-Oc0010383	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S22-Oc0010383	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S22-Oc0005667	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Chloride	S22-Oc0005581	NCP	mg/L	8.5	8.4	1.1	30%	Pass	
Conductivity (at 25 °C)	S22-Oc0012454	NCP	uS/cm	77	79	1.4	30%	Pass	
Nitrate & Nitrite (as N)	S22-Oc0005667	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nitrate (as N)	S22-Oc0005667	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Nitrite (as N)	S22-Oc0005667	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Phosphate total (as P)	R22-Se0047911	NCP	mg/L	< 0.01	0.01	26	30%	Pass	
Sulphate (as S)	S22-Oc0005581	NCP	mg/L	< 2	< 2	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-Oc0005667	CP	mg/L	180	190	4.3	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0005668	CP	mg/L	8.8	8.0	9.5	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S22-Oc0005669	CP	mg/L	0.002	0.002	12	30%	Pass	
Cadmium	S22-Oc0005669	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S22-Oc0005669	CP	mg/L	0.002	0.002	21	30%	Pass	
Copper	S22-Oc0005669	CP	mg/L	0.003	0.003	<1	30%	Pass	
Lead	S22-Oc0005669	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S22-Oc0005669	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S22-Oc0005669	CP	mg/L	0.002	0.002	7.0	30%	Pass	
Zinc	S22-Oc0005669	CP	mg/L	0.034	0.034	1.8	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-Oc0005669	CP	mg/L	13	13	<1	30%	Pass	
Magnesium	S22-Oc0005669	CP	mg/L	4.4	4.3	<1	30%	Pass	
Potassium	S22-Oc0005669	CP	mg/L	1.0	1.0	3.1	30%	Pass	
Sodium	S22-Oc0005669	CP	mg/L	23	23	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	S22-Oc0005670	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S22-Oc0005670	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S22-Oc0005670	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	S22-Oc0005670	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S22-Oc0005670	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S22-Oc0005670	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	S22-Oc0005670	CP	mg/L	5.1	4.8	6.5	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	S22-Oc0005671	CP	mg/L	3.0	3.4	11	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chlorophyll a	S22-Oc0005672	CP	ug/L	5.1	< 5	100	30%	Fail	Q15

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Robert Biviano	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Gabriele Cordero	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ENV Solutions Pty Ltd
1/35 North Creek Road
Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Robert Todhunter**

Report **932190-W**
Project name ADDITIONAL - WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID ADDITIONAL - 217140
Received Date Oct 17, 2022

Client Sample ID			**SW01**	**SW02**	**SW03**	**SW04**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-Oc0030344**	**S22-Oc0030345**	**S22-Oc0030346**	**S22-Oc0030347**
Date Sampled			**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	0.05	mg/L	1.5	0.42	0.42	1.3
Iron	0.05	mg/L	2.7	1.5	0.80	2.7

Client Sample ID			**SW05**	**SW06**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S22-Oc0030348**	**S22-Oc0030349**
Date Sampled			**Sep 29, 2022**	**Sep 29, 2022**
Test/Reference	LOR	Unit		
Heavy Metals				
Aluminium	0.05	mg/L	0.83	0.78
Iron	0.05	mg/L	4.6	4.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Oct 17, 2022	28 Days

- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS

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NATA# 2377 Site# 2370

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Tel: 0800 856 450
IANZ# 1290

Company Name: ENV Solutions Pty Ltd
Address: 1/35 North Creek Road
Ballina
NSW 2478

Order No.:
Report #: 932190
Phone: 0421 519 354
Fax:

Received: Oct 17, 2022 11:20 AM
Due: Oct 17, 2022
Priority: Same day
Contact Name: Robert Todhunter

Project Name: ADDITIONAL - WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: ADDITIONAL - 217140

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Aluminium	Iron
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SW01	Sep 29, 2022		Water	S22-Oc0030344	X	X
2	SW02	Sep 29, 2022		Water	S22-Oc0030345	X	X
3	SW03	Sep 29, 2022		Water	S22-Oc0030346	X	X
4	SW04	Sep 29, 2022		Water	S22-Oc0030347	X	X
5	SW05	Sep 29, 2022		Water	S22-Oc0030348	X	X
6	SW06	Sep 29, 2022		Water	S22-Oc0030349	X	X
Test Counts						6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Aluminium			mg/L	< 0.05			0.05	Pass	
Iron			mg/L	< 0.05			0.05	Pass	
LCS - % Recovery									
Heavy Metals									
Aluminium			%	91			80-120	Pass	
Iron			%	93			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	N22-Se0039719	NCP	%	85			75-125	Pass	
Iron	N22-Se0012588	NCP	%	109			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S22-Oc0030346	CP	mg/L	0.42	0.45	6.7	30%	Pass	
Iron	S22-Oc0030346	CP	mg/L	0.80	0.82	2.6	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Robert Biviano	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Ballina
NSW 2478

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
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Attention: **Robert Todhunter**

Report **928799-W-V2**
Project name WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID 217140
Received Date Oct 05, 2022

Client Sample ID			**MW2**	**MW3**	**MW4**	**MW5**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S22-Oc0005577**	**S22-Oc0005578**	**S22-Oc0005579**	**S22-Oc0005580**
Date Sampled			**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**
Test/Reference	LOR	Unit				
Ammonia (as N)	0.01	mg/L	[R09]0.51	0.05	0.16	0.41
Chloride	1	mg/L	14	8.8	22	18
Conductivity (at 25 °C)	10	uS/cm	54	53	100	59
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5	< 0.05	< 0.25	0.23
Nitrate (as N)	0.02	mg/L	< 0.2	< 0.02	< 0.25	0.23
Nitrite (as N)	0.02	mg/L	< 0.2	< 0.02	< 0.1	< 0.02
pH (at 25 °C)	0.1	pH Units	5.8	4.2	4.5	4.5
Phosphate total (as P)	0.01	mg/L	0.12	0.09	0.03	0.13
Sulphate (as S)	2	mg/L	< 2	< 2	< 2	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	92	40	88	68
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	[R09]0.5	0.5	1.5	6.1
Total Nitrogen (as N)*	0.2	mg/L	0.5	0.5	1.5	6.33
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5	370	350	630
Alkali Metals						
Calcium	0.5	mg/L	< 0.5	< 0.5	3.6	2.3
Magnesium	0.5	mg/L	0.8	1.0	3.7	2.6
Potassium	0.5	mg/L	2.4	0.6	0.9	0.6
Sodium	0.5	mg/L	30	7.0	19	14

Client Sample ID			**MW7**
Sample Matrix			**Water**
Eurofins Sample No.			**S22-Oc0005581**
Date Sampled			**Sep 29, 2022**
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.30
Chloride	1	mg/L	8.5
Conductivity (at 25 °C)	10	uS/cm	26
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5
Nitrate (as N)	0.02	mg/L	< 0.2
Nitrite (as N)	0.02	mg/L	< 0.2
pH (at 25 °C)	0.1	pH Units	4.6
Phosphate total (as P)	0.01	mg/L	0.10

Client Sample ID			MW7
Sample Matrix			Water
Eurofins Sample No.			S22-Oc0005581
Date Sampled			Sep 29, 2022
Test/Reference	LOR	Unit	
Sulphate (as S)	2	mg/L	< 2
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	40
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.5
Total Nitrogen (as N)*	0.2	mg/L	2.5
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	190
Alkali Metals			
Calcium	0.5	mg/L	1.0
Magnesium	0.5	mg/L	0.9
Potassium	0.5	mg/L	0.6
Sodium	0.5	mg/L	8.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Oct 13, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Oct 06, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Oct 06, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Oct 13, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Oct 13, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 13, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Chloride	Sydney	Oct 18, 2022	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Conductivity (at 25 °C)	Sydney	Oct 10, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
pH (at 25 °C)	Sydney	Oct 10, 2022	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Sydney	Oct 10, 2022	28 Days
- Method: In-house method LTM-INO-4270 Anions by Ion Chromatography			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Oct 10, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Eurofins Suite B11C: Na/K/Ca/Mg	Sydney	Oct 10, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Oct 10, 2022	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

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Company Name: ENV Solutions Pty Ltd
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NSW 2478

Order No.:
Report #: 928799
Phone: 0421 519 354
Fax:

Received: Oct 5, 2022 9:30 AM
Due: Oct 12, 2022
Priority: 5 Day
Contact Name: Robert Todhunter

Project Name: WEST BYRON WATER QUALITY MONITORING (10 YEAR)
Project ID: 217140

Eurofins Analytical Services Manager : Robert Biviano

Sample Detail						Conductivity (at 25 °C)	pH (at 25 °C)	Sulphate (as S)	Total Suspended Solids Dried at 103 °C to 105 °C	Polycyclic Aromatic Hydrocarbons	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254											X		
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X		X	X
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	MW2	Sep 29, 2022		Water	S22-Oc0005577	X	X	X	X	X	X	X	X
2	MW3	Sep 29, 2022		Water	S22-Oc0005578	X	X	X	X	X	X	X	X
3	MW4	Sep 29, 2022		Water	S22-Oc0005579	X	X	X	X	X	X	X	X
4	MW5	Sep 29, 2022		Water	S22-Oc0005580	X	X	X	X	X	X	X	X
5	MW7	Sep 29, 2022		Water	S22-Oc0005581	X	X	X	X	X	X	X	X
Test Counts						5	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
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7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
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ppb: parts per billion
%: Percentage
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NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

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CP	Client Parent - QC was performed on samples pertaining to this report
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Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
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SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as S)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Ammonia (as N)	%	101			70-130	Pass	
Conductivity (at 25 °C)	%	98			70-130	Pass	
Nitrate & Nitrite (as N)	%	101			70-130	Pass	
Nitrate (as N)	%	101			70-130	Pass	
Nitrite (as N)	%	107			70-130	Pass	
Phosphate total (as P)	%	93			70-130	Pass	
Sulphate (as S)	%	95			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	96			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	103			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	100			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	99			80-120	Pass	
Magnesium	%	87			80-120	Pass	
Potassium	%	107			80-120	Pass	
Sodium	%	88			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M22-Oc0013121	NCP	%	100			70-130	Pass	
Nitrate & Nitrite (as N)	M22-Oc0013121	NCP	%	99			70-130	Pass	
Nitrate (as N)	M22-Oc0013121	NCP	%	99			70-130	Pass	
Phosphate total (as P)	S22-Oc0005577	CP	%	94			70-130	Pass	
Sulphate (as S)	S22-Oc0005667	NCP	%	104			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M22-Oc0010384	NCP	%	81			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0005579	CP	%	115			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-Oc0005581	CP	%	95			75-125	Pass	
Magnesium	S22-Oc0005581	CP	%	110			75-125	Pass	
Potassium	S22-Oc0005581	CP	%	103			75-125	Pass	
Sodium	S22-Oc0005581	CP	%	108			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S22-Oc0005667	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Nitrate & Nitrite (as N)	S22-Oc0005667	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nitrate (as N)	S22-Oc0005667	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Nitrite (as N)	S22-Oc0005667	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	S22-Oc0005577	CP	mg/L	0.5	0.6	16	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S22-Oc0005669	NCP	mg/L	13	13	<1	30%	Pass	
Magnesium	S22-Oc0005669	NCP	mg/L	4.4	4.3	<1	30%	Pass	
Potassium	S22-Oc0005669	NCP	mg/L	1.0	1.0	3.1	30%	Pass	
Sodium	S22-Oc0005669	NCP	mg/L	23	23	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphate total (as P)	S22-Oc0005578	CP	mg/L	0.09	0.07	27	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S22-Oc0005579	CP	mg/L	350	390	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25 °C)	S22-Oc0005580	CP	uS/cm	59	56	5.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S22-Oc0005581	CP	mg/L	8.5	8.4	1.1	30%	Pass	
Sulphate (as S)	S22-Oc0005581	CP	mg/L	< 2	< 2	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-Oc0005581	CP	mg/L	40	36	11	30%	Pass	

Comments

This report has been revised V2 to correct missing chloride samples.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC
R09	Theoretically the TKN result should be greater or equal to the ammonia concentration. However the difference reported is within the measurement uncertainty of the individual tests

Authorised by:

Robert Biviano	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Gabriele Cordero	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Attachment 3: Photolog

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
1	29/09/2022

Description

Surface water monitoring location SW01.

Photo No.	Date
2	29/09/2022

Description

Surface water monitoring location SW02

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
3	29/09/2022

Description

Surface water monitoring location SW03

Photo No.	Date
4	29/09/2022

Description

Surface water monitoring location SW04

PHOTOGRAPHIC LOG

Client Name	Site Location	Project
Planit	Harvest Estate, Melaleuca Drive, Byron Bay, NSW 2481	ENV217140

Photo No.	Date
5	29/09/2022

Description

Surface water monitoring location SW05

Photo No.	Date
6	29/09/2022

Description

Surface water monitoring location SW06