

12 November 2024

Our ref: 24SYD9538

Greenvalleys Mountain Bike Park Pty Ltd
2926 Illawarra Highway
Tongarra NSW

Attention: Nick Haertsch

Dear Nick,

Riparian Assessment for Planning Proposal Application – Greenvalleys Mountain Bike Park, 2926 Illawarra Highway, Tongarra NSW

Eco Logical Australia Pty Ltd (ELA) has been engaged to assess the condition of mapped watercourses at Greenvalleys Mountain Bike Park, 2926 Illawarra Highway, Tongarra NSW to support a Planning Proposal. The study area is located at 2926 Illawarra Highway and comprises the southern part of Lot 1 DP881927 in Tongarra NSW (Figure 1). The Greenvalleys Mountain Bike Park (GVMTBP) is located within the eastern part of the study area and extends south as far as Lakeview Road but not beyond. The planning proposal seeks to:

- Enable the mountain bike facility at the site to operate on a permanent basis. It is the Mountain Bike Park in its existing form that is proposed to operate on a permanent basis – NO new bike trails or other development works are proposed. That part of the site located to the north of the Illawarra Highway does not form part of the Planning Proposal.
- Amend the *SP2 Infrastructure – Classified Road Zone* that applies to the part of the site that includes the Mountain Bike Park facility. Specifically, the intended outcome is to reduce the width of this zone with the affected land being rezoned as *RU1 Primary Production* – consistent with land to the south.
- The part of the site located to the north of the Illawarra Highway does not form part of the Planning Proposal.

The Planning Proposal also seeks to reduce the width of the SP2 Infrastructure zone that affects the Mountain Bike Park. This involves also reducing the extent of the associated underlying Road Widening Order (RWO). The proposed rezoning is from SP2 to RU1 Primary Production, which is consistent with adjacent land to the south. No new land uses are proposed in relation to this land zoning adjustment. The purpose of the zoning change is to enable the Mountain Bike Park to achieve compliance with the requirement that there should be no permanent infrastructure located within the RWO (with the

exception of overflow car parking). All other planning controls applying to the site will remain unchanged.'

Ten mountain bike tracks exist within the operational area, which each intersect a watercourse on the state 'hydroline' map (*Water Management (General) Regulation 2018 hydroline spatial data 1.0*). Seven 1st order tributaries traverse the study area, six of which converge to form three 2nd order tributaries to Macquarie Rivulet which flow northward within the study area. A fourth 2nd order watercourse exists in the far western corner of the study area, which is a tributary of Tongarra Creek. The scope of this assessment is to validate the status of the mapped watercourses as 'rivers' for the purposes of the *Water Management Act 2000* (WM Act) to determine whether they pose a constraint for the proposed permanent use of the site as a mountain bike park. Additionally, this assessment provides recommendations for impact mitigation for the proposed permanent operation of the Mountain Bike Park.

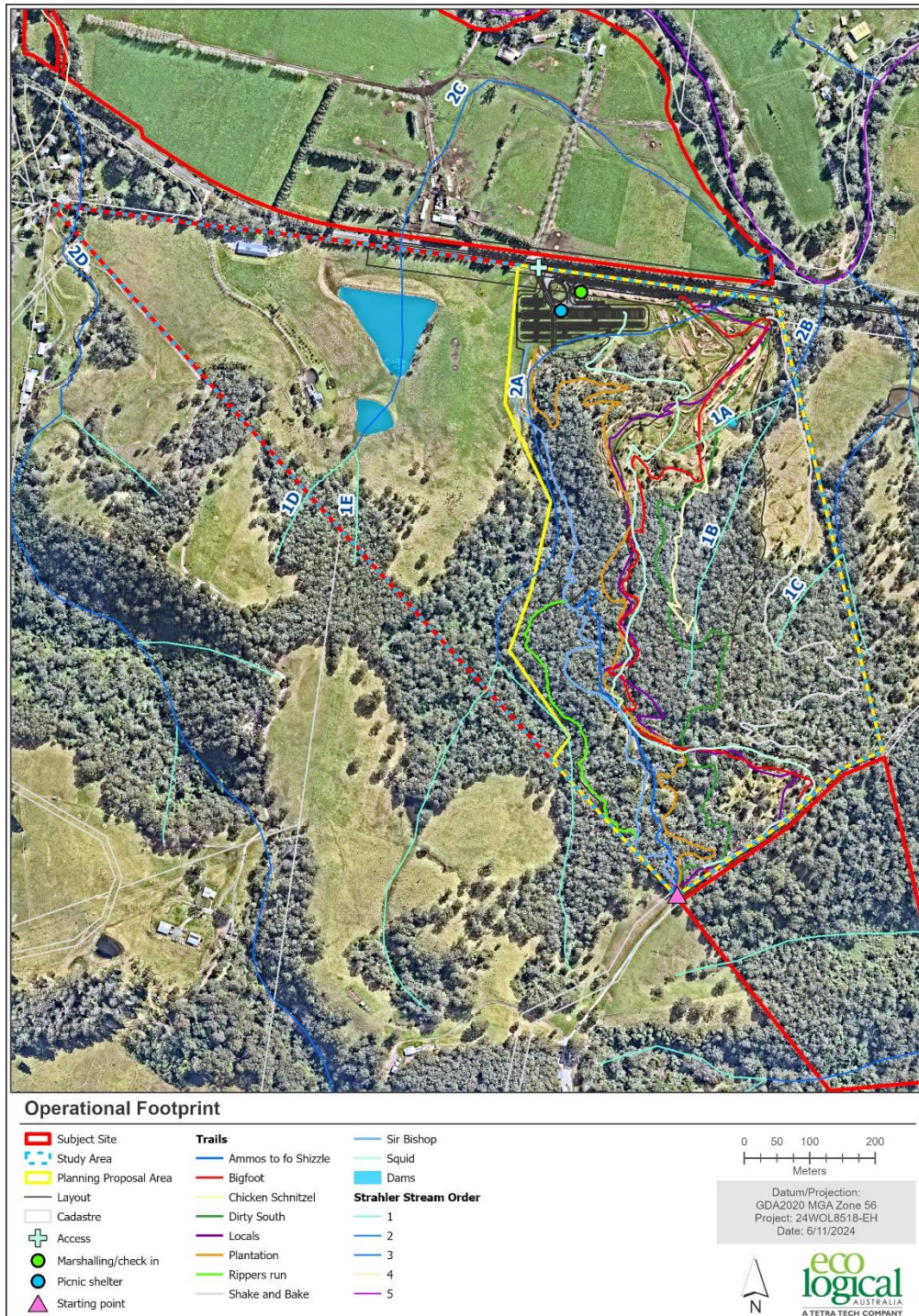


Figure 1: Operational footprint (Planning Proposal Area) of Greenvalleys Mountain Bike Park within the study area

METHODS

A field inspection of each hydroline within the operational area was undertaken by the owner of the site, Nick Haertsch of Greenvalleys Mountain Bike Park Pty Ltd in August and December of 2022. Photographs taken during the site assessment were used to determine the extent of native vegetation cover, connectivity of the riparian corridor, condition of the vegetation community, bed and bank stability, habitat diversity and aquatic habitat condition, including vegetation structure, regeneration and extent of weed infestations.

In addition, the photographs were inspected for evidence of geomorphic processes in the bed and banks to assess whether the watercourses meet the definition of a 'river' under the WM Act. Additional watercourses within the study area, outside of the operational area, were assumed to meet the definition of a river via desktop-only assessment (examination of high-resolution aerial imagery), as no photographs of these watercourses have been provided.

Under the WM Act, 'waterfront land' includes all land within 40 m of a mapped 'river' when measured from the top of bank, and the riparian corridor is comprised of a vegetated riparian zone (VRZ) plus the channel width (DPE 2022). Where a watercourse was defined as a river, the appropriate riparian buffers were applied in accordance with the NSW DCCEEW *Guidelines for Controlled Activities on Waterfront Land* (DPE 2022) (DCCEEW riparian guidelines) (DPE 2022), where the width of the riparian corridor is determined by the Strahler method of stream ordering (Table 1).

Any works proposed on waterfront land would require field-validation of each hydroline and delineation of the top of bank.

Table 1: Recommended riparian corridor widths (DPE 2022)

| Watercourse type | VRZ width (each side of watercourse) | Total riparian corridor width |
|---|--------------------------------------|-------------------------------|
| 1 st order | 10 m | 20 m + channel width |
| 2 nd order | 20 m | 40 m + channel width |
| 3 rd order | 30 m | 60 m + channel width |
| 4 th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters) | 40 m | 80 m + channel width |

RESULTS

Photographs suggest the five reaches within the operational area of the existing Mountain Bike Park (reach 2A, 2B, 1A, 1B and 1C) exhibit features characteristic of a 'river' for the purposes of the WM Act (Figure 2: Mapped watercourses and field photograph locations; Table 2). As such, waterfront land exists within 40 m of the top of bank of these watercourses.

Reach 2C, 2D, 1D and 1E, outside of the existing operational area of the Mountain Bike Park, were assumed to meet the definition of a 'river' under the WM Act in lieu of field observations. A defined channel was observed along reach 2D in high-resolution aerial imagery, however, such features were not as clearly defined along reach 2C, 1D and 1E.

No development works are proposed by the Planning Proposal however, if any future works are ever proposed in the future, the following would be required:

- Any works proposed on waterfront land would require field-validation of each hydroline and delineation of the top of bank.
- Assessment of any proposed works against the DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull 2013).

Portions of the existing bike tracks are situated within waterfront land and within the riparian corridor of each reach within the operational area, with affected areas indicated in Figure 3. Watercourses that are within the Study Area but that are outside the operational area of the existing Mountain Bike Park would not be impacted by the Planning Proposal (Figure 3).

The nearest Key Fish Habitat (KFH) identified by NSW DPI Fisheries is Macquarie Rivulet, is approximately 50m northeast of the operational area of the existing Mountain Bike Park. Due to the ephemeral, disconnected nature of the watercourses on site, the Planning Proposal is unlikely to impact on KFH.

The Greenvalleys Mountain Bike Park comprises a mix of heavily disturbed land with improved and native grazing pastures and less disturbed areas that continue to support remnant native forests and woodland. The site inspection photographs suggest riparian corridors are heavily impacted by weeds, particularly *Lantana camara* and *Cenchrus clandestinus*. The condition of each reach is summarised in Table 2 below.

CONTROLLED ACTIVITY APPROVAL

Works on waterfront land requires a controlled activity approval (CAA) unless exempt under Schedule 4 Part 2 of the *Water Management (General) Regulation 2018* (WM Regulations). The study area subject to the Planning Proposal is zoned RU1 and C3 under Shellharbour LEP 2013.

The part of the study area which is zoned RU1 under the Shellharbour LEP 2013 does not require a CAA, given that the construction of crossings or tracks on a minor stream within a rural zone, as defined by the WM Regulations, is exempt from the requirement to obtain CAA under Clause 23 Schedule 4 of the WM Regulations. However, the construction of crossings or tracks on a minor stream within a C3 Environmental Management Zone, would require a CAA for the physical works, including the implementation of mitigation measures.

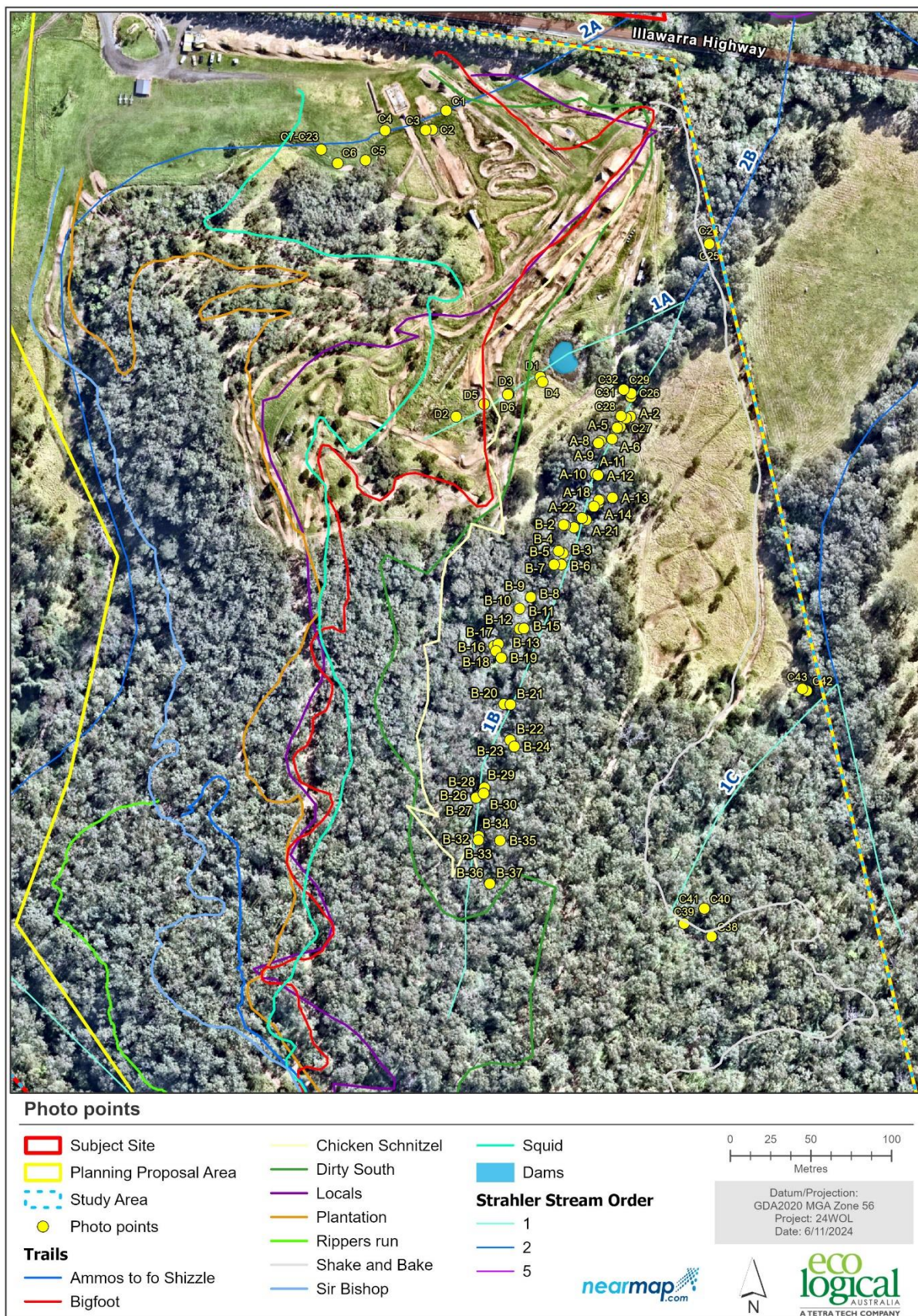


Figure 2: Mapped watercourses and field photograph locations

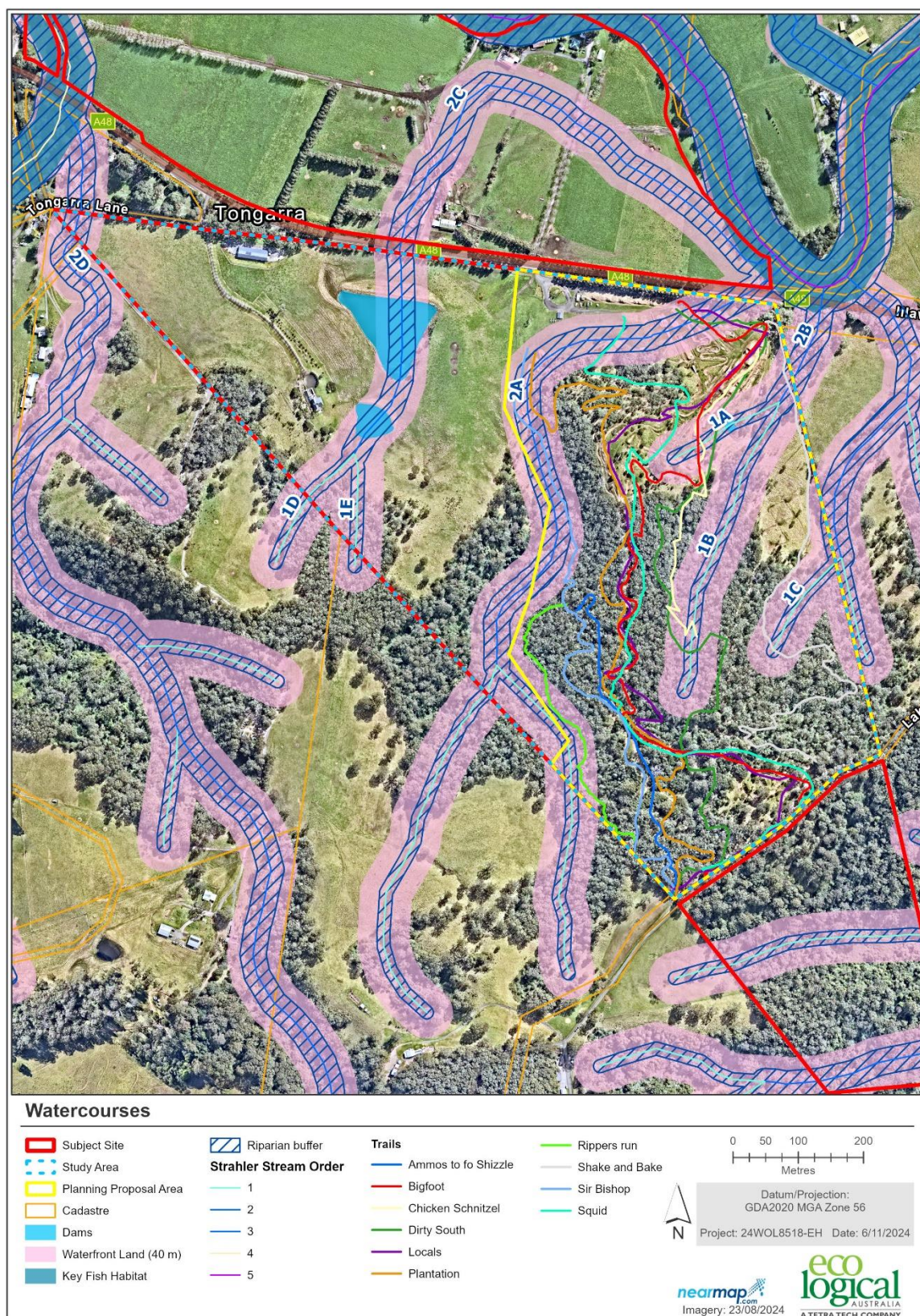

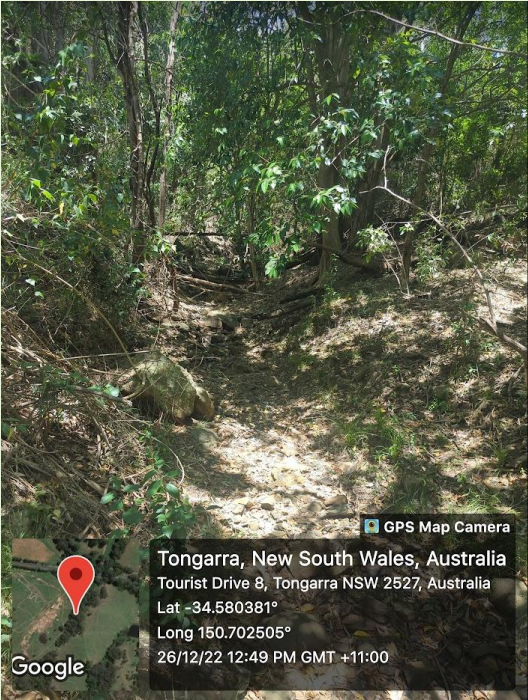





Figure 3: Validated watercourses within Greenvalleys Mountain Bike Park

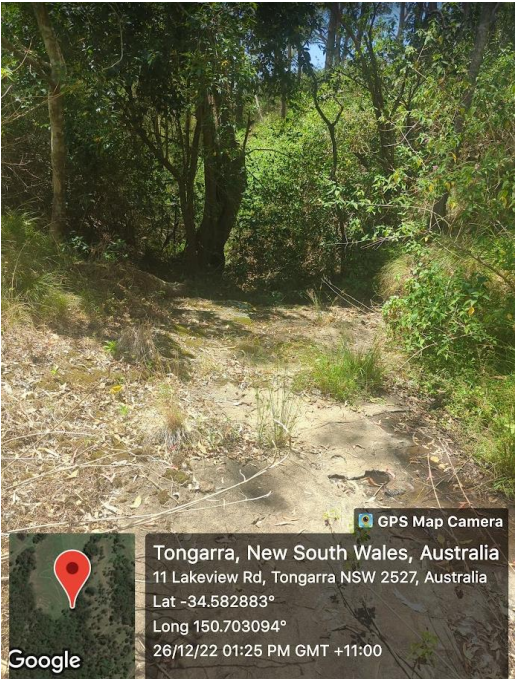

Table 2: Reach descriptions

| Reach name | Strahler stream order ('Hydroline' desktop mapping only) | Likely WM Act 'river' status (desktop validated) | Typical features | Representative photos |
|------------|--|--|---|---|
| 2A | 2 nd | River | <p>Ephemeral channel with clearly defined bed and banks in the upper reach of the watercourse. Channel contains cobbles, likely deposited during high-flow events.</p> <p>The lower reach has been previously cleared of vegetation and overgrown with <i>Cenchrus clandestinus</i> (Kikuyu). However, the steep banks and channel are still defined – see photo 2.</p> |  |

| Reach name | Strahler stream order ('Hydroline' desktop mapping only) | Likely WM Act 'river' status (desktop validated) | Typical features | Representative photos |
|------------|--|--|--|--|
| 2B | 2 nd | River | Ephemeral channel with defined bed and banks. Banks appear to be heavily eroded. Deposited cobbles were present in the channel, indicating this reach experiences intermittent high flow events. |  <p>GPS Map Camera Tongarra, New South Wales, Australia Tourist Drive 8, Tongarra NSW 2527, Australia Lat -34.580381° Long 150.702505° 26/12/22 12:49 PM GMT +11:00</p> |

| Reach name | Strahler stream order ('Hydroline' desktop mapping only) | Likely WM Act 'river' status (desktop validated) | Typical features | Representative photos |
|------------|--|--|---|---|
| 1A | 1 st | River | In the absence of a clearly defined channel or bed, a gullied drainage line coupled with a change in vegetation is suggestive of the presence of an ephemeral 'river'. An area of lush green grass upstream of the dam (photo 2) suggests an overland flow path provides water to the dam consistently. |  |

| Reach name | Strahler stream order ('Hydroline' desktop mapping only) | Likely WM Act 'river' status (desktop validated) | Typical features | Representative photos | |
|------------|--|--|--|--|--|
| 1B | 1 st | River | Defined bed and banks present, with a bedrock-lined channel with cobbles, indicative of high flow events. Water was present in the channel at the time of site inspection. |  |  |

| Reach name | Strahler stream order ('Hydroline' desktop mapping only) | Likely WM Act 'river' status (desktop validated) | Typical features | Representative photos |
|------------|--|--|--|--|
| 1C | 1 st | River | Ephemeral, defined channel with water present at the time of survey. Bare bedrock channel indicates that the substrate likely gets eroded away during high-flow events. Steep banks are present on either side of the channel. |  <div data-bbox="1270 954 1404 1110">  </div> <div data-bbox="1404 933 1783 1110"> <p>GPS Map Camera</p> <p>Tongarra, New South Wales, Australia</p> <p>11 Lakeview Rd, Tongarra NSW 2527, Australia</p> <p>Lat -34.582883°</p> <p>Long 150.703094°</p> <p>26/12/22 01:25 PM GMT +11:00</p> </div> |

CONCLUSION

The five mapped watercourses within the operational area of the existing mountain bike park (i.e. the Planning Proposal area) exhibit features characteristic of a 'river' for the purposes of the Water Management Act 2000. Therefore, waterfront land exists within 40m of the top bank of these watercourses. Portions of the existing bike tracks are situated within waterfront land and within the riparian corridor of each watercourse that is mapped within the Planning Proposal area.

Measures have been identified to mitigate the proposed permanent use of the existing mountain bike park on watercourses and these include: constructing bridges over bike track creek crossings, installing turn out banks along bike tracks and installing rock armouring along creek banks at approach and exit points of bike track creek crossings.

The part of the study area which is zoned RU1 under the Shellharbour LEP 2013 does not require a CAA, given that the construction of crossings or tracks on a minor stream within a rural zone, as defined by the WM Regulations, is exempt from the requirement to obtain CAA under Clause 23 Schedule 4 of the WM Regulations. However, the construction of crossings or tracks on a minor stream within a C3 Environmental Management Zone, would require a CAA for the physical works, including the implementation of mitigation measures. Watercourses that are within the Study Area but that are outside the operational area of the existing Mountain Bike Park, will not be affected by the Planning Proposal.

Due to the ephemeral, disconnected nature of the identified watercourses within the Planning Proposal area, the Planning Proposal is unlikely to impact on Key Fish Habitat. No development works are proposed by the Planning Proposal however, IF any future works are ever proposed in the future, the following would be required:

- Any works proposed on waterfront land would require field-validation of each hydroline and delineation of the top of bank.
- Assessment of any proposed works against the DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull 2013).

RECOMMENDATIONS

Measures recommended to mitigate potential impacts of Planning Proposal on watercourses include:

- Construct bridges over bike track creek crossings where possible to prevent mechanical erosion of banks and sedimentation of water.
- Design of crossings should be guided by Fairfull and Witheridge (2003) to allow for the free passage of fish.
- Install turn out banks along the bike tracks to redirect water flowing from the tracks to prevent deposition of eroded soil into the watercourses. See Erosion and Sediment Control Plan (SEEC 2024) for further design considerations.
- Install rock armouring within the creek banks at the approach and exit points of the bike track creek crossings.
- Schedule track maintenance or upgrade works in dry periods with little to no rainfall.

Regards,

A handwritten signature in black ink, appearing to read 'Lily Tonks', with a stylized, cursive script.

Lily Tonks
Aquatic Ecologist

REFERENCES

Department of Planning and Environment—Water (DPE) 2022. *Guidelines for controlled activities on waterfront land – Riparian corridors*. Available online: <https://www.dpie.nsw.gov.au/water/our-work/licensing-and-trade/controlled-activity-approvals/guidelines>

Fairfull and Witheridge 2003. 'Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings'. DPI Fisheries

Fairfull, S. 2013. *Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (2013 update)*. Available online: http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/634694/Policy-and-guidelines-for-fish-habitat.pdf

SEEC 2024. *Greenvalleys Mountain Bike Park Erosion & Sediment Control Plan*. Prepared for Greenvalleys Mountain Bike Park Pty Ltd. Final issue, 24 Sep 2024