



Longwood Water Race Natural and artificial water race segments' assessment

26 September 2023

Report Prepared for

Greater Wellington Regional Council

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LONGWOOD WATER RACE NATURAL AND ARTIFICIAL WATER RACE SEGMENTS' ASSESSMENT

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EXECUTIVE SUMMARY

The Longwood Water Race is located in South Wairarapa District, and sources water from the Tauherenikau River. It was established approximately 100 years ago, to provide drinking water for livestock.

Currently, it is unclear what kind of watercourse water races are under the definitions in Greater Wellington Regional Council's (GWRC) natural resources plan (NRP). Watercourse definition has implications for which rules are applicable, including stock exclusion and watercourse clearance and maintenance (i.e., in the bed of a watercourse).

The purpose of this investigation was to classify the various sections¹ of the Longwood Water Race network against the Resource Management Act (RMA) and GWRC's NRP classifications for watercourses (i.e., whether an individual Longwood Race section is "water race that is or used to be stream" or "artificial water race"). To assess whether a section of a water race is or was a stream or artificial we developed assessment criteria based on the definitions of "River" in the RMA and those set out in a GWRC guidance document. The assessment comprised a desktop component that drafted a classification of all sections of the water race, and a field verification component.

The combined findings of the desktop and field assessments with regard to the status of the water race sections (artificial or sections that are or used to be streams) are depicted in Figure A. Some key findings were:

- The water race sections from the intake until the first contact with the stream flowing on the western side of the water race (including the overflow watercourses) do not intercept any natural sources of water and are unlikely to have conveyed water in the absence of the water race intake. They should be considered artificial.
- The water race intercepts a natural stream downstream of the flow gauging site. The water race section from the point of first contact between the water race and the stream, until they merge is considered an artificial water race that potentially contains water from a natural stream. From the confluence of the water race and the stream, until the split by the quarry, the water race flows in the modified channel of the stream, and should be considered a water race that is or used to be a stream.
- The true right watercourse at the split by the quarry is running parallel to, but higher than, the true left watercourse. It also potentially conveys water from the stream that merged with the water race. Consequently, that section and all the sections it supplies with water, until the ends of the water race, should be considered artificial water races that potentially convey water from a natural stream.
- The true left watercourse at the split by the quarry has a natural form and partly conveys water from a natural stream. It should be considered a water race that is or used to be a stream, until it reaches the Tauherenikau River.
- Straightened sections of the water race that receive water from the true left watercourse downstream of the split by the quarry, until the ends of the water race, should be considered artificial water races that potentially convey water from a natural stream.
- The water race reaching SH2 does not have River characteristics and is included in the group of artificial water races that potentially convey water from a natural stream. Downstream of SH2, however, it flows in a naturally formed channel, which could potentially be an old streambed, and should be considered a water race that is or used to be a stream, until it reaches the Tauherenikau River.

¹ A section of the water race network is defined as a watercourse flowing between two network nodes (i.e., points where a watercourse splits or two or more watercourses merge).

Longwood Water Race

Artificial Water Race

Water Race that is or used to be a stream

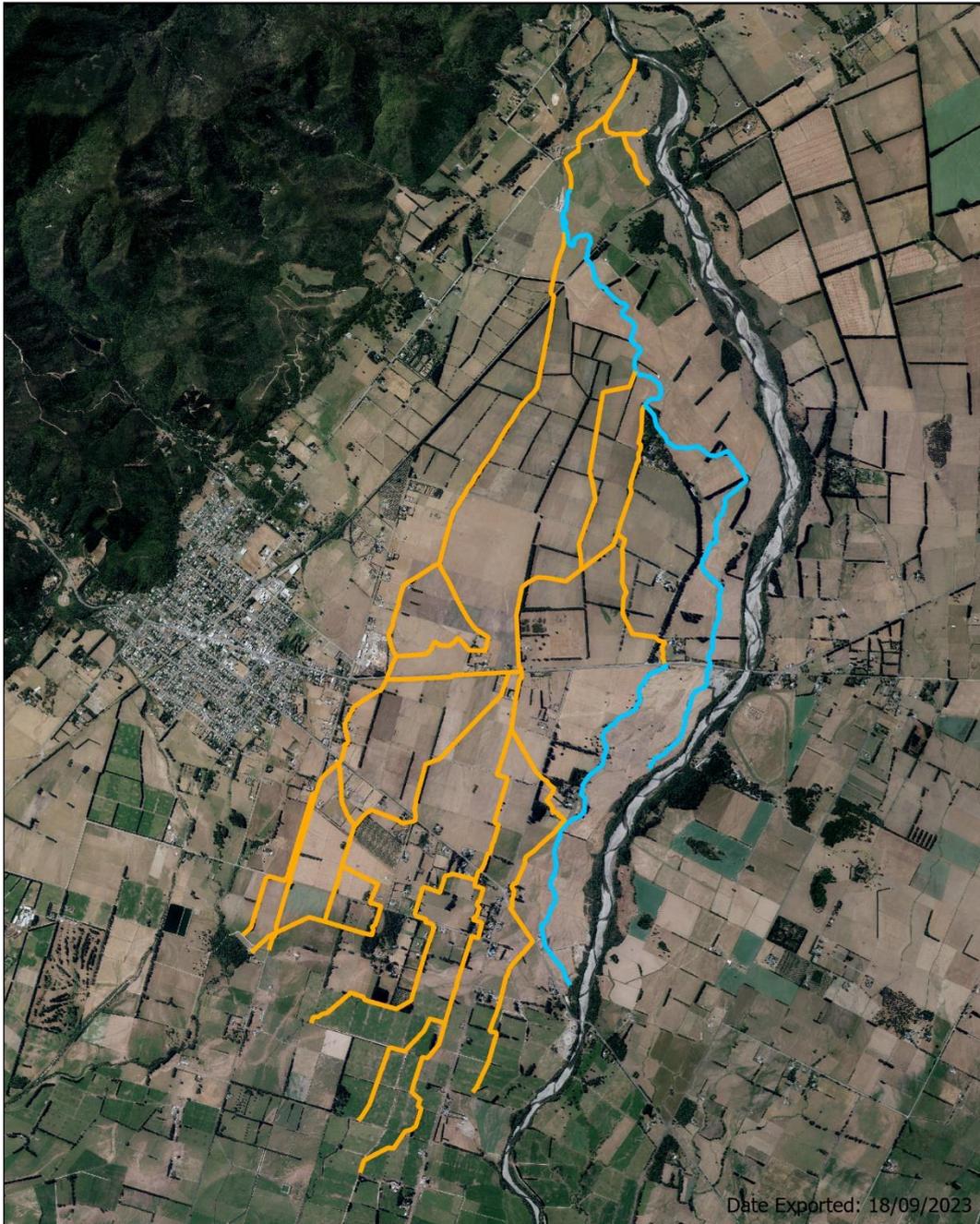


Figure A: Classification of sections of the Longwood Water Race as water races that are or used to be streams (marked with blue), or artificial water races (marked with yellow) after the desktop and field assessments that took place in 2022.

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1 Introduction

1.1 Context

A water race is a constructed (i.e., artificial) water channel designed to convey water from a natural stream/river to be used for stock water and domestic supply purposes. Multiple connected water races (i.e., a water race with multiple branches) conveying water from a natural source is referred to as a water race network. The primary function of water race networks is to provide water for domestic needs and livestock. The overall allocation of water from a water race network is managed through a consenting process. Water race networks can also provide an important stormwater management service, helping to manage the flood risk to low lying areas. Moreover, they can support thriving and valuable instream biological communities. Across the Wellington Region water races have been found to support native populations of longfin eels, giant kokopu and brown mudfish, which are all nationally threatened.

The South Wairarapa District Council (SWDC) provides and manages two water race networks, the Longwood Water Race network near Featherston and the Moroa Water Race network near Greytown. The Longwood Race was established approximately 100 years ago to provide livestock with drinking water. It takes approximately 250 litres of water a second from the upper reaches of the Tauherenikau River and services over 1,500 ha of nearby farmland. The Longwood Water Race network has a total length of over 40 km (Water Race Users Group, Code of Practice – Moroa and Longwood Water Races, 2017).

Over the last decade water race networks have come under increased scrutiny regarding whether they contain sections of ‘rivers’ that are not actually ‘artificial’ watercourses under section 13 of the Resource Management Act (RMA). Watercourse delineation is important as it has implications for how the water contained in the race can be used (i.e., allocation and minimum flow) and the activities that can occur in the water race (i.e., activities in the bed of a stream) under the provisions of the RMA. While water races have generally been considered ‘artificial’ water courses, sections of water races may join and/or follow natural stream channels, while others may receive inputs from natural streams. In these two cases, the water race may be considered a ‘River’ under the RMA. Delineating water race networks that contain sections of ‘Rivers’ can be a difficult undertaking, especially in water races that have existed for a long period of time such as the Longwood Race.

1.2 Aim & Scope

The purpose of this investigation was to classify the various sections¹ of the Longwood Water Race network against the RMA and Greater Wellington Regional Council’s (GWRC) Natural Resources Plan (NRP) classifications for watercourses as water races that are or used to be streams, and as artificial water races. No such classification exercise has been previously undertaken for the water races in SWDC.

Mapping of the Longwood Water Race took place in September 2022 (desktop assessment) and November 2022 (field assessment), to distinguish “artificial” sections of the water race from ‘river’ sections, i.e., sections that are or used to be streams. The purpose of the field assessment was to ground-truth the results of the initial desktop assessment.

¹ A section of the water race network is defined as a watercourse flowing between two network nodes (i.e., points where a watercourse splits or two or more watercourses merge).

2 Watercourse determination

In 2020 GWRC had guidance developed by Aquanet Consulting Ltd for determining whether a watercourse is a river, a highly modified river or stream, an ephemeral watercourse or an artificial watercourse, as each of these classifications are subject to different rules under the NRP (Greer, 2021).

The following definitions from the RMA and GWRC's NRP need to be considered when classifying watercourses:

RMA

- **river** means a permanently or intermittently flowing body of fresh water, which is subject to RMA section 13, and includes streams and modified watercourses, but does not include artificial watercourses (e.g., irrigation canals, water supply races, canals for the supply of water for electricity power generation, and farm drainage canals).

Natural Resources Plan

- **highly modified river or stream** means a river or stream that has been modified and channelled for the purpose of land drainage of surface or sub-surface water and has the following characteristics:
 - It has been channelled into a single flow.
 - The channel has been straightened.
 - The channel is mechanically formed with straight or steeply angled banks.And
 - It exhibits these characteristics for at least its entire length through the property in which the activity is being carried out.
 - It is not managed as part of a stormwater network and is not a water race.
- **ephemeral flow path** means a river that:
 - has a bed that is predominantly vegetated.
 - only conveys or temporarily retains water during or immediately following heavy rainfall events.
 - does not convey or retain water at other times.

The classification process, then, needs to consider whether:

- the watercourse is a flowing body of freshwater under the RMA.
- the watercourse has a "natural" or "constructed/modified" form:
- flow permanence in the watercourse is ephemeral or permanent/intermittent.
- the watercourse has a natural or artificial source of flow, i.e., whether the watercourse
 - has a natural form (which is a reliable indicator of natural source of flow).
 - has a modified form in the place of a pre-existing water body (e.g., river, lake, wetland).
 - receives its water via a constructed system, and would otherwise not be a watercourse.

These definitions and this process set the criteria that we addressed in order to classify the sections of the Longwood Water Race as 'water races that are or used to be streams' or 'artificial water races'.

3 Water Race assessment criteria

To classify a section of the Longwood Water Race as a 'water race that is or used to be a stream' or 'artificial water race' under the RMA and NRP we undertook an initial desktop assessment and subsequent field investigation.

The desktop component assessed:

- whether the watercourse has a natural source of flow; this was done through the use of aerial photographs to determine whether:
 - o the watercourse intercepts or merges with natural freshwater bodies, or
 - o the watercourse intercepts known groundwater sources, such as springs (determined through discussion with GWRC).
- whether the watercourse has a natural or constructed/modified form, i.e.:
 - o whether the watercourse has been channelled into a single flow.
 - o whether the watercourse has been straightened, lacking any meandering/sinuuous natural form that would be expected in a stream or river.

The field component assessed whether the watercourse:

- is a flowing body of freshwater under the RMA.
- has a natural source of flow, e.g.:
 - o whether the watercourse intercepts or merges with natural watercourses, or
 - o whether the watercourse intercepts other freshwater bodies, e.g., lakes, wetlands, or groundwater sources, such as springs.
- has a natural or constructed/modified form, i.e.:
 - o whether the watercourse has been channelled into a single flow.
 - o whether the watercourse has been straightened, lacking any meandering/sinuuous natural form that would be expected in a stream or river.
 - o whether the channel is mechanically formed with straight or steeply angled banks.
- has permanent/intermittent or ephemeral flow, as indicated by:
 - o the level of vegetation covering its bed,
 - o the retention/conveyance of water at the time of assessment.

The two assessments lead to the classification of the water race sections as:

- water races that are or used to be streams, or
- artificial water races, which were further distinguished into:
 - o artificial water races potentially conveying water from a natural stream, or
 - o artificial water races with no natural inputs.

4 Water Race assessment

4.1 Desktop assessment

The desktop assessment was undertaken on the 1 September 2022 by Traverse Environmental (formerly Aquanet Consulting) and GWRC staff. The classification of the various sections of the Longwood Water Race is presented in Figure 1. Water race sections that required further assessment to identify the type of watercourse were also identified.

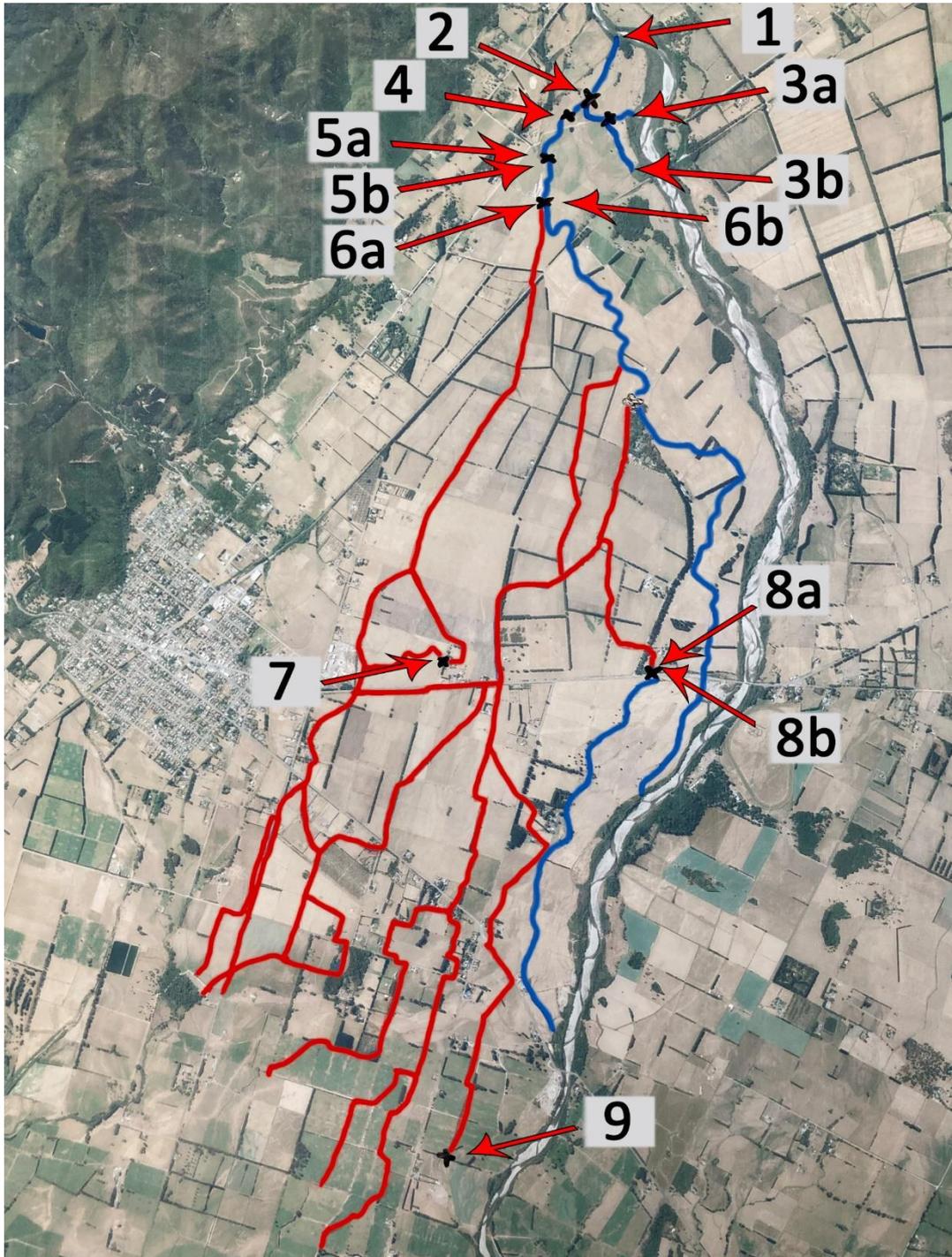


Figure 1: Classification of sections of the Longwood Water Race as water races that are or used to be streams (marked with blue) or artificial water races (marked with red) through the desktop assessment. Sites that required field assessment are numbered and marked with a black cross.

4.2 Field assessment

The field assessment survey was undertaken on 29 November 2022, by Traverse Environmental staff, GWRC and Wellington Water Ltd., who are managing the water race on behalf of SWDC. Table 1 lists the sites that were selected during the desktop assessment to be verified on-site.

Table 1: Sites along the Longwood Water Race that were assessed on the ground.

Site #	Description	Latitude (NZTM)	Longitude (NZTM)
1	Intake from the Tauherenikau River on its true right bank	5450142.398	1798487.606
2	Overflow split, returning surplus of water back to the river	5449725.094	1798284.098
3	a. Overflowing water reach split – northern branch	5449549.661	1798459.865
	b. Overflowing water reach split – southern branch	5449484.387	1798408.588
4	Water race flow gauging site	5449679.329	1798241.757
5	a. Water race and stream first contact	5449294.106	1797958.810
	b. Water race and stream confluence	5449154.322	1797992.160
6	a. Quarry split – true right watercourse	5448906.215	1797922.637
	b. Quarry split – true left watercourse	5448921.685	1797932.629
7	Loop watercourse	5445537.321	1797200.414
8	a. Water race crossing SH2 – upstream	5445452.375	1798707.736
	b. Water race crossing SH2 – downstream	5445415.289	1798720.966
9	End of water race	5442073.808	1797204.494

4.2.1 Site 1 – Intake from the Tauherenikau River on the True Right Bank (TRB)

This was not originally a field assessment site, but it informs the assessment of sites 2, 3 and 4 (Table 1 and Figure 2). The intake that diverts water from the Tauherenikau River towards the Longwood Water Race is an entirely artificial structure. Consequently, the field assessment rejected the desktop assessment, and the water race section between sites 1 and 2 on Table 1 should be considered **artificial water race**.

4.2.2 Site 2 – Overflow split, returning surplus of water back to the river

The section that brings the water from the intake to the water race is a reasonably straight watercourse. The overflow split is a concrete structure, which directs water, up to a maximum flow, to the water race, and any exceeding amounts back to Tauherenikau River through another channel (Figure 3a). The substrate upstream from the overflow split was classified as soft bottom² (Figure 3b). There were no signs of naturally incoming freshwater other than the amount diverted from Tauherenikau River; consequently, the field assessment rejected the desktop assessment, and the section on which Site 2 is located should be considered **artificial water race**.

² A soft-bottomed stream is one where the substrate is dominated by particles smaller than gravel size (i.e., >50% of the bed is made up of sand/silt). A hard-bottomed stream is one where the substrate is dominated by particles of gravel size or greater (i.e., <50% of the bed is made up of sand/silt).



Figure 2: Site 1 – Intake from the Tauherenikau River, conveying water to the Longwood Water Race, November 2022

a.



b.

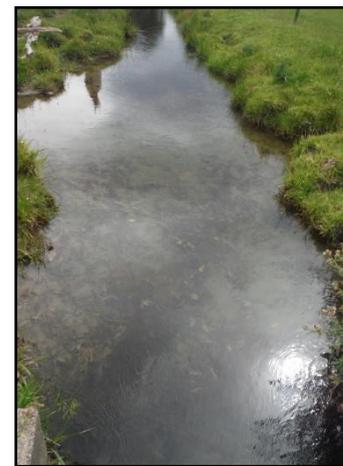


Figure 3: Site 2 – Longwood Water Race a) the overflow split, returning surplus of water back to the river, and b) upstream from the overflow split, November 2022.

4.2.3 Site 3 – Overflowing water reach split.

Downstream of the split, overflowing water flows around a sharp curve and splits into two smaller channels (tributaries), the northern (a) and the southern (b). Upstream of the split the channel is surrounded by pasture, generally functions as a drain and is classified by tall grass and has shrubs on its banks and a hard-bottom bed (Figure 4a). Nevertheless, as it conveys water from an artificial section of the water race, the field assessment rejected the desktop assessment, and the section from the overflow split until the split should be considered **artificial water race**.

a. Northern tributary

The northern tributary has a similar bed to the upstream overflow channel (Figure 4b). It is channelised, surrounded by pasture and generally functioning as a drain. Its banks are vegetated with tall grass and shrubs, while the bed is hard bottomed. About 200 m downstream, after an abrupt turn the watercourse enters densely vegetated bush and becomes much wider, shallower and has soft bed (Figure 4c). The channel terminates in a wetland area that is located on the TRB of the Tauherenikau River. The field assessment of the overall characteristics of this section rejected the desktop assessment, and thus this section should be considered **artificial water race**.

b. Southern tributary

Water flowing into the southern tributary continues in a similar environment only for a few metres (Figure 4d), before crossing Underhill Road through a piped culvert. Where the water is discharged, a shallow pond is formed (Figure 4e). Water is discharged from the pond into a very narrow channel (<0.5 m wide), and eventually flows into the south end of the wetland area where water from the northern tributary flows as well. While this channel does not appear to have been dug, as it is characterized by very small and shallow meandering, the watercourse bed is partially vegetated (an indication of only ephemeral flows) and the channel appears to only convey water because it is overflowing from the pond (i.e., the water is following the path of least resistance, while without the water race input, the channel would be dry). Consequently, the field assessment rejected the desktop assessment, and the southern tributary is also **artificial water race**.

4.2.4 Site 4 – Water race flow gauging site

The water that passes the overflow split into the water race flows through the flow gauging site (Figure 5a & b). The channel is weakly sinuous, and its substrate comprises a mixture of small-sized particles, mostly ranging between sand and small cobbles (Figure 5c). The channel banks are vegetated mostly by grasses and small shrubs, but upstream from the site both banks are low, while downstream the True Left Bank (TLB) suddenly increases in height. The absence of any obvious incoming freshwater and the small distance from the overflow split (Site 2) led the field assessment to reject the desktop assessment and classify this section also **artificial water race**.

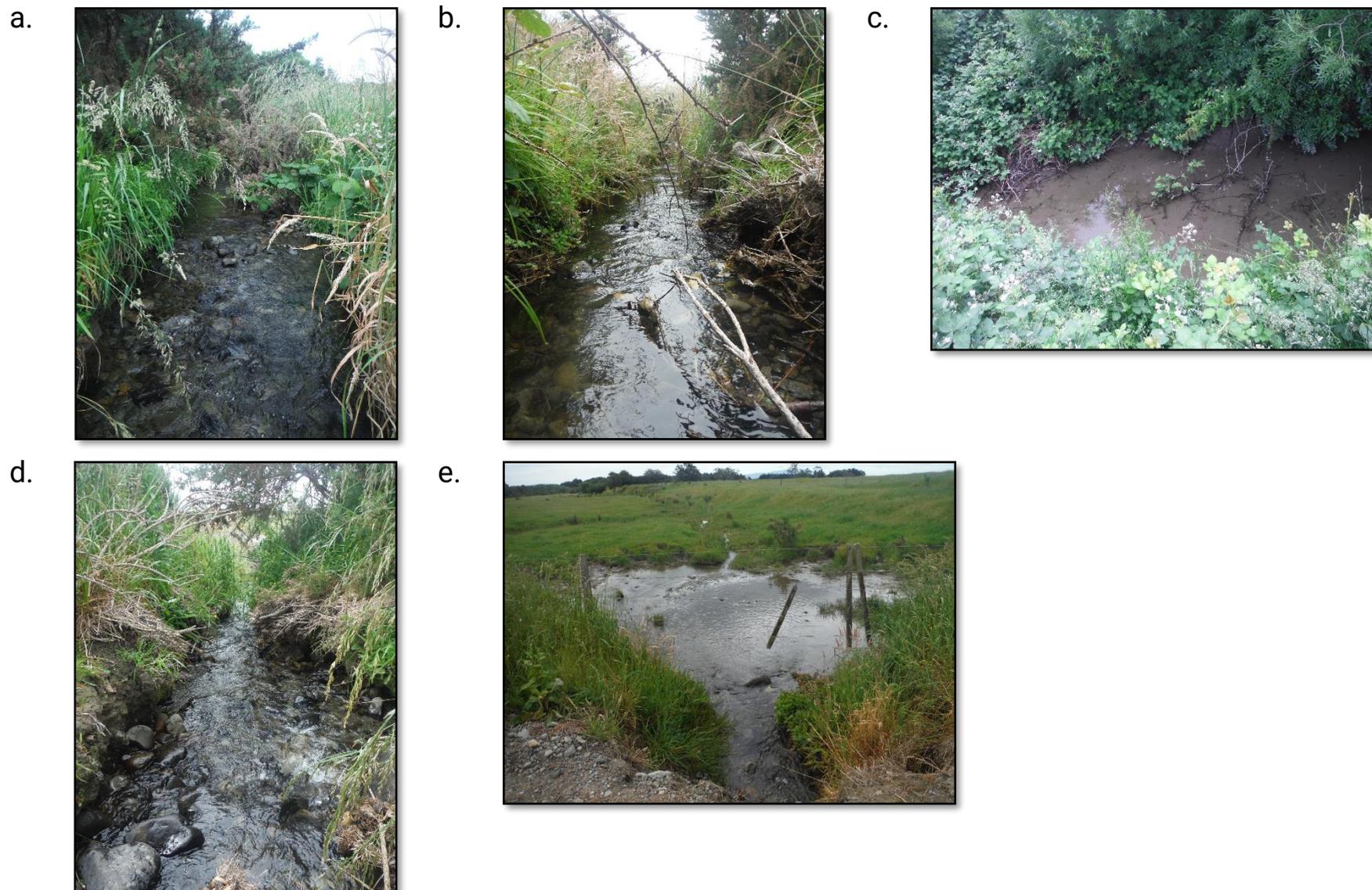


Figure 4: Site 3 – Longwood Water Race overflowing water reach split, a) upstream from the split, b) northern tributary hard-bottom reach, c) northern tributary soft-bottom reach, d) southern tributary hard-bottom reach, e) southern tributary puddle and soft-bottom reach, November 2022.

a.



b.



c.



Figure 5: Site 4 – Longwood Water Race flow gauging site a) upstream, b) downstream, c) streambed, November 2022.

4.2.5 Site 5 – Water Race and Stream confluence

Downstream of the flow gauging site (Site 4), the water race crosses Underhill Road. A natural stream (i.e., a river under the RMA) flows on the western side of the water race (Figure 6a & b), crosses Underhill Road via a culvert, and eventually flows on the paddock, approximately parallel to the water race (Figure 6c). While the stream has a natural, hard bottom channel upstream and downstream of Underhill Road, when it reaches the paddock, it flows in a very narrow, shallow, vegetated channel, with the water often spreading on the ground, like in an ephemeral stream. However, as the field assessment took place during a relatively dry period, the stream should not be considered ephemeral. The water race and the stream then come in contact at two points (5a and 5b, within a distance of less than 150 m):

a. Water race and stream first contact

At the first point, the soil separating the two watercourses had been removed or given way at the time of the field assessment, opening a section smaller than a metre, through which some of the water from the stream was entering the water race (Figure 6d). Consequently, the field assessment adapted the desktop assessment, and the water race from Site 5a to Site 5b should be considered an **artificial water race, potentially conveying water from a natural stream**.

b. Water race and stream confluence

At the second point, the two watercourses merge completely, with the watercourse bed being largely covered by submerged macrophytes (Figure 6e). While the stream flows into the water race channel, it can be assumed that in reality, the water race is flowing through the stream channel, which might have been modified in the past to serve the water race's purpose, as there is no alternative channel for the stream to flow through in the absence of the water race. Consequently, the field assessment confirmed the desktop assessment, and the water race from Site 5b to Site 6 (see section 3.2.6) should be considered a **water race that is or used to be a stream**.

4.2.6 Site 6 – Quarry split

About 250 m downstream from Site 5, there is a split of the watercourse, by the quarry located on the TRB of the race (Figure 7a). At the splitting point, the substrate of the watercourse is largely covered by macrophytes. Both resulting watercourses continue flowing downstream in parallel for about 250 m.

a. True Right Watercourse (TRW)

The TRW sits at a slightly higher elevation than the true left watercourse (TLW), by approximately a metre (Figure 7b). Additionally, there is a backwash area next to the main water race channel, in line and behind the TRW, which has accumulated large amounts of sediment. The TRW conveys a much smaller amount of water than the TLW, through a narrower channel (Figure 7c), and at a lower gradient, towards long and straight stretches of the water race network (Figure 1). As this section is located downstream from sites 5a and 5b, it also partly conveys naturally sourced water. Consequently, the field assessment adapted the desktop assessment, and the TRW should be considered an **artificial water race, potentially conveying water from a natural stream**.

b. True Left Watercourse (TLW)

The TLW conveys the bulk of the water flow through a hard-bottomed, wider, deeper and steeper channel (Figure 7d), towards a natural-looking, strongly meandering section of the water race, which follows the general direction of the Tauherenikau River (Figure 1). This watercourse is the natural continuation of the water race section from Site 5b to Site 6. As it also partly conveys naturally sourced water and has a natural form, the field assessment confirmed the desktop assessment, and thus, the TLW is considered a **water race that is or used to be a stream**.

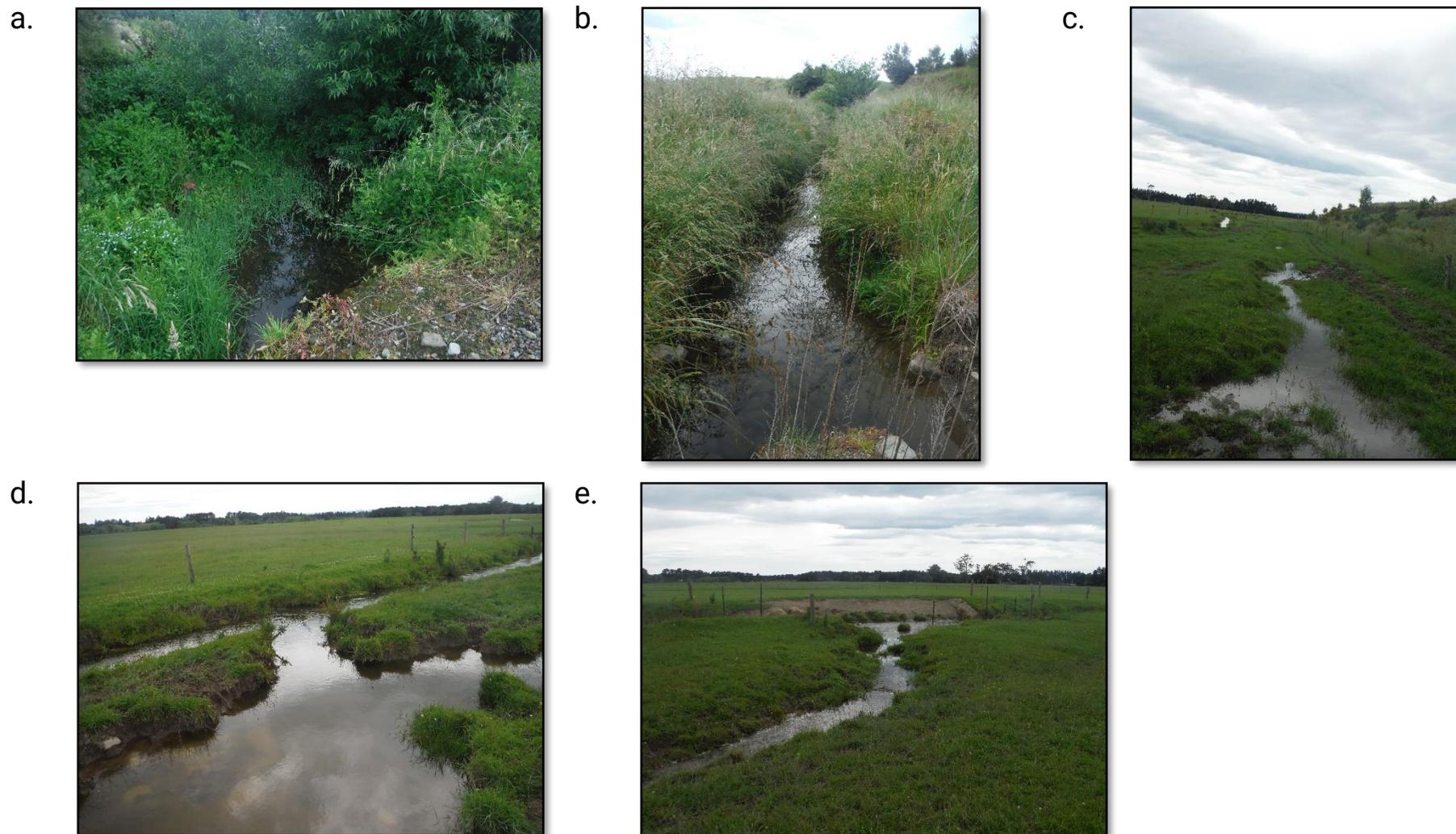


Figure 6: Site 5 – Longwood Water Race and stream confluence. a) Stream upstream from Underhill Road, b) Stream downstream from Underhill Road, c) water race and stream parallel reaches, d) first contact site of stream and water race, e) stream confluence with water race, November 2022.



Figure 7: Site 6 – Longwood Water Race split by the quarry, a) upstream from the split, b) the two parallel reaches downstream from the split, c) the True Right Watercourse, d) the True Left Watercourse, November 2022.

4.2.7 Site 7 – Loop watercourse

At the lower half of the water race, on its western side, there is a looped watercourse. Although this mostly comprises straight reaches, also includes a more sinuous reach (Figure 1), and ground-truthing was deemed necessary to determine whether the reason was the pre-existence of a stream at the site. Upon inspection, a very shallow watercourse was observed, with obviously excavated material forming both banks, which were clearly elevated compared to the surrounding flat environment, with a large amount of sediment on the streambed (Figure 8). There were no indications of a natural stream; however, as this watercourse also partly conveys naturally sourced freshwater, the field assessment adapted the desktop assessment, and thus the section of the water race is an **artificial water race, potentially conveying water from a natural stream**.



Figure 8: Site 7 – Longwood Water Race loop-watercourse, November 2022.

4.2.8 Site 8 – Water Race crossing SH2

At the same length of the water race network as Site 7, but on its eastern side, the water race crosses SH2 via a culvert.

a. Water Race crossing SH2 – upstream

Upstream from SH2, water is conveyed via a series of, to a great extent, straightened channels (Figure 1). The section of the water race immediately upstream from SH2 is classified by soft soil banks, only partially vegetated, and with abundant macrophytes in the channel (Figure 9a). Noting, however, that due to the presence of livestock in the vicinity of the watercourse, the macrophytes might have been found in the stream as a result of livestock trampling. This section of the water race conveys water diverted from the TLW of the quarry split, which is partly naturally sourced. Consequently, the field assessment adapted the desktop assessment, and this section should be considered an **artificial water race, potentially conveying water from a natural stream**.

b. Water Race crossing SH2 – downstream

Downstream from SH2, water flows through a short reach with heavily eroded banks (Figure 9b), and cascades to a watercourse three to four metres lower. From here, it turns to the west, flowing in a soft bottom channel with large amounts of sediment and macrophytes covering its substrate (Figure 9c), and which meanders through the plain towards its discharge into the Tauherenikau River (Figure 1 and Figure 9d). On the day of the field assessment, there was water at the eastern side of the lower watercourse, flowing towards the west, merging with the water race. However, upon inspection, it proved to be a run-off fed collection in an otherwise dry ground depression. As the form of the watercourse is natural, and the source of the water flowing through it is at least partly natural, the field assessment confirmed the desktop assessment, and the water race downstream from SH2 can be considered a **water race that is or used to be a stream**.

4.2.9 Site 9 – End of the Water Race

The watercourse at the end of the water race comprises a narrow, straight channel at the edge of a paddock (Figure 10a). Close to the end of the water race, the watercourse widens and becomes more sinuous (Figure 10b). After the end of the water race, the watercourse bends around another paddock and eventually merges with the Tauherenikau River (Figure 10c). The abrupt change from predominantly straight watercourse reaches to a curved reach that merges with the river suggests that the section at the end of the water race is also artificial. However, as the end-sections of the water race partly convey freshwater that is naturally sourced, the field assessment adapted the desktop assessment, and thus these sections should be considered **artificial water race, potentially conveying water from a natural stream**.

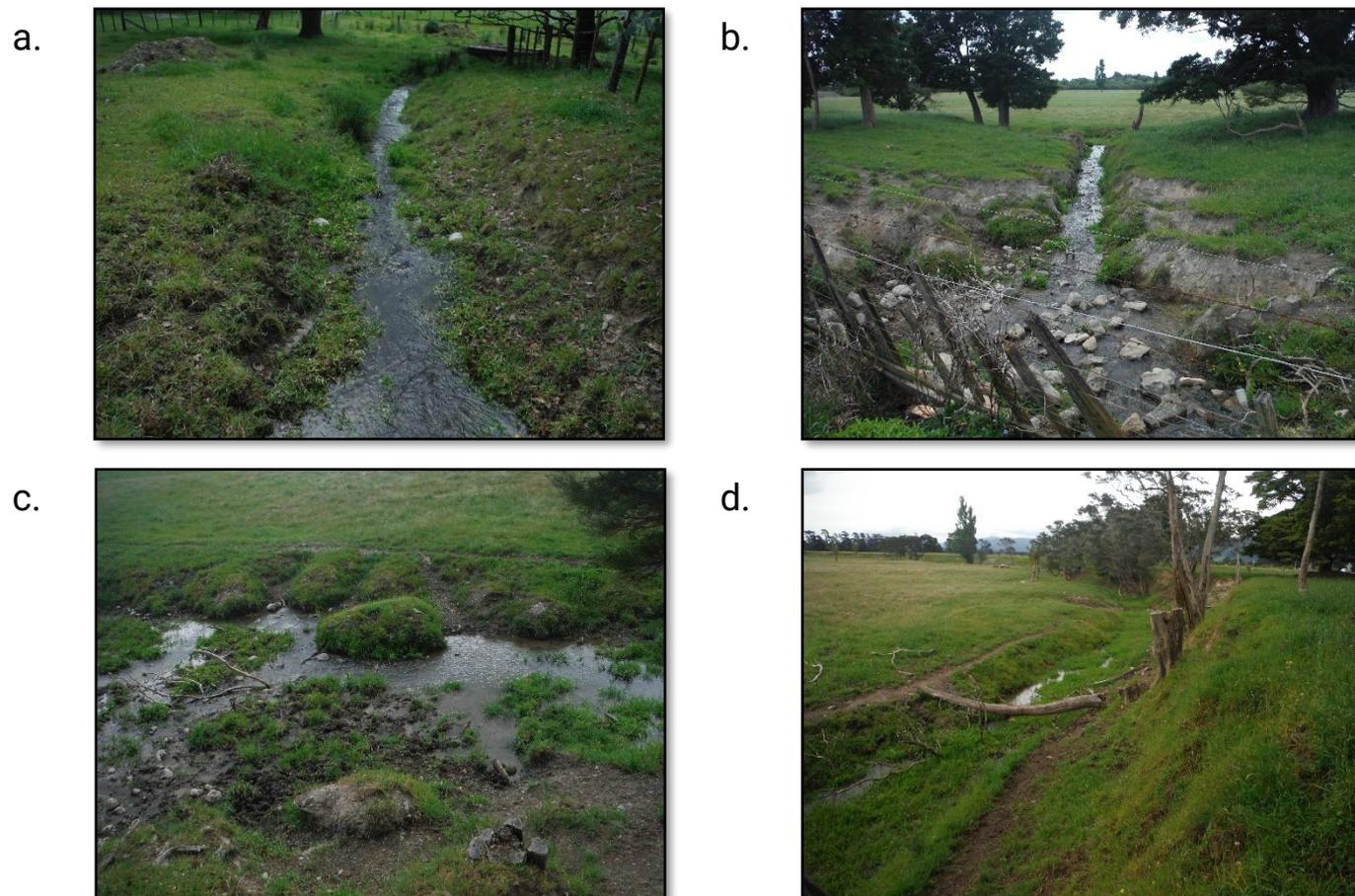


Figure 9: Site 8 – Longwood Water Race crossing SH2: a) upstream from SH2, b) downstream discharge of the culvert crossing SH2, c) receiving reach downstream from SH2, d) water race downstream from SH2, November 2022.



Figure 10: Site 9 – End of the Longwood Water Race, a) reach along the paddock, b) official end of the water race, c) continuing reach downstream from the water race, flowing back in the Tauherenikau River, November 2022.

5 Key conclusions

The combined findings of the desktop and field assessments with regard to the status of the Longwood water race sections as artificial or water races that are or used to be streams, are depicted in Table 2 and Figure 11 and Figure 12. Key findings were:

- The water race sections from the intake until the first contact with the stream flowing on the western side of the water race (including the overflow watercourses) do not intercept any natural sources of water and are unlikely to have conveyed water in the absence of the water race intake. They should be considered artificial.
- The water race intercepts a natural stream downstream of the flow gauging site. The water race section from the point of first contact between the water race and the stream, until they merge is considered an artificial watercourse that potentially contains water from a natural stream. From the confluence of the water race and the stream, until the split by the quarry, the water race flows in the modified channel of the stream and should be considered a water race that is or used to be a stream.
- The true right watercourse at the split by the quarry runs parallel to, but higher than, the true left watercourse. It also potentially conveys water from the stream that merged with the water race. Consequently, that section and all the sections it supplies with water, until the ends of the water race, should be considered artificial water race, potentially conveying water from a natural stream.
- The true left watercourse at the split by the quarry has a natural form and partly conveys water from a natural stream. It should be considered a water race that is or used to be a stream, until it reaches the Tauherenikau River.
- Straightened sections of the water race that receive water from the true left watercourse downstream of the split by the quarry, until the ends of the water race, should be considered artificial water races that potentially convey water from a natural stream.
- The watercourse reaching SH2 does not have River characteristics and is included in the group of artificial water races that potentially convey water from a natural stream. Downstream of crossing SH2, however, it flows in a naturally formed channel, which could potentially be an old streambed, and should be considered a water race that is or used to be a stream, until it reaches the Tauherenikau River.

Table 2: Classification of sections of interest along the Longwood Water Race, as assessed on the ground, November 2022.

Site #	Description	Assessment	Notes
1	Intake from the Tauherenikau River on its true right bank	Artificial water race	
2	Overflow split, returning surplus of water back to the river	Artificial water race	
3	a. Overflowing water reach split – northern branch	Artificial water race	
	b. Overflowing water reach split – southern branch	Artificial water race	
4	Water race flow gauging site	Artificial water race	
5	a. Water race and stream first contact	Artificial water race	potentially conveying water from a natural stream
	b. Water race and stream confluence	Water race that is or used to be a stream	
6	a. Quarry split – true right watercourse	Artificial water race	potentially conveying water from a natural stream
	b. Quarry split – true left watercourse	Water race that is or used to be a stream	
7	Loop watercourse	Artificial water race	potentially conveying water from a natural stream
8	a. Water race crossing SH2 – upstream	Artificial water race	potentially conveying water from a natural stream
	b. Water race crossing SH2 – downstream	Water race that is or used to be a stream	
9	End of water race	Artificial water race	potentially conveying water from a natural stream

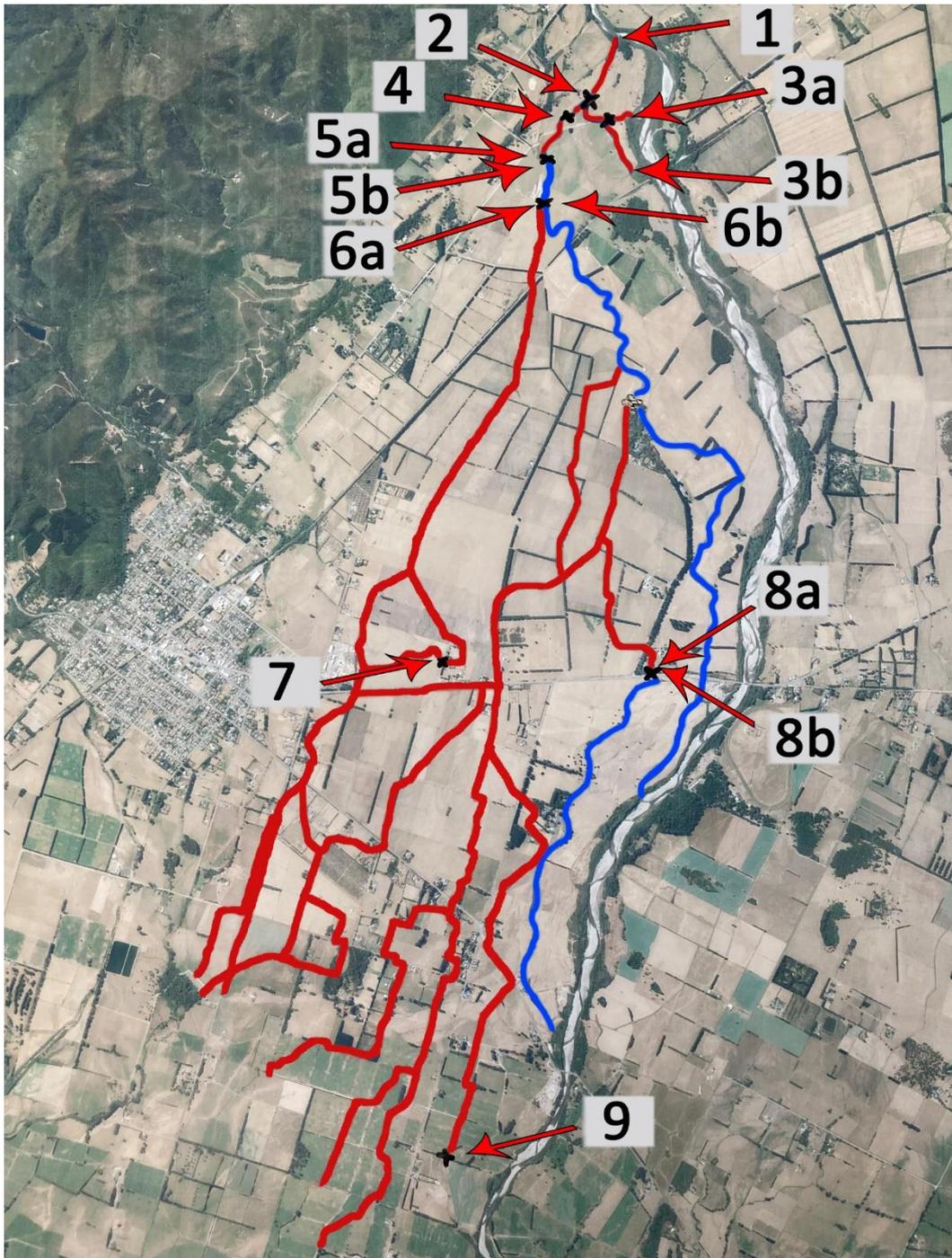


Figure 11: Classification of sections of the Longwood Water Race as water races that are or used to be streams (marked with blue) and artificial water races (marked with red), based on the desktop and field assessments that took place in 2022. Sites that required ground assessment are numbered and marked with a black cross.

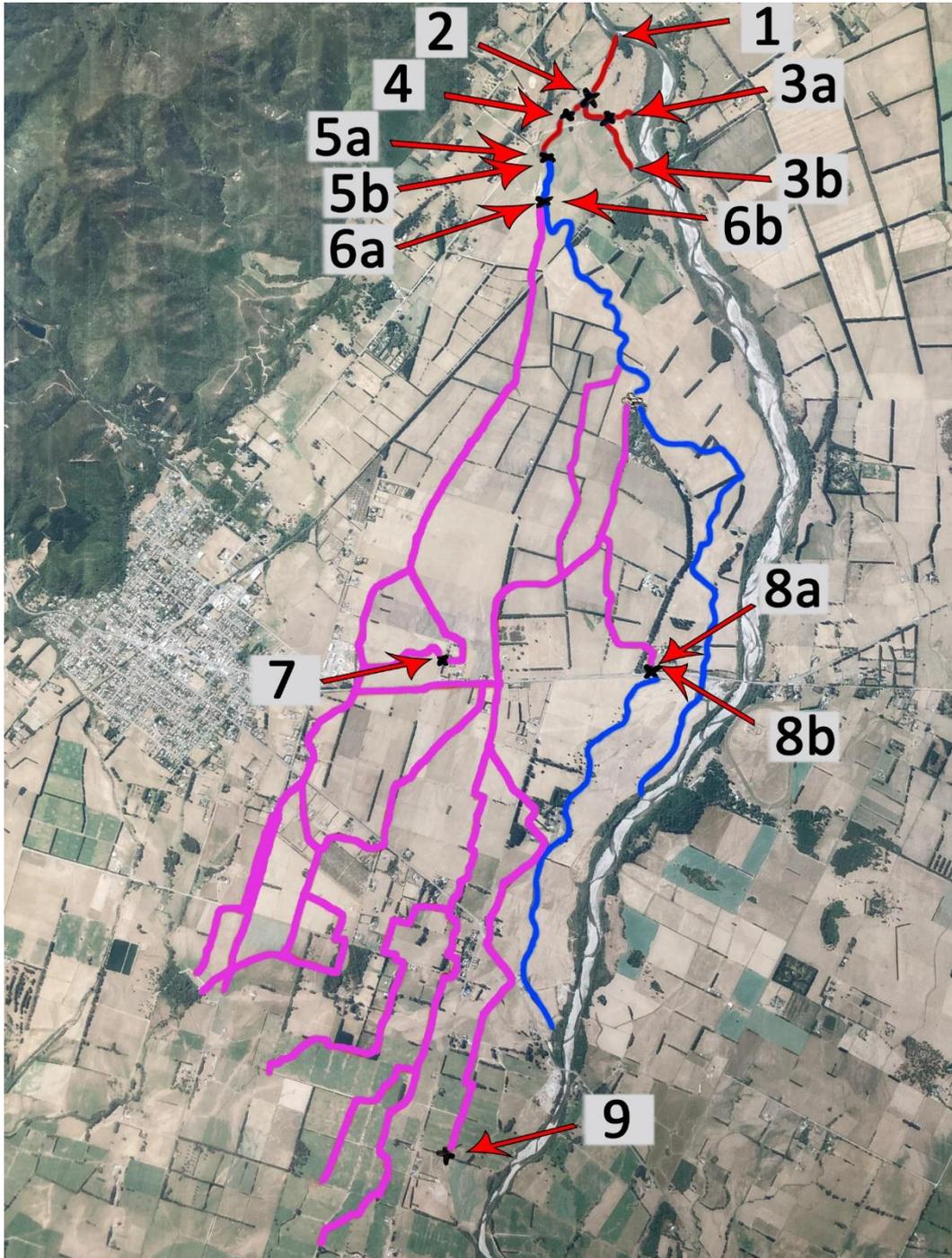


Figure 12: Classification of sections of the Longwood Water Race as water races that are or used to be streams (marked with blue), artificial water races with no inputs from natural streams (marked with red), and artificial water races, potentially conveying water from natural streams (marked with purple), based on the desktop and field assessments that took place in 2022. Sites that required ground assessment are numbered and marked with a black cross.

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