FURTHER INFORMATION

Waterway investigation within Lot 4 SP332712, Olsen Road New Beith

Queensland Government

Date: 29 July 2024

To: State Assessment Referral Agency

From: *Fishology Consulting Pty Ltd*

Project: Waterway investigation within Lot 4 SP332712, New Beith.

1.0 Introduction

Fishology Consulting Pty Ltd have been engaged by Frasers Property Australia to investigate the presence and extent of waterways that provide for fish passage within Lot 4 SP332712 (Olsen Road, New Beith) (Figure 1). The subject site is located in the Logan City Council area within the Greater Flagstone Priority Development Area. This report was prepared to provide updated site information that was collected during an investigation undertaken in July, 2024.

1.1 Background

The *Fisheries Act 1994* defines a waterway as including a river, creek, stream, watercourse drainage feature or inlet of the sea. This definition includes freshwater and tidal waters and both permanent and ephemeral waterways. It also includes natural channels along which fish are expected to move if they connect isolated water bodies to defined waterways during times of flow. However, it does not include isolated waterbodies where no connectivity is available.

The Department of Agriculture and Fisheries (DAF) provides guidance material to assist with the interpretation and application of the *Fisheries Act 1994* definition of a waterway including:

- DAF waterway mapping,
- Queensland waterways for waterway barrier works mapping User Guide (version 3.0) ('user guide'), and
- What is a waterway? DAF factsheet[1].

[1] DAF factsheet was updated on the 15 February 2024 after field work for this investigation was completed and is now published by Business Queensland https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/development/waterways/qld. The definition of a waterway in the Fisheries Act has not changed.

Prepared by: ***Fishology Consulting Pty Ltd***
ABN: 24673817484
www.fishologyconsulting.com.au

Figure 1. Sub-catchments and DAF mapped waterways within the study area.

DAF updated the waterway mapping in December 2023 (version 3). The DAF waterway mapping layer has been derived from existing data sets with some ground truthing of the original data set, as set out in Fisheries Queensland's *Guide for the determination of waterways using the spatial layer Queensland waterways for waterway barrier works,* (2013). Subsequently DAF's superseded guideline stated that the data layer is ***not reliable*** at the individual property scale and ground-truthing the waterway features is recommended (DAF, 2021). The current user guide states that anomalies may become apparent when ground truthing occurs (DAF, 2023). In addition to the updated mapping, DAF have also updated the policy interpretation of the Fisheries Act definition of a waterway.

The current policy interpretation of the waterway definition is that a waterway must have one of the following attributes (Business QLD, 2024):

Defined bed and banks. *Waterways generally have defined bed and banks, however, can contain less defined sections that connect more defined sections during periods of flow.*

Adequate flow. *The flow of water needs to be sufficient to sustain basic ecological processes and habitats, and maintain biodiversity within, or across, the water channel. The adequacy of flow depends on the ecological function of the channel. Some waterways that connect to a fish habitat like wetland or waterhole may only need infrequent and short-duration flows to provide connectivity for fish passage.*

Fish habitat at, or upstream of, the site. *Most instream features provide habitat for fish during adequate flow conditions, or in pools during dry periods. The ability to provide constant or periodic connectivity to upstream and off-stream fish habitat is considered a feature of a waterway. To determine if this connectivity exists, you'll need to have some knowledge of fish species at the site and how they use their habitat, particularly in headwater streams.*

However, this policy interpretation does not apply if there is sufficient evidence to show that are no fish communities present within a mapped waterway that has one or more of the above features. Furthermore, considering any of these factors in isolation from each other attempts to simplify complex ecological systems (waterways).

1.2 Summary of previous investigation

The current waterway mapping layer indicates that the investigation site contains six DAF mapped waterways assigned a fish passage attribute of 1 (green ‘low’ risk), and one DAF mapped waterway assigned a fish passage attribute of 3 (red ‘high risk’ waterway) (Figure 1).

An initial waterway investigation was undertaken for the project and a report was produced that outlining the results of the investigation findings (Fishology Consulting, 2024). The field work for the project was undertaken in January 2024, following a sustained period of substantial rainfall within the region. In the week prior to the first site visit a total of 47mm of rainfall fell (BOM, 2024). This rainfall was not isolated but occurred during a month of above average rain conditions with a total of 272mm of rain recorded (long term average of 125.3mm). Undertaking waterway investigations soon after substantial rainfall events are beneficial for waterway assessments. Large rainfall events and elevated river flows provide an opportunity for fish to migrate and recolonise marginal habitats that may have been previously dry.

The previous waterway investigation had the following conclusions:

- No fish were captured at all during site investigations that included the use of backpack electrofishing in two sites and dip netting in 14 sites. Orange fingered crayfish and tadpoles were common in many of the sites.

- Whilst dip netting is not effective in determining fish abundance or to sample the whole fish community, it is effective in determining the presence or absence of fish (particularly carp gudgeons that are common in small QLD streams) and crustaceans within small, contained waterbodies.

- For the purposes of the *Fisheries Act 1994,* it was determined that the study area contained a single waterway in the lower reach of Feature B which has the physical and hydrological attributes and potential to support a fish assemblage consistent with a green waterway (fish passage attribute of 1). This conclusion was based on the site having physical and hydrological attributes of a waterway (defined bed and banks, presence of pools and fish habitats). Despite this backpack electrofishing was undertaken within this waterway and NO fish were recorded.

- It was concluded that all other mapped waterways (Features A, C, D and E), and possible flow paths investigated within the study area were not waterways that provide for fish passage. These features did not contain the physical or hydrological attributes of a waterway, had natural instream physical barriers (rock outcrops) and / or high gradients and did not provide waterway habitats for fish.

1.3 Pre lodgement advice

Pre lodgement advice was received on the 31st of May after submission of the initial waterway investigation report. The advice received is provided in Appendix A of this report. A summary of this advice includes:

1. Survey method.

The method predominantly employed across sites (i.e. dip netting) is inferior in the detection of fish when compared with other commonly used techniques such as backpack electrofishing. The difference in detection between these methodologies is particularly common where there is a prevalence of rock, timber, and debris (i.e. as appears to be the case at several sites surveyed) due to the behavioural tendency of fish to hide in interstitial spaces within rock, timber, and debris. As such, it is considered that the absence of fish in surveys may not be a true representation of the presence of finned fish at sites, and therefore fish passage.

It is noted, Orange fingered yabbies (Cherax depressus) were captured at 7 of the 16 sites surveyed, and importantly that these are considered fish under the Fisheries Act 1994.

2. Waterways

The Fisheries Act 1994 defines a waterway as a river, creek, stream, watercourse, drainage feature or inlet of the sea. A waterway must have at least one of the following attributes:

(1) defined bed and banks
(2) adequate flow
(3) fish habitat at, or upstream of, the site.

Based on a desktop assessment, and the information and images provided:

- *Feature B, C, D, and E have defined bed and banks and the presence of fish habitat in the form of shallow pools. As such, these features are considered waterways under the Fisheries Act 1994.*

- *Feature A and F do not have defined bed and banks and lack shallow pools (i.e. fish habitat) and as such are not considered waterways under the Fisheries Act 1994.*

2.0 Methods

A second field investigation was undertaken to further assess habitat features of study sites and undertake a fish survey with backpack electrofishing. The following outlines the field conditions, methodology and approach used.

2.1 Sites

Site data was collected at a total of 13 sites during the second site investigation (Figure 2). Photos of the sites are presented in Appendix A of this report. Despite these sites being specific areas where data was collected, much larger areas were assessed during site walkovers. Site walkovers were undertaken to make a thorough assessment of mapped waterway features and ensure that no areas potentially containing habitat are missed. During fieldwork the mapped waterways were accessed via internal property tracks and then the waterway was investigated via a walkover (walking in from road access).

2.2 Waterway features

Where additional data was required the physical, hydrological and habitat features of sites were described and quantified. This included mean and maximum depth (calculated from a minimum of 10 representative measurements at each site, where possible) and width of low flow channel, high flow channel (mean value calculated from a minimum of 10 representative measurements at each site, where present). A visual assessment was made of any bed and bank features, any obstructions to the channel, presence of any fish habitat features and hydrological characteristics. Where natural barriers were present these were measured and described. Gradients of mapped waterway features were assessed using QLD globe. Elevation data was obtained and each waterway was measured to obtain waterway gradients (%).

2.3 Fish sampling

Within the study area fish sampling with backpack electrofishing was used with any available standing water present. This included very shallow areas of Flagstone Creek and isolated pools within Feature B and C. No fish sampling was undertaken with Feature E and D as these were dry and did not contain suitable areas for fish sampling.

Backpack electrofishing was used as the primary fish sampling methodology within five fish survey sites. This technique is commonly used for sampling small creeks and wetlands, because of the ability to sample complex structure, aquatic vegetation and water depths under 1m (Schoenebeck et al., 2005). Backpack electrofishing provides robust estimates of relative abundances and fish diversity within sites (Lake, 2013), and all wadable habitat types within a stream reach can be sampled.

Within each site an attempt was made to collect comparable electrofishing effort so that resulting fish abundance data was consistent between sites. However, there was often a lack of areas to sample and effort differed between sites. Within all sites all available habitat types were sampled with backpack electrofishing. Fish counts and species were recorded and any fish that were observed and could be positively identified were added to the total catch. This project was undertaken under General Fisheries Permit number 254464 and animal ethics approval CA 2020/11/1432.

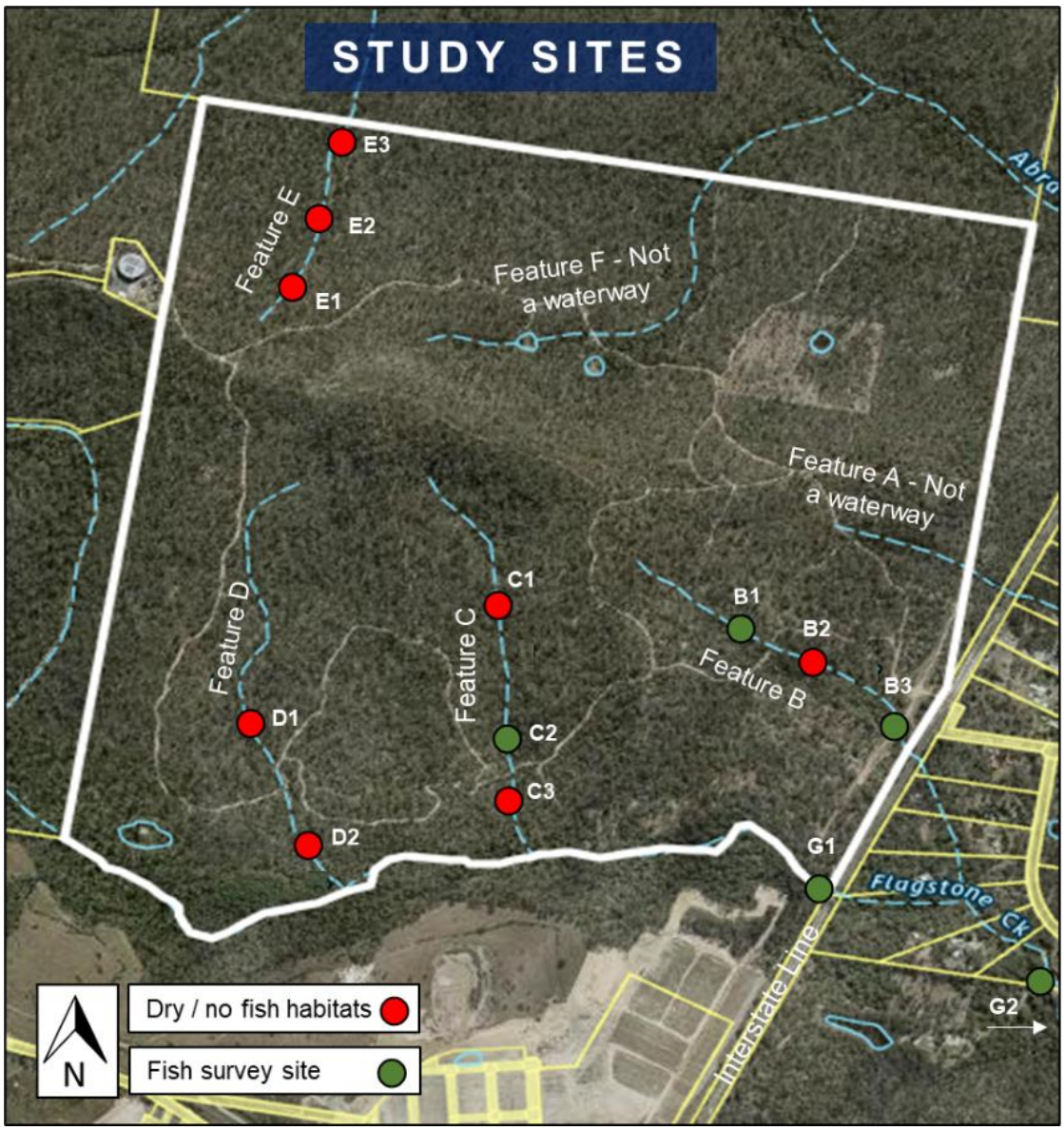


Figure 2. Overview of study area and survey sites revisited during the current assessment. Site G2 was located just above the Pebble Creek Way Road crossing.

2.4 Rainfall

Fieldwork was completed between the 4th and 5th of July 2014 immediately following 18mm of rainfall that fell between the 1st and 3rd. Despite the recent rainfall the majority of areas visited were dry with no discernible flow or habitat features for fish.

Rainfall records for 2024 (from Yarrahappini BOM station number 040762) are presented in Figure 1 against the long-term average for the region. A review of rainfall data form this period clearly shows:

- The original survey of the site was undertaken in late January (24th – 25th) after a period of exceptionally wet weather. During January nearly three times the long-term average was recorded (Figure 1).

- In the last three months below rainfall conditions have occurred, resulting in dryer conditions within the region.

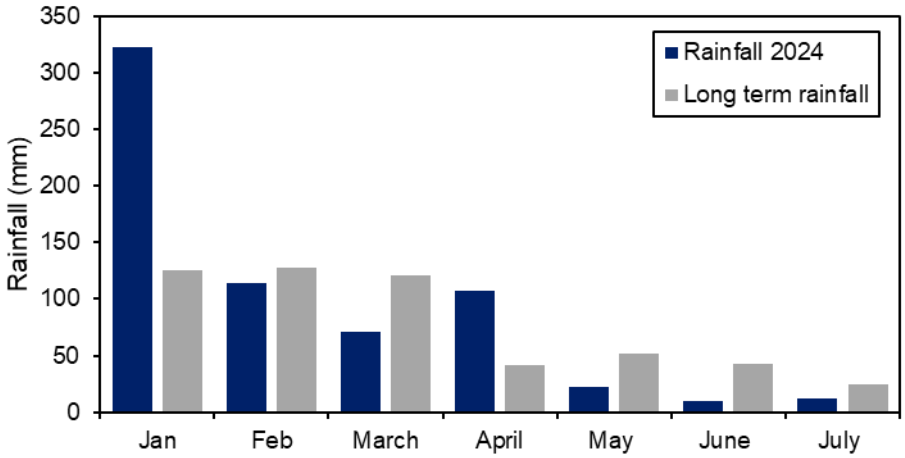


Figure 1. Rainfall records vs long term average in the study region (BOM, 2024).

2.5 Water Quality

Within each of the fish sampling sites within the investigation area water quality data was collected. Water quality was measured using a TPS multi-probe (model 90 FLT). The water quality parameters recorded included Temperature (°C), pH, Dissolved Oxygen (% saturation) and conductivity.

3.0 Results and Discussion

3.1 Water quality

Water quality results from four of the study sites is presented In Table 1. This information indicates the following:

- Dissolved oxygen was good within Flagstone Creek, that had a small amount of flow from the rainfall received in the days before the field investigation.

- Lower conductivities in Flagstone Creek and the upper site in Feature B indicate that these sites may have been influenced by rainfall in the days prior to fieldwork.

- Dissolved oxygen was low within the residual pools located in the smaller mapped waterways. It is likely that dissolved oxygen in these pools could be detrimental to fish species that are sensitive to hypoxia. Values less than 30% oxygen saturation are considered to be low for many native species (Butler and Burrows, 2007). The residual pools at the time of the survey lacked flow and had high levels of organic matter. The breakdown of this material can lead to low dissolved oxygen particularly during periods of low flows.

Table 1. Water quality from four of the study sites.

Parameter	B1	B3	C2	G1
Oxygen (%)	25	30	38	102
Conductivity (uS)	113	385	289	78.4
pH	6.42	6.40	6.12	7.99
Temperature	19.0	18.2	20.9	17.6

3.2 Rock barriers and steep gradients

During site walkovers the characteristics of the mapped waterways was documented, this included the presence of rock outcrops within the bed of the mapped waterways. All of the mapped features had rock outcrops that would prohibit fish passage over a wide range of flows (Figure 3: Appendix B). As the mapped waterway features are upper headwater systems these rock barriers would not drown out to allow fish to pass. This is due to high gradients, and small catchment areas insufficient enough to create enough flow for drownout (i.e. tail water level does not rise and drownout the barrier).

Of all the mapped waterways, Feature E had the highest number of rock barriers with five general areas observed. Within most of these areas there were often a series of rock structures. For example, at the upper rock barrier site there were four separate rock drop-offs over a distance of 30m. Despite the other mapped features having fewer rock barriers, the ones that were observed in the other mapped features (B, C and D) were very large and would prohibit fish passage.

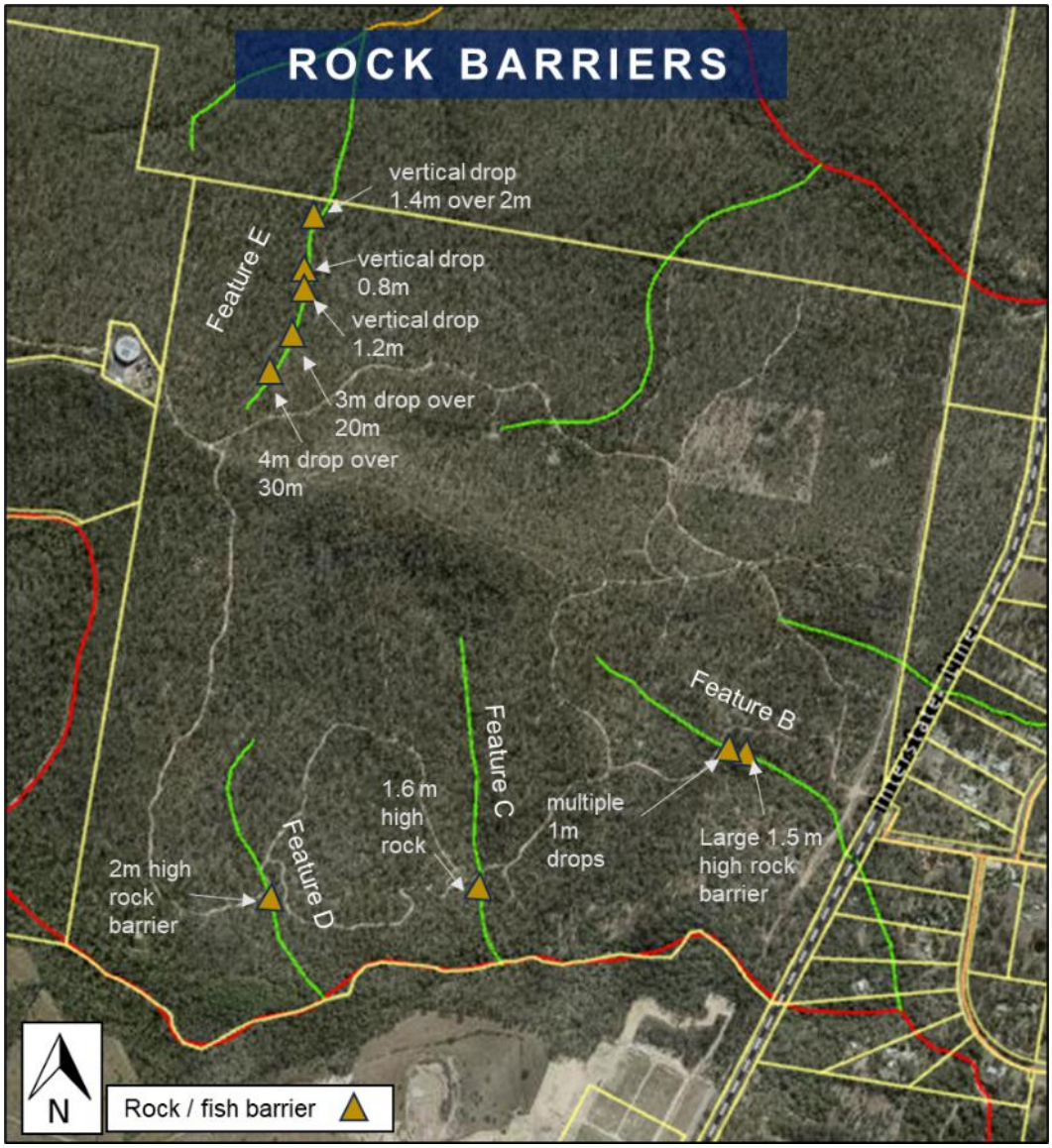


Figure 3. Rock barriers observed during site walkovers.

The waterway gradients of each of the mapped features are presented within Table 2. The lower and upper sections of the mapped waterways were separated to show differences between these areas. All mapped features recorded high gradients in excess of those used to construct conventional rock ramp fishways. Please note that rock-ramp fishways are preferably built on a grade between 3.3% and 4% however the maximum grade of 5% is used in limited circumstances (O'Connor *et. al.*, 2015). The exception was Feature D that ranged between 2.2% and 2.6% (Table 3). Feature E had the highest gradient of all the mapped features with 9.5% recorded in the lower section and 6.9% recorded in the upper section. The lower section of this feature is twice as steep as a conventional rock ramp fishway.

Table 2. Gradients of the mapped features within the site. Data obtained using elevation data on QLD Globe. For context a rock ramp fishway maximum grade between 3.3 - 5% (1:30 – 1:20)

	Feature B	Feature C	Feature D	Feature E
Lower section				
Distance (m)	400	189	268	95
Drop (m)	15	7	7	9
Gradient (%)	3.8	3.7	2.6	9.5
Upper section				
Distance (m)	317	481	360	275
Drop (m)	25	23	8	19
Gradient (%)	7.8	4.8	2.2	6.9

3.2 Fish communities

Within the study area fish sampling was undertaken within four survey sites where there was sufficient water to undertake backpack electrofishing. All other sites that were visited were dry and contained no viable fish habitats. Within the study area no fin fish were captured in any of the sites. All of the sites contained orange fingered crayfish (*Cherax depressus*) and two of the sites contained frog tadpoles (Table 3). All tadpoles were large and were close to leaving the water as frogs.

Table 3. Catch of fish and other fauna from the survey sites. Note site G2 is located downstream of study area.

Family *Species*	Common Name	B1	B3	C2	G1	G2	Total
Native fish species							
ANGUILLIDAE							
Anguilla reinhardtii	Long finned eel	-	-	-	-	4	5
ELETRONIDAE							
Hypseleotris compressa	Empire gudgeon	-	-	-	-	8	12
Hypseleotris klunzingeri	Western carp gudgeon	-	-	-	-	1	2
Gobiomorphus australis	Striped gudgeon	-	-	-	-	16	21
MELANOTAENIIDAE							
Melanotaenia duboulayi	Rainbowfish	-	-	-	-	2	3
Pest fish							
Gambusia holbrooki	Mosquitofish	-	-	-	-	62	110
Other fauna records							
CHELIDAE							
Myuchelys latisternum	Saw shelled turtle	-	-	-	-	1	1
PARASTACIDAE							
Cherax depressus	Orange fingered crayfish	16	36	15	8	5	80
ANURA							
Frog tadpoles	Various species	25	2	1	-	-	28
Total native fish captured		0	0	0	0	43	43
Electrofishing effort		61	394	76	277	303	1,111

Two sites were surveyed within Flagstone Creek. Flagstone Creek was not part of the waterway investigation but was sampled to context. Site G1 was located on the southeastern boundary of the site and G2 was located 1.3km further downstream. The downstream site was sampled to establish a downstream fish community. No fish were caught within G1 while four native fish species and a single pest species were captured further downstream (Table 2). The downstream site had large permanent pools and was very different to the shallow sand dominated channel located further upstream (Appendix B).

The result of this survey confirms the previous investigation where no fish were captured using backpack electrofishing in two sites and dip netting in all other sites (Fishology Consulting, 2024). It is apparent from these results that the study area does not contain any viable habitats to support fish communities. This finding is clearly an outlying phenomenon as there are limited areas that have habitats that would normally support a fish community, including the lower portion of Feature B and within Flagstone Creek. The absence of fish within the site are generally related to:

- The majority of mapped waterway features are very sandy and highly ephemeral (Feature A, upper B, C, D E and F). These features contained shallow surface flow immediately following above average rainfall in January but were dry the following winter. Features that had the potential to provide refuge habitats for fish were rare.

- Features that were sampled did not contain fish and were not providing refuge habitats (Table 2). The water quality within any potential refuge pools was poor and oxygen concentrations recorded are likely to be detrimental to some species of fish (Butler and Burrows, 2007).

- All of the mapped waterway features (except Flagstone Creek) had large natural rock outcrops that would act to restrict the migration of fish above these features (Figure 3, Appendix B). Most of the mapped waterways were also very steep or had steep sections that would act to further prevent fish migration, especially features B, C and E (Table 2).

- For fish to colonise the southern portion study area they would have to come from Flagstone Creek. Backpack electrofishing surveys undertaken in both February and July are yet to locate a single fish in this section of the creek (site G1). It is likely that this portion of the creek is highly ephemeral due to the sand slug that is present in this area. The sand has smothered all instream habitat features and no refugia is present. This sand slug is also acting as a natural barrier to fish passage. During baseflow conditions it is likely that flows are sub-surface and no fish habitats are present.

- There are fish present in Flagstone Creek approximately 1.3km directly below the site. With five native fish species being captured without much electrofishing effort.

3.3 Bed and banks

Previous reporting from the first field investigation (Fishology Consulting, 2024) provided summaries of the bed and bank features of the mapped waterway features. The middle and upper reaches of the high gradient mapped waterway features within Lot 4 SP332712 generally had a defined sandy bed but lacked bank formations required to form a main channel. This is due to the mapped features being headwaters within a confined valley setting (Brierley and Fryirs, 2005). In these conditions, overland flow acts to transfer material downstream and is not adequate to deposit bed loads adjacent to form banks. Furthermore, due to small catchment areas flows do not appear to be large or deep enough to create defined main channels in all areas.

Below provides a summary of bed and bank features:

Feature B – The lower and upper site generally had defined bed and banks. No bed and banks were present in the middle reach (B2).

Feature C – All sites had defined beds. Main channel was defined in the lower reaches but not in upper areas (site C2 and above).

Feature D - All sites had defined bed. Main channel was well defined in the lower reaches but not in upper areas (site D2 and above).

Feature E – Lower section had defined bed and banks. Middle and upper sections had a bed but no defined main channel.

3.4 Adequacy of flow

Adequacy of flow within a mapped waterway is essential to sustain basic ecological processes and fish communities. Fieldwork was undertaken to investigate the waterways within Lot 4 SP332712, was completed over two contrasting hydrological conditions. This included the first site visit in exceptionally wet conditions and the most recent survey that was undertaken during the dry season. These two events provide contrasting hydrological conditions that allow the adequacy of flow to be determined for the waterway features. During the first site visit most of the mapped features contained water and small amounts of flow. Shallow ponding and pools occurred within mapped features B, C, D and E.

Adequacy of flows assessment undertaken during the second survey event found that:

- Feature B retained water within pools in the lower portion of the mapped waterway and a single pool in the middle reach. However, the ponded water was anoxic and lacked maintaining inflows to provide suitable conditions for fish. Upper features were also above rock barriers. No fish were captured.

- Some water was retained (2 areas of ponded water within the middle of mapped feature C). As per the above these were anoxic and lacked maintaining flows to provide suitable conditions for fish. Upper features were also above rock barriers. No fish were captured.

- A lack of any flow or retained water within Mapped feature D shows that this system lacks adequacy of flow.

- A lack of any flow or retained water within Mapped feature E shows that this system lacks adequacy of flow.

3.5 Presence of fish habitats

Despite the presence of persistent potential fish habitats in the study area (feature B and C and G). No fin fish have been recorded. Therefore, it appears that the mapped waterway features do not provide adequate fish habitats to sustain fish communities.

4.0 Conclusion

Two site visits were undertaken of Lot 4 SP332712 during contrasting hydrological conditions to assess the status of mapped waterways. This second site visit did not provide any new information to change the results of the first site assessment undertaken and documented in Fishology Consulting (2024). Alternative mapping is provided in Appendix C of this report.

Fish sampling using backpack electrofishing within four sites within the site failed to catch any fin fish. A lack of fish is likely related to the sandy and highly ephemeral nature of upper Flagstone Creek and the mapped waterways. High gradients of mapped features, the presence of rock barriers and poor water quality within the few remaining areas of standing water are also likely to be contributing factors.

This investigation found that, for the purposes of the *Fisheries Act 1994,* the study area contains a waterway in the lower reach of Feature B which has the physical and hydrological attributes and potential to support a fish assemblage consistent with a green waterway (fish passage attribute of 1).

Based on the findings of this investigation all other mapped waterways and possible flow paths investigated within the study area are not waterways that provide for fish passage or contain fish habitats associated with the life cycle of fish. All the other features do not have adequacy of flow to provide suitable habitats to sustain fish as well as having physical rock barriers and high gradients prohibiting fish passage.

Waterway barrier works proposed within the confirmed waterway must either comply with the relevant accepted development requirements or a development permit for operational works that is the construction or raising of waterway barrier work.

To ensure waterway barrier works are planned and designed appropriately, endorsement of alternative waterway mapping is recommended.

5.0 References

Butler, B. and Burrows, D.W. 2007. Dissolved oxygen guidelines for freshwater habitats of northern Australia. Australian Centre for Tropical Freshwater Research James Cook University. ACTFR Report No. 07/32

Bureau of Meteorology, 2024. Daily rainfall – Yarrahpinni. Available at: http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=040762

Business QLD, 2024. Waterways in Queensland. Available at: https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/development/waterways/qld

Brierley, G.J. and Fryirs, K.A. 2005. Geomorphology and River Management. Blackwell Publishing, Victoria.

DAF, October 2023. Queensland waterways for waterway barrier works spatial data layer: Guide to determining waterways, v3. Available at: https://www.publications.qld.gov.au/dataset/6e30e52d-86a8-4995-891c-dc9ce84d8c53/resource/a465f32e-f5d5-4f53-bdcf-6962f887c254/download/queensland-waterways-for-waterway-barrier-works-mapping-user-guide.pdf

Fisheries Act 1994 – As at 27 January 2024.

Fishology Consulting. 2024. Waterway Investigation within Lot 4 SP332712, New Beith, Final report, Issue B dated 21-5-2024.

Lake, M. 2013. Freshwater fish: electrofishing fixed reach, version 1.1. Document: DOCDM-755847 Department of Conservation New Zealand.

O'Brien, A., Marsden, T., Peterkin, C., and Draper, I. 2016 Risk management of waterways: Impact determination of barriers works for fish passage in Queensland. *Conference paper: 11th International Symposium on Ecohydraulics*. Melbourne, Australia

O'Connor, J., Mallen-Cooper, M. and Stuart, I. (2015). Performance, operation and maintenance guidelines for fishways and fish passage works. Arthur Rylah Institute for Environmental Research Technical Report No. 262 for the Water and Catchments Group, Department of Environment, Land, Water and Planning. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Schoenebeck, C.W., Timothy, R. and Strakosh. C. 2005. Effect of Block Net Use and Time of Sampling on Backpack Electrofishing Catches in Three Kansas Reservoirs. North American Journal of Fisheries Management. 25 (2): 604-608.

Appendix A – Pre lodgement advice

Queensland Government

SARA reference: 2405-40533 SPL

31 May 2024

Frasers Property Group
c/- Fishology Consulting
fishologyconsulting@gmail.com

Attention: Ms Nicole McKirdy

Dear Ms McKirdy

SARA Pre-lodgement advice – Olson Road, New Beith

I refer to your pre-lodgement request received on 21 May 2024 in which you sought pre-lodgement advice from the State Assessment and Referral Agency (SARA) regarding the proposed development at the above address. This notice provides advice on aspects of the proposal that are of relevance to SARA.

SARA's understanding of the project

It is understood the proponent has undertaken a waterway investigation to determine the presence and extent of waterways within Lot 4 on SP332712 (the site). The site contains six low (green) and one high (red) Queensland waterways for waterway barrier works.

The proponent's investigation was in regard to the low (green) Queensland waterways onsite and determined only one of the low (green) waterways constitutes a waterway under the *Fisheries Act 1994*. The proponent is seeking endorsement of alternative waterway mapping based on the findings of the investigation.

Supporting information

The advice in this letter is based on the following documentation that was submitted with the pre-lodgement request.

Drawing/report title	Prepared by	Date
RE: Pre-lodgement meeting request, waterway investigation at Lot 4 on SP332712; New Beith	Fishology	21 May 2024
Waterway investigation within Lot 4 on SP332712, New Beith.	Fishology	21 May 2024

Pre-lodgement advice

Planning and Development Services (SEQ South)
Level 9, 12-14 Marine Parade, Southport
PO Box 3290, Southport BC QLD 4215

The following advice outlines the aspects of the proposal that are of relevance to SARA.

Waterway advice	
1.	Survey method Despite it being stated in submitted material that no finned fish were captured during surveys, it is considered that the method predominantly employed across sites (i.e. dip netting) is inferior in the detection of fish when compared with other commonly used techniques such as backpack electrofishing. The difference in detection between these methodologies is particularly common where there is a prevalence of rock, timber, and debris (i.e. as appears to be the case at several sites surveyed) due to the behavioural tendency of fish to hide in interstitial spaces within rock, timber, and debris. As such, it is considered that the absence of fish in surveys may not be a true representation of the presence of finned fish at sites, and therefore fish passage. It is noted, Orange fingered yabbies (*Cherax depressus*) were captured at 7 of the 16 sites surveyed, and importantly that these are considered fish under the *Fisheries Act 1994.*
2.	Waterways The *Fisheries Act 1994* defines a waterway as a river, creek, stream, watercourse, drainage feature or inlet of the sea. A waterway must have at least one of the following attributes: (1) defined bed and banks (2) adequate flow (3) fish habitat at, or upstream of, the site. Based on a desktop assessment, and the information and images provided: • Feature B, C, D, and E have defined bed and banks and the presence of fish habitat in the form of shallow pools. As such, these features are considered waterways under the *Fisheries Act 1994*. • Feature A and F do not have defined bed and banks and lack shallow pools (i.e. fish habitat) and as such are not considered waterways under the *Fisheries Act 1994*. It is noted, there are multiple unmapped grey waterways identified on the Development Assessment Mapping System on site. It is the proponent's responsibility to ground truth whether the grey unmapped waterways constitute a waterway for waterway barrier works. For furthermore information see the Business Queensland website, available at: https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/development/waterways/qld.
3.	Future works If any work is proposed within Feature B, C, D and E, the works would need to be undertaken as per the Acceptable Development Requirements, available at: https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/011a916e-30ad-4f52-87e9-f9c5a6b2532f/adr-waterway-barrier-works.pdf?ETag=3a6d51480fc5ada47f0abece6c1871e7, and where this may not be possible, would require a development approval for constructing or raising waterway barrier works in fish habitats. The proponent is advised to only seek further pre-lodgement advice once detailed plans of the proposed development are available to allow detailed advice to be provided. If required, the State Development Assessment Provisions (SDAP) Guideline for State code 18:

	Constructing or raising waterway barrier works in fish habitats (State code 18), available at: https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/e7d73fdc-7bb8-4472-aa5f-45a11796c5e5/state-development-assessment-provisions-guideline-state-code-18-constructing-or-raising-waterway.pdf?ETag=26e8a203c08966420f010e2ca7dbea59, will assist in the preparation of a development application.

This advice outlines aspects of the proposed development that are relevant from the jurisdiction of SARA. This advice is provided in good faith and is:

- based on the material and information provided to SARA
- current at the time of issue
- not applicable if the proposal is changed from that which formed the basis of this advice.

This advice does not constitute an approval or an endorsement that SARA supports the development proposal. Additional information may be required to allow SARA to properly assess the development proposal when a formal application has been lodged.

If you require further information please contact Brianna Gosper, Senior Planning Officer, on (07) 5644 3272 or via email SEQSouthPlanning@dsdilgp.qld.gov.au who will be pleased to assist.

Yours sincerely

Fletcher Smith
Principal Planning Officer, Planning and Development Services (SEQ South)

Development details	
Proposal:	Waterway investigation
Street address:	Olson Road, New Beith
Real property description:	Lot 4 on SP332712
SARA role:	-
Assessment Manager:	-
Assessment criteria:	State code 18 of the SDAP
Existing use:	Vacant land
Relevant site history:	-

Appendix B - Site photos

Site B3. Fish habitat in lower section of mapped waterway with no fish. Anoxic water present in pool.

Site B2. Large 1.5m high rock barrier with several additional 1m rock drop offs above in the middle of mapped waterway (27.7849, 152.9560). Natural barrier to fish in a dry section of mapped waterway with no fish.

Site B1. Upper isolated pool within rock basin with no fish. Sandy area above B1 was completely dry. Water quality in isolated pool was poor and anoxic.

Site C3. Large rock barrier (single 0.9m vertical drop and 1.6m drop overall) that is a significant barrier to fish in the middle of the dry mapped waterway (other than the occasional very small puddle from recent rain).

Site C2. Isolated pool. Only two small pools were found in the upper area of feature C that contained water. No fish were recorded.

Below C3. Mapped waterway near Flagstone Creek was dry although had defined low flow and main channel features.

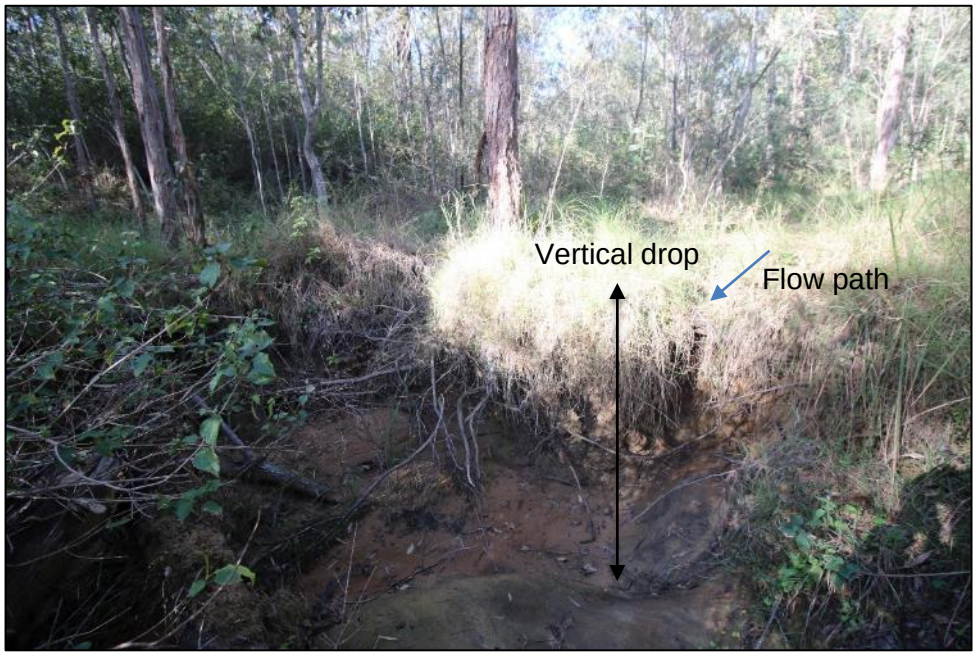
Site D2. Mapped waterway feature that was completely dry with grass growing throughout the mapped feature.

Site D1. Large rock barrier (estimated to be 2.0m high) within the channel of the mapped waterway. A major barrier to fish.

Site D2. Dry channel at the bottom of feature D near Flagstone Creek. The lower portion of this mapped feature had defined bed and bank features. Site was completely dry and contained no fish or fish habitats.

Site E3. Lower portion of feature E near site boundary. Site was mostly dry and had sandy low flow channel within in a highly incised valley. This portion of the site had a low flow channel but a poorly defined main channel.

Site E3. First major rock barrier in feature E located at 27.7752, 152.9470. Several rock features measured 1.2m high over 4m. A barrier for fish during both low and high flows.



Site E2. Third major waterway barrier within feature E measured at 1.2m high (27.778115, 152.946167). There were other additional rock barriers located immediately below this area.

Site E3. Upper area of mapped waterway. Terrestrial grasses growing in poorly defined high gradient gully.

Site G1. Flagstone creek fish sampling. Despite some water being present no fish were recorded during two sampling events. Large sand slug covers the bed and smothers habitat.

Site G2. Fish sampling in Flagstone Creek just above Pebble Creek Way. 1.2km below the study area.

Above site G2. Part of the rock structure in Flagstone Creek is a likely to be a considerable barrier fish passage.

Empire gudgeon (left) and striped gudgeon (right) captured in lower Flagstone Creek (Site G2).

Appendix C – Alternative waterway mapping