

Aboriginal Archaeological Heritage Survey  
**Bunbury Water Resource Recovery Scheme**



12537061-00000-EN-RPT-004

December 2020





**REPORT OF AN ABORIGINAL  
ARCHAEOLOGICAL HERITAGE SURVEY  
FOR TWO PROPOSED WASTE WATER  
PIPELINE ROUTES: BUNBURY  
WESTERN AUSTRALIA**

*A report prepared for GHD Pty Ltd  
on behalf of Aqwest*

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## ACKNOWLEDGEMENTS

The authors would like to thank the following organisations and individuals who helped with the management of this Archaeological Aboriginal heritage survey:

- Dr Fionnuala Hannon – GHD Pty Ltd (Technical Director, Environment)
- Ms Melanie Portman – GHD Pty Ltd (Senior Environmental Scientist)
- Ms Zafrin Ahmed – Department of Planning, Lands and Heritage (Heritage Operations – Heritage Support Officer)
- Mr Brad Goode – Brad Goode & Associates (Managing Director & Anthropologist)
- Mrs Leah Mackie – Brad Goode & Associates (Research & Mapping Assistant)

### **Gnaala Karla Booja WC1998/058 Native Title Claim group representatives**

- Mr Murray Collard
- Ms Korrine Bennell

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## MAPPING

Datum Used: GDA 1994 MGA Zone 50H. Handheld Garmin GPSMap 64SC (+/- 10m)

## GLOSSARY OF TERMS

The Proponent – GHD on behalf of Aqwest  
The Consultant – Brad Goode & Associates Pty Ltd  
ACMC – Aboriginal Cultural Material Committee  
AHA – Western Australian *Aboriginal Heritage Act 1972*  
AHIS – Aboriginal Heritage Information System  
BGA – Brad Goode & Associates  
BP – Before Present  
CHMP – Cultural Heritage Management Plan  
DPLH – Department of Planning, Lands and Heritage  
GKB – Gnaala Karla Booja  
ha - Hectares  
HIS – Heritage Information Submission  
Main Roads – Main Roads Western Australia  
NSHA – Noongar Standard Heritage Agreements  
SWALSC – South West Aboriginal Land and Sea Council  
WWTP – Waste Water Treatment Plant

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## EXECUTIVE SUMMARY

In June 2020, GHD commissioned an Aboriginal archaeological survey on behalf of Aqwest for two proposed waste-water pipeline routes in Bunbury, southwest Western Australia. The two proposed routes are identified as Stage 1 – an approximately 5.5 km long and 0.02 km wide corridor running roughly north-northeast – south-southwest along Blair Street and Parade Road and Stage 2 – an approximately 8.5 km long and 0.02 km wide route aligned generally east – west along Centenary Road through to the Bunbury waste water treatment plant at the end of Minninup Road South (Figure 1, Figure 2). The proposed routes are primarily located within the reserves of existing roads, or along tracks or firebreaks in an area of coastal dunes and wetlands.

This report is part of the due diligence and approvals work required for the GHD's planned development project. The survey was undertaken to ensure that any Aboriginal archaeological sites within the survey area were identified and recorded so that GHD can either avoid them or proceed to seek consent from the Minister to disturb them under the provisions of section 18 of the Western Australian *Aboriginal Heritage Act 1972*. Other management recommendations for ground disturbing works that include a risk of uncovering Aboriginal archaeological material are also included.

The Aboriginal archaeological survey included desktop research to identify any previously recorded Aboriginal sites and relevant previous survey data within the nominated project area. On 1<sup>st</sup> July 2020, a search was made of registered sites, other heritage places and previous surveys using the on-line Aboriginal Heritage Inquiry System of the Western Australian Department of Planning, Lands and Heritage. **No** Aboriginal archaeological sites and **one** Aboriginal archaeological 'Other Heritage Place' intersect the survey areas. The survey areas intersect with the extents of **thirteen** previous archaeological or ethnographic/archaeological surveys listed by the Department of Planning, Lands and Heritage.

Archival research showed four historical sites listed on the City of Bunbury Municipal Inventory in the vicinity of the pipeline survey areas: ID 6597 Bunbury Regional Hospital (former), ID 5621 Withers Homestead Housing Estate, ID 4149 Original Airstrip site, ID 5670 Bushbelt – Ocean-Preston Regional Park. These places do not have statutory protection under Western Australian heritage legislation but may be subject to planning law.

The fieldwork described in this report was conducted by BGA archaeologist, Dr Vicky Winton, in consultation with, and assisted by, two representatives from the Gnaala Karla Booja Native Title Claimant group (WC1998/058) Mr Murray Collard and Ms Korrine Bennell. No representatives from GHD participated in the archaeological survey.

An Aboriginal archaeological survey of areas nominated by GHD and Aqwest for the development of their Stage 1 and Stage 2 waste water pipelines in Bunbury has been completed. Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 was not identified within the survey area, or nearby, as a result of the fieldwork reported here and this finding concurs with previous survey results since although an isolated quartz artefact was recorded here (Tempus 2007), no surface Aboriginal archaeological artefact scatter site has been found at this location. The previously identified isolated artefacts (Tempus 2007) indicate that there is the potential for sub-surface Aboriginal archaeological material in this vicinity.

No Aboriginal archaeological sites or materials were recorded during the survey. However, ground surface visibility was generally poor (5-40%) and there is potential for Aboriginal archaeological material to exist sub-surface in areas of previously uncleared bushland within the Stage 2 corridor west of Parade Road / 373140 mE.

During the survey, Mr Murray Collard provided information about the cultural values of the native flora throughout the project area and historical information about his prior involvement in the

harvesting of 'bean sticks' (*Kunzea ericifolia*) for local horticulturalists. This information demonstrates on-going connection to Country and traditional use of its resources but specimens of these plants are not protected by the Aboriginal Heritage Act (1972).

## RECOMMENDATIONS

In consultation with representatives of the Gnaala Karla Booja WC 98/058 Native Title Claim group the following recommendations are made:

**It is recommended** that GHD/Aqwest avoid ground disturbance within the polygon listed by DPLH as Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 (Figure 5).

**It is recommended** monitors in the form of two representatives of the Gnaala Karla Booja WC1998/058 Native Title Claim are engaged for initial ground disturbance on the Stage 2 corridor west of Parade Road / 373140mE and on the Stage 1 corridor south from 6306000 mN.

**It is recommended** that if Aboriginal cultural materials are uncovered during ground disturbance then all work should be stopped whilst an appropriately qualified archaeologist, in consultation with Gnaala Karla Booja WC1998/058 Native Title Claim representatives, assesses whether or not the materials constitute a site under the Aboriginal Heritage Act 1972. If the material constitutes an Aboriginal site then the matter should be reported to the Registrar at DPLH for approvals advice before work can recommence.

If human skeletal remains are uncovered then **it is recommended** that the WA police should be informed under the Coroners Act 1996. Should the Police determine the remains to be of Aboriginal origin then the proponent should report the matter to DPLH under section 15 of the AHA, and SWALSC under the NSHA.

**It is recommended** that all GHD and Aqwest staff and contractors should be informed of their obligations under the Aboriginal Heritage Act 1972.

**It is finally recommended** that GHD / Aqwest contact City of Bunbury about their proposed installation of waste-water pipelines in areas which are listed on the Municipal Inventory and may be subject to local planning laws.

## INTRODUCTION

A survey for Aboriginal archaeological sites and materials located within two proposed waste-water pipeline routes was commissioned by GHD in June 2020.

The survey included a desktop component to assess the environmental context of the survey area and relevant previous archaeological research and consultancy. Any Aboriginal archaeological sites identified during archival research or in the field, were to be recorded sufficiently to allow GHD to either avoid them or apply for consent from the Minister to disturb them under the provisions of the Western Australian *Aboriginal Heritage Act (1972)*. This would include archaeological significance assessment of any archaeological sites/materials found and consultation with Gnaala Karla Booja (WC 1998/058) Native Title Claimant representatives about the findings plus the management of any potential archaeological finds that might be made during the proposed works.

The archaeological fieldwork was conducted on 1<sup>st</sup> and 2<sup>nd</sup> December 2020 by archaeologist, Dr Vicky Winton in consultation with two representatives of the Gnaala Karla Booja Native Title Claimant group (WC1998/058). No GHD representatives participated in the archaeological survey.

### LOCATION OF SURVEY AREA

The survey areas are corridors extending up to 20 metres either side of a centreline provided to the consultant as GIS data and on a pdf map (Figure 1, Figure 2). The survey areas comprise:

- Stage 1 – an approximately 5.48 km long corridor running roughly north-northeast – south-southwest along Blair Street and Parade Road. There are short sections of the route aligned perpendicular to the main corridor and positioned to service facilities along the route at JE Hands Memorial Park and Lions Park (north and south); and
- Stage 2 – an approximately 8.6 km long route aligned generally east – west along Centenary Road through to the waste water facility at the end of Minnipup Road South. Two sections of alternative route are included in the survey areas – one is located immediately east of Bussell Highway and positioned to avoid high ground whilst the other runs along the exiting bitumen road to the Bunbury waste water treatment plant.

The corridors are located within areas previously cleared for residential, commercial, recreational and agricultural use and are primarily aligned along extant tracks, fire-breaks and roads.





Figure 1: Location Plan: the survey area.

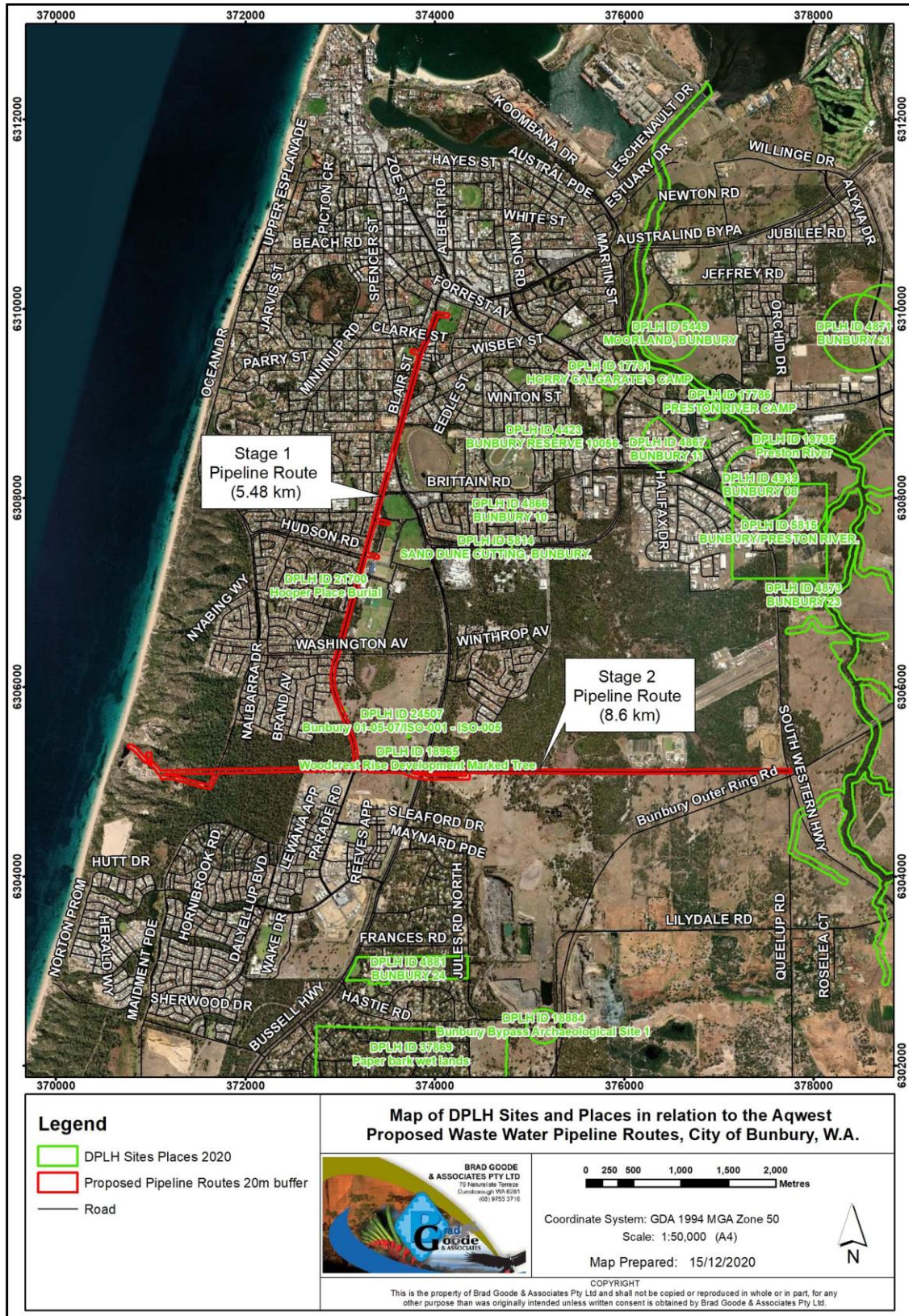


Figure 2: The Survey Areas in relation to nearby DPLH listed Aboriginal heritage sites and places.

## ENVIRONMENTAL BACKGROUND

### *Climate*

The project area has a Dry Mediterranean bioclimate today, defined by 5-6 dry months per year (Beard 1990: 39; Bognauls and Gausson 1957). The nearest long-term climate station is at Bunbury Post Office which operated from 1877-1985. The mean annual rainfall recorded at Bunbury P.O. was 872 mm; 477 mm falling in the winter (June to August or *Makaru* and early *Djilba* Nyungar seasons according to Walley [2016:2-8]) and just 36.6 mm falling during the hot, dry summer months of December through to February (*Birok* and early *Bunuru* Nyungar seasons [Walley 2016:2-8]). The highest temperatures are reached in February with a mean maximum of 27.8°C and mean minimum of 15.4°C recorded. By contrast, the coldest month is July with a mean maximum of 16.8°C and mean minimum of 8.4°C (Australian Government Bureau of Meteorology 2020).

### *Geology*

The survey corridors are located within tens of metres above sea level on the Swan Coastal Plain and intersect with the following geological formations (State of Western Australia [Department of Mines, Industry Regulation and Safety] 2017, Semeniuk and Semeniuk 2019):

- The Safety Bay Sands / Quindalup Dunes (Figure 3);
- The Tamala Limestone and Spearwood Dunes;
- The Bassendean Dunes;
- The Guildford Formation which is variably podzolized and laterised Quaternary alluvium;
- the Recent alluvium (Holocene age, < 10,000 years old).

Aboriginal archaeological sites have been found in all sediment formations of the Swan Coastal Plain (Dortch and Dortch 2019).



**Figure 3: View eastwards across the Safety Bay Sands / Quindalup Dunes from the western end of the Stage 2 Corridor at the Bunbury waste water treatment plant.**

### **Flora and Fauna**

The project area lies within the Drummond Botanical Subdistrict of the South West Botanical Province (Beard 1990:87-97). On the 1:3,000,000 pre-European vegetation map of Western Australia the survey areas are located within Vegetation Type 2, Vegetation Type 3 and Vegetation Mosaic 101 (Beard et al. 2013:18-21, 110-111). Vegetation Type 2 is distributed in a strip along the coast. It is medium forest and woodland of jarrah (*Eucalyptus marginate*) and marri (*Corymbia calophylla*). Vegetation Type 3 lies inland of Vegetation Type 2 in the Project Area and comprises jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*) and wandoo (*Eucalyptus wandoo*) woodland with trees of about 20 m height and a relatively open canopy of 10-30 % foliage cover. A variety of smaller trees and shrubs are associated with Vegetation Types 2 and 3 including bull banksia (*Banksia grandis*), sheoak (e.g. *Allocasuarina fraseriana*), snottygobble (*Persoonia longifolia*) and many species of Myrtaceae, Proteaceae, Fabceae, Ericaceae with grass trees (*Kingia australis* and *Xanthorrhoea* spp.) and zamia (*Macrozamia riedlei*). Vegetation Mosaic 101 is found on the swamps and sand ridges of the Bassendean Dune System south of Perth and includes jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) woodland with low banksia woodland (especially *B.attenuata*, *B. menziesii*, *B. ilicifolia* and also *Nuytsia floribunda*) and low paperbark (*Melaleuca* spp.) forest around wetlands.

Much of the flora native to the project area is traditionally important to Aboriginal people for food, tool raw materials and medicine (Kings Park and Botanical Garden n.d., Meagher 1975) e.g. grass tree as a source of nectar, shelter, fire-stick, glue and edible bardi grubs and zamia seed as a food (requires burial to leach out the toxins).

The native fauna of the area includes the following species traditionally used by Aboriginal people for food and other resources e.g. sinew/cord or fur for warmth/decoration (Meagher 1975):

- large macropods, most commonly the grey kangaroo (*Macropus fuliginosus*) but also wallaroo (*Macropus robustus*) and occasionally red kangaroo (*Megeleia rufa*).
- wallabies such as Brush Wallaby (*Marcopus Irma*), Tammar (*Macropus eugenii*), Quokka (*Setonix brachyurus*) – once common on the Mainland, Woylie (*Bettongia penicillata*) Today, much of the area has been cleared for farming (Figure 8).
- possums (*Trichosurus Vulpecula* and *Pseudocheirus peregrius*)
- burrowing mammals such as dalgyte (*Macrotis lagotis*) and boodie (*Bettongia lesueur*)
- dingo (*Canis familaris*)
- birds such as emu (*Dromaius novaehollandiae*), black swan (*Cygnus atratus*)
- reptiles such as Gould's monitor lizard (*Varanus gouldii*), Bobtail (*Tiliqua Rugosa*)
- Frogs, fish (sometimes caught using built weirs – Gibbs 2011) and insects

### **Existing level of disturbance and limitations of the current survey**

The project area comprises roads, road reserves, public parks, paddocks, woodland tracks and firebreaks. The project area has been heavily disturbed since European contact.

## **PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS**

### **DEFINITIONS**

The most common Aboriginal archaeological materials found in Australia are stone artefacts – flaked stone tools or the waste from making them and ground stone tools. In fact, stone artefacts may have formed a small part of the overall toolkit used but because stone is durable stone artefacts are the most commonly preserved items of material culture available for analysis. Hard rocks with very fine crystal size – or best of all, crystals that are invisibly small to the naked eye i.e., cryptocrystalline – were found and selected for use as sharp cutting tools. Quartz, chert, chalcedony, silcrete and metamorphic siliceous rocks were commonly used as flaked stone artefacts.

Flaked stone tools were created by striking flakes from the edges of cores using hammerstones. In order to successfully strike a flake from a core, a stone knapper needed to accurately strike an edge on the core where an angle of  $<90^\circ$  was found between two adjoining surfaces. Often then, a systematic approach to core working was followed where one surface was designated as the 'striking platform' and an adjoining surface, which met it at an angle of less than  $90^\circ$  was designated as the 'flaking face'. Stone flakes could then be used as is, or further modified to form a particular shape by striking smaller chips from the flake's edge i.e., 'retouch'.

Where stone raw material occurred as small rocks with obtuse edges and/or was relatively intractable and hard, a technique called 'bipolar percussion' could be used to detach flakes and spalls from a core (Hiscock 2015). In bipolar technique the core is placed on an anvil and struck on the opposing surface with the hammerstone. This generates shock waves from both ends of the core which can be effective in detaching flakes from cores ill-suited to free hand hammerstone percussion. Bipolar percussion is particularly effective in flaking quartz fragments and would have been an important technique for Nyungar stone toolmakers.

From the time of European settlement in Western Australia, glass and ceramics that have the same conchoidal fracture as natural siliceous rocks were used by Aboriginal people for flaked artefacts. Aboriginal flaked artefacts made on glass or ceramic raw material can be described, recorded and analysed in ways similar to stone artefacts. However, the anatomy of the original glass or ceramic raw material are included in the recording and analysis and this can show regional patterns in the preference for use of different parts of bottles (Figure 4, Harrison 2000). Moreover, the date of manufacture of glass bottles or ceramics can provide age estimates for the flaked artefacts made on them. However, it is necessary to exercise caution in recording flaked glass or ceramic artefacts because these materials naturally and accidentally fracture in ways that mimic deliberately flaked tools. Indeed, laboratory analyses of microscopic patterns of wear and identification of residues of worked materials adhering to flaked glass or ceramic artefact edges may be necessary to definitively demonstrate the presence of deliberately shaped and used tools (Harrison 2000:45).

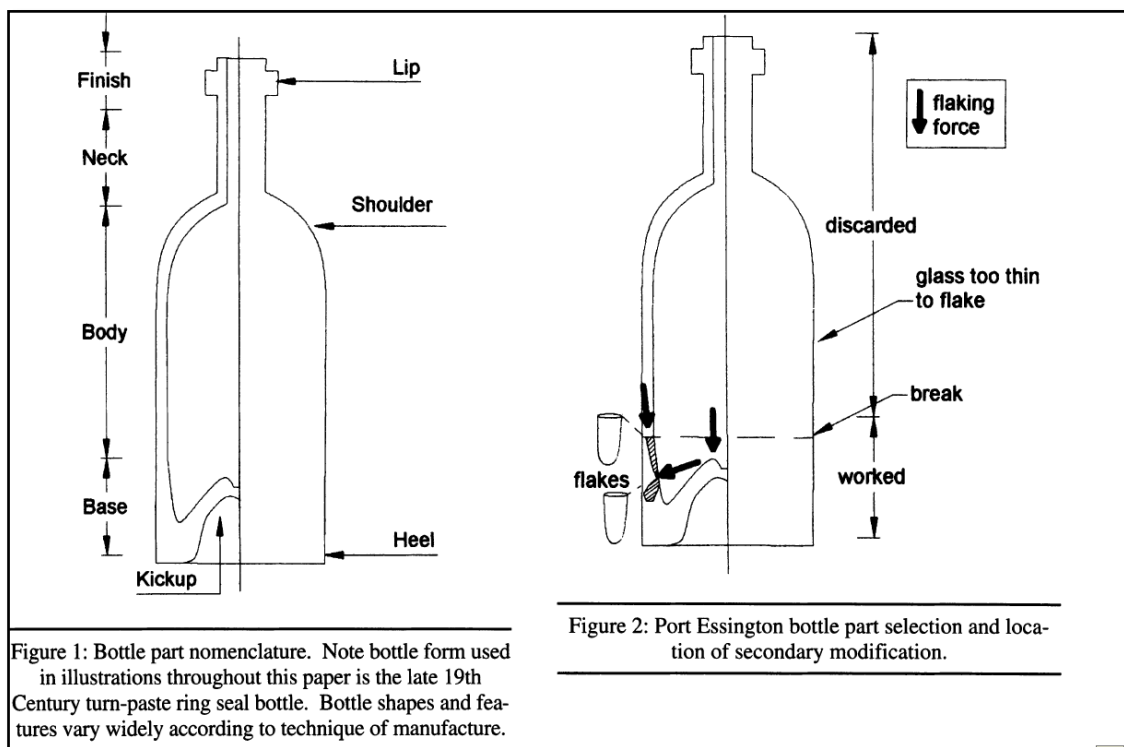


Figure 4: Anatomy of glass bottles used in describing flaked glass artefacts (left) and method of flaking used by Aboriginal people to make flaked glass artefacts at Port Essington, Northern Territory according to Allen (1969) (right).

Besides flaked and ground artefact concentrations, other types of Aboriginal archaeological material preserved in the landscape include:

- modified trees,
- stone arrangements including fish traps, hut bases, hunting hides, ceremonial ground markers or standing stones,
- middens e.g. piles of discarded sea shell,
- ochre,
- painted rock art,
- engraved rock art,
- previously occupied rockshelters,
- burials and ancestral remains,
- hearths,
- archaeobotanical remains (plants)
- faunal remains (bone)
- caches of artefacts (often in niches in rockshelters and may include rare finds of wooden artefacts).

For the purposes of the survey discussed in this report, an archaeological ‘site’ is defined as a place where ‘significant traces of human activity are identified’ (Renfrew & Bahn 1991:42). In other words, where there is substantial *in situ* evidence of past Aboriginal occupation or activity. This is a scientific definition, not a legal definition.

The decision as to whether a place might or might not constitute a “site” under Section 5 of the W.A. *Aboriginal Heritage Act 1972*, is made by the Aboriginal Cultural Material Committee. It is important to note that all sites, whether known or not, are protected under the W.A. *Aboriginal Heritage Act 1972* and that it is an offence to disturb or conceal a site, or remove artefacts, without permission afforded by the Act.

## REGISTERED SITES AND OTHER HERITAGE PLACES

A search of the Western Australian Department of Planning, Lands and Heritage’s Aboriginal Heritage Inquiry System prior to the archaeological survey, established that **no** registered Aboriginal archaeological sites and **one** ‘other heritage place’, Bunbury 01-05-07/ISO-001-ISO-005 Place ID 24507, intersect the survey areas.

### Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005

The 20 metre diameter polygon for Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 which overlaps the Stage 1 corridor on the east side of Parade Road by less than one metre, is one of four circular polygons used DPLH to map the five isolated artefact that comprise this place. This place is an isolated artefact find spot with ‘lodged’ status at the DPLH i.e. ACMC have not determined whether or not it is an Aboriginal site under sections 5 and 39.2 of the AHA. The actual find spot for Bunbury 01-05-07/ISO-003 is given as 373044mE and 6305763mN (GDA94 Zone 50H) which is outside the Stage 1 corridor. It was reported by Tempus Archaeology (2007) during the Aboriginal archaeological survey of a proposed housing subdivision in the locality of Wellington. The artefact find spot is described as is described as ‘...approximately 20m east of Parade Road...on the north-facing slope of a low outcrop of Bassendean Sands...’ (Tempus Archaeology 2007: 22). The isolated artefact recorded as Bunbury 01-05-07/ISO-003 is described as ‘...a small quartz transversely fractured bipolar flake fragment...’ measuring 6.07 mm c 5.77 mm and 2.83 mm which has crushing to its proximal end and a transverse fracture (Tempus Archaeology 2007: 25).

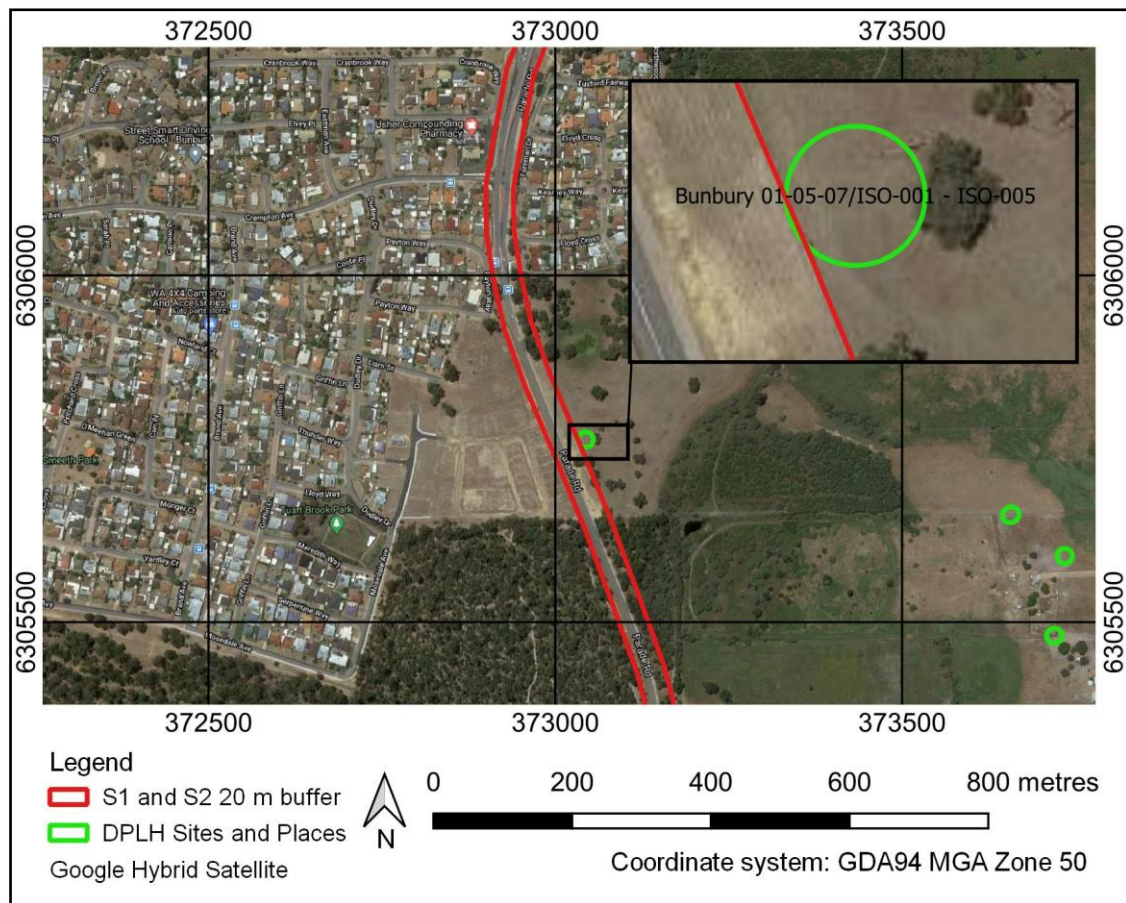


Figure 5: Map showing the slight overlap of DPLH lodged place Bunbury 01-05-07/ISO-003 and the project area (S1 and S2 20 m buffer).

### Historical sites

Four historical sites are listed on the City of Bunbury Municipal Inventory in the vicinity of the Stage 1 and Stage 2 pipeline survey areas: ID 6597 Bunbury Regional Hospital (former), ID 5621 Withers Homestead Housing Estate, ID 4149 Original Airstrip site, ID 5670 Bushbelt – Ocean-Preston Regional Park. These places do not have statutory protection under Western Australian heritage legislation but may be subject to planning law.

### REVIEW OF RELEVANT ARCHAEOLOGICAL REPORTS

A query of the Aboriginal Heritage Inquiry System of Western Australian Department of Planning, Lands and Heritage shows **thirteen** previous Aboriginal archaeological survey areas intersect with the current survey areas (Table 1).

Table 1. Previous Aboriginal archaeological surveys which geographically intersect with the survey area.

Survey reference details and DPLH report ID	Extent of intersection with the survey areas	Relevant results
<p><b>Goode, B., and Harris, J. 2020.</b> Addendum Report of an Aboriginal Heritage Survey of the Bunbury Outer Ring Road (BORR) Gap and Western Power Survey Areas: Greater Bunbury, Western Australia. A report prepared for BORR Integrated Planning Team on behalf of Main Roads Western Australia. [Report ID 201226].</p>	<p>A 215 metre by 6 metre overlap on the south side of Centenary Road, just west of Bussell Highway.</p>	<p>No Aboriginal archaeological sites located within the current survey as a result of this work.</p>

Survey reference details and DPLH report ID	Extent of intersection with the survey areas	Relevant results
<b>Harris, J. 2020</b> , Report of an Archaeological Aboriginal Heritage Survey of Bunbury Outer Ring Road, Southern Section: Greater Bunbury Region, Western Australia. A report prepared for BORR Integrated Planning Team on behalf of Main Roads Western Australia. [Report ID 201224].	960 metre overlap with Stage 2 corridor on Centenary Road, either side of and including Bussell Highway. Also includes the whole of the alternative route on the east side of Bussell Highway.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Goode, B. and Johnston, S. 2012</b> , <i>Report of an Aboriginal Heritage Survey for the Eaton Monash Boulevard to Bunbury Wastewater Treatment Plant, South Western Australia</i> [Report ID 24048].	2.7 km overlap with Stage 1 corridor and 170 metre overlap with the western end of the Stage 2 corridor including the westernmost alternative route.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Goode, B., O'Reilly, T., and Johnston, S. 2012</b> , An Aboriginal Heritage Survey of the Proposed Bunbury Outer Ring Road (Stage 2) at Gelorup, Western Australia. A report prepared for GHD Pty Ltd on behalf of Main Roads Western Australia. [Report ID 201222]	15 metre overlap at the eastern end of the Stage 2 corridor	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Goode, B. Harris, J. and Johnston, S. 2010</b> , <i>An Aboriginal Heritage Survey of the Proposed Bunbury Outer Ring Road (Stage 1) and the Port Access Road (Stage 2) at Picton, Western Australia</i> [Report ID 28385].	45 metre overlap with the east end of the Stage 2 corridor.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Tempus Archaeology (K. Edwards) 2007</b> , Report on a phase i Archaeological Survey Proposed housing subdivision in the locality of Wellington, Bunbury, Western Australia. Prepared for Ethnoscience. [Report ID 22804].	About 1 metre overlap along the eastern margin of the Stage 1 corridor between 6305270mN and 6306000mN on Parade Road.	Isolated artefact Bunbury 01-05-07/ISO-003 was identified close to the Stage 1 corridor and subsequently mapped by DPLH as a 20 metre diameter circular polygon which overlaps the Stage 1 corridor by 0.7 metres. The artefact find spot is noted as 373044mE, 6305763mN and is described as ‘...approximately 20m east of Parade Road...on the north-facing slope of a low outcrop of Bassendean Sands...’ (Tempus Archaeology 2007: 22). The artefact is described as ‘...a small quartz transversely fractured bipolar flake fragment...’ measuring 6.07 mm c 5.77 mm and 2.83 mm which has crushing to its proximal end and a transverse fracture (Tempus Archaeology 2007: 25). The report also records concern of the Aboriginal Traditional Owners consulted that ‘...cultural material, including human skeletal remain (sic), might be uncovered in the course of



Survey reference details and DPLH report ID	Extent of intersection with the survey areas	Relevant results
		earthworks, especially on sandy rises.' (Tempus Archaeology 2007: 25).
<b>Goode, B. 2003</b> , An addendum to a desktop preliminary Aboriginal heritage Survey for Water Corporations proposed development of the Yarragadee Aquifer extending to the Blackwood Groundwater area [Report ID 20283].	475 metres overlap with the east end of the Stage 2 corridor.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Parker, R. 2002</b> , Site Avoidance Survey under the Aboriginal Heritage Act (1972) of the Brook Village Development Project Area on Bussell Highway at Bunbury in Western Australia [Report ID106084].	About 1 m overlap along the eastern margin of the southernmost 900 metres of the Stage 1 corridor on Parade Road.	No Aboriginal archaeological sites or materials identified despite looking in the area along the eastern margin of the current AqWest Stage 1 corridor.
<b>Murphy, A. 1999</b> , <i>Addendum archaeological monitoring programme: Dalyellup subdivision, Capel, Western Australia</i> [Report ID 18251].	1.9 km overlap at the western end of the Stage 2 corridor including the western alternative route.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>McDonald, Hales and Associates 1998</b> , <i>Report of an Aboriginal Heritage Survey proposed Dalyellup subdivision Hareswood Road Capel, Western Australia</i> [Report ID 18374].	1.9 km overlap at the western end of the Stage 2 corridor including the western alternative route.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Hammond, M. and O'Reilly, T. 1995</b> , <i>Report of an Aboriginal Heritage Survey Bunbury Bypass Road Bunbury Western Australia</i> [Report ID 19390].	450 metres overlap with the east end of the Stage 2 corridor.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>McDonald, E., Murphy, A. and Jarvis, A. 1992</b> , <i>Report of an Archaeological and Ethnographic Investigation Proposed Upgrading of the Southwest Highway between Bunbury and Donnybrook March 1992</i> [Report ID 104319].	10 metre overlap with the eastern end of the Stage 2 corridor / intersection with Southwest Highway.	No Aboriginal archaeological sites located within the current survey as a result of this work.
<b>Murphy, A. 1990</b> , <i>Report of an Archaeological and Ethnographic Survey for Aboriginal Sites, Bussell Highway, Bunbury. April 1990</i> [Report ID 102188].	100 metre overlap with the section of the Stage 2 corridor as it crosses Bussell Highway.	No Aboriginal archaeological sites located within the current survey as a result of this work.

## PREVIOUS ARCHAEOLOGICAL RESEARCH

A query of GIS data provided by the Department of Planning, Lands and Heritage shows that, at a local scale, there are 25 Aboriginal sites listed by the Department within five kilometres of the survey area. These comprise 10 artefact scatters; five historical camp sites with various features including humanly made structures; one modified tree; three burials/skeletal material sites; and one listing for a shell midden site. These sites demonstrate the past presence of Aboriginal people in this landscape. The historical sites and the four mythological / ethnographic sites further indicating continuity of use and transmission of knowledge about the landscape into the modern era (Table 1 Table 2).

**Table 2: Aboriginal heritage places listed by the Department of Planning, Lands and Heritage within 5 km of the project area.**

Site type	Registered	Lodged	Stored data / not a site	Total
Artefacts / scatter site	1	7	2	10
Artefacts / scatter site and sacred tree	1	0	0	1
Burial / skeletal material (one with artefact scatter)	0	2	1	3
Camp site (some with artefact scatters, built structures, a birth place and one Reserve)	1	2	2	5
Midden	0	1	0	1
Modified tree	0	1	0	1
Mythological	2	2	0	4
<b>TOTAL</b>	<b>5</b>	<b>15</b>	<b>5</b>	<b>25</b>

Regionally, archaeological research in the southwest of Western Australia has focused on three biogeographical zones:

- the Swan Coastal Plain (Dortch and Dortch 2012, 2019, Hallam 1975, 1987, O’Connell and Allen, 2012);
- the inland and relatively upland, wooded environments of the Darling scarp and plateau (Anderson 1984, Pearce 1981, 1982); and,
- the forests of the extreme Southwest (Dortch 2002, 2004, Faith et al. 2017, Fergusson 1985).

There is good evidence from archaeological site recording and historical research in the Perth metropolitan area / Swan Coastal Plain that Nyungar people followed a seasonal pattern of relative aggregation at sites throughout the Swan Coastal Plain during summer and dispersal in smaller groups throughout the Darling Scarp and uplands during winter (Anderson 1984:34-36). Archaeological sites associated with the rivers and wetlands of the Swan Coastal Plain are the largest and most diverse in the southwest of Western Australia (following Hallam 1975, 1987) and this is probably due to the practical importance of water (to drink, for good hunting, fishing and gathering) and its centrality to Nyungar culture/spirituality. However, Pearce’s archaeological work in the Boddington/Quindanning/Collie area demonstrates not only the high frequency of small sites which appear to represent the foraging and hunting of small dispersed groups but also large sites near to pools and swamps indicating ‘...recurrent occupation of the areas for camping, social gatherings or ceremonies (Pearce 1981:57) and sites in the Boddington area are known to have been ceremonial grounds in the historic past. Today’s Traditional Owner’s talk of seasonal movements which saw their ancestor’s travelling throughout their ranges from the coast through to the wooded and forested uplands, taking advantage of a rich variety of food resources as they became available (Gnaala Karla Booja Native Title Claimant representatives, Mr Joe Northover, Mr James Khan, Mrs Sue Kelly, Mrs Lera Bennell pers. comm. 2020).

Some of the earliest dates for Aboriginal archaeological sites in Australia are from the southwest region of Western Australia e.g. at Devil’s Lair, near Margaret River, occupation may extend back to as early as 48,000 years ago (Dortch 2002). Recent re-calibration of a radiocarbon date for the past Aboriginal use of a site near Upper Swan near Perth is 43,600 years before present (O’Connell and Allen 2012). Aboriginal archaeological sites exist in all geological formations of the Swan Coastal Plain e.g. at the Fiona Stanley Hospital development in the Perth metropolitan area artefacts excavated within the Bassendean Sands provide a dated sequence for Aboriginal occupation from around 9,000 years ago back to around 35,000 years ago (Dortch and Dortch 2019:19, 20-21).

Our understanding of the archaeology of the project area indicates that flaked stone artefacts may be located within the survey areas as isolated artefacts and/or surface scatters. Modified trees may also exist within the project area where old woodland is preserved. There may be burials / skeletal material, particularly in the coastal dunes and inland sand ridges (Tempus Archaeology 2007:25). Although there may be cultural deposit with excavation potential preserved in the area this is unlikely to be intact at or near (within 30 cm below surface) in areas of previous ground disturbance and development and much of the survey area has been previously disturbed.

## SURVEY PERSONNEL AND METHODS

The fieldwork was conducted on 1<sup>st</sup> and 2<sup>nd</sup> December 2020 by archaeologist Dr Vicky Winton. Ms Korrine Bennell and Mr Murray Collard participated as representatives of the Gnaala Karla Booja WC 98/058 Native Title Claim group.

The archaeological survey comprised a desktop component in preparation for fieldwork. Mrs Leah Mackie from BGA used a GIS shape file of the project area to query the Department of Planning, Lands and Heritage's AHIS system for Aboriginal heritage places and previous heritage survey areas intersecting the project area. Relevant reports were acquired and site files of Aboriginal heritage places intersecting the project area were obtained from the Department of Planning, Lands and Heritage. Dr Vicky Winton then undertook a GIS query of Aboriginal places mapped by the Department of Planning, Lands and Heritage within 5 km of the project area to further develop an understanding of the local archaeology. References about the regional archaeological record were obtained to inform survey and site recording.

Google Earth satellite aerial image, the Collie 1-250,000 geology map (State of Western Australia [Department of Mines, Industry Regulation and Safety] 2017) and Pre-European vegetation mapping data (Beard et al. 2013) were studied to assess current land use and disturbance, surface hydrology, geological and geomorphological context and native vegetation types in the project area.

The fieldwork included an initial consultation with the Gnaala Karla Booja NTC group representatives to gather any information offered by them about the past use and archaeology of the region and specific project area. Then the survey team undertook a survey of the areas of highest archaeological potential on foot with 20 metre spacing between the participants i.e. one person walking the centre-line and the other two walking parallel but to, but twenty metres from, the centre-line on either side of it. The area of highest archaeological potential was the Stage 2 corridor, west of the Bunbury Regional Prison as it passes through areas of bushland – the whole of the Stage 2 corridor west of the prison (including the two associated alternative routes) were surveyed on foot. The intersection of the DPLH lodged other heritage Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 and adjacent firebreak on and just outside the eastern edge of the Stage 1 corridor was surveyed by Dr Winton. The rest of the survey area which comprised roads, road reserves and parkland was driven through in vehicles, visited and discussed but was not surveyed on foot given the negligible opportunity for identifying Aboriginal archaeological material in the context of extremely poor ground surface visibility and prior disturbance due to landscaping and constructed infrastructure/housing/commercial buildings.

## RESULTS

A search of sites and places listed by the Department of Planning, Lands and Heritage found **no** registered Aboriginal archaeological sites **one** 'other heritage place' within the survey area. No Aboriginal archaeological artefacts were identified in the intersecting area between Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 and the Stage 1 corridor or in the adjacent firebreaks on and just east of the Stage 1 corridor as a result of the field survey reported here. This finding is consistent previous survey results: although Tempus Archaeology (2007) recorded a very small quartz artefact in this vicinity no other artefacts were found nearby and there is no Aboriginal

archaeological site on the surface at this location. The artefacts previously identified in this paddock indicate the potential for subsurface archaeological material in the low sand dunes here.

No Aboriginal archaeological sites or materials were found as a result of the fieldwork on the 1<sup>st</sup> and 2<sup>nd</sup> December 2020. However, ground surface visibility was poor (5-40%) due to leaf litter and vegetation cover and in places the vegetation was so dense that it was not possible to maintain the spacings and the survey team walked along the cleared firebreak or track through the survey area (generally the centre-line). The entire routes of the Stage 1 and Stage 2 corridors were found to have some level of prior disturbance (e.g. at least a track or firebreak) and are well-used in contemporary times (Figure 6, Figure 7). A modern survey marker was cut into the bark of a jarrah tree adjacent to a track between Parade Road and Ocean Drive on the Stage 2 corridor (Figure 7) – this is not an Aboriginal modified tree site. The best potential for previously undisturbed ground and intact sub-surface Aboriginal archaeological material is in the Stage 2 corridor west of Parade Road and adjacent to Parade Road south of 6306000mN in an area where Tempus (2007) identified Aboriginal flaked stone artefacts on the surface.



**Figure 6: A wooden ladder or trackway apparently associated with recreational use of the bushland in dunes at 50 H 371361 6305137 near the Bunbury Waste Water Treatment Plant.**

Incidental to the survey for Aboriginal archaeological material, Mr Murray Collard identified many species of native flora which he knew to have traditional Nyungar uses. Specimens of these plants have cultural value but are not protected by the *Aboriginal Heritage Act (1972)*. They include:

- *Banksia attenuata* whose flower can be used to make a sweet tea and whose seed cone can be use to make and carry fire;
- *Banksia grandis* whose buds can be chewed like gum;
- *Macrozamia* spp. whose seeds can be treated and eaten and whose fibres can be used, with *Xanthorrhoea* spp. grass tree stem, to make fire;
- *Xylomelum occidentale* whose bent limbs can be used to make boomerangs (Figure 8);
- *Kunzea ericifolia* (spearwood) whose trunks/branches were harvested for spears or from the time of European settlement, used as poles to support vegetable crops. In the past, Mr Collard had himself cut ‘bean sticks’ for horticulturalists to use.



**Figure 7: A survey marker cut into a jarrah tree at 50 H 372805 6305114 on the Stage 2 corridor between Parade Road and Ocean Drive.**



**Figure 8: Mr Murray Collard pointing out the bent trunk of a woody pear tree which could be harvested to make a boomerang.**

## CONCLUSION

An Aboriginal archaeological survey of areas nominated by GHD and Aqwest for the development of their Stage 1 and Stage 2 waste water pipelines in Bunbury has been completed. **No** registered Aboriginal archaeological sites and **one** ‘other heritage place’, Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005, are listed by the Department of Planning, Lands and Heritage within these survey areas.

Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 was not identified within the survey area, or nearby, as a result of the fieldwork reported here and this finding concurs with previous survey results since although an isolated quartz artefact was recorded here, no surface Aboriginal archaeological artefact scatter site has been found at this location. However, the artefacts found on the surface during previous survey of this paddock (Tempus 2007) do indicate the potential for subsurface Aboriginal archaeological material in the low sand ridges here and so monitors are recommended (see below).

**No** Aboriginal archaeological sites or materials were recorded during the survey. However, ground surface visibility was generally poor (5-40%) and there is potential for Aboriginal archaeological material to exist sub-surface in areas of previously uncleared bushland adjacent to the Stage 2 corridor centre-line west of Parade Road / 373140 mE.

During the survey, Mr Murray Collard provided information about the cultural values of the native flora throughout the project area and historical information about his prior involvement in the harvesting of ‘bean sticks’ (*Kunzea ericofolia*) for local horticulturalists. This information demonstrates on-going connection to Country and traditional use of its resources but specimens of these plants are not protected by the *Aboriginal Heritage Act (1972)*.

Archival research showed four historical sites listed on the City of Bunbury Municipal Inventory in the vicinity of the pipeline survey areas: ID 6597 Bunbury Regional Hospital (former), ID 5621 Withers Homestead Housing Estate, ID 4149 Original Airstrip site, ID 5670 Bushbelt – Ocean-Preston Regional Park. These places do not have statutory protection under Western Australian heritage legislation but may be subject to planning law.

## RECOMMENDATIONS

In consultation with representatives of the Gnaala Karla Booja WC 98/058 Native Title Claim group the following recommendations are made:

**It is recommended** that GHD/Aqwest avoid ground disturbance within the polygon listed by DPLH as Place ID 24507 Bunbury 01-05-07/ISO-001-ISO-005 (Figure 5).

**It is recommended** monitors in the form of two representatives of the Gnaala Karla Booja WC1998/058 Native Title Claim are engaged for initial ground disturbance on the Stage 2 corridor west of Parade Road / 373140mE and on the Stage 1 corridor south from 6306000 mN.

**It is recommended** that if Aboriginal cultural materials are uncovered during ground disturbance then all work should be stopped whilst an appropriately qualified archaeologist, in consultation with Gnaala Karla Booja WC1998/058 Native Title Claim representatives, assesses whether or not the materials constitute a site under the *Aboriginal Heritage Act 1972*. If the material constitutes an Aboriginal site then the matter should be reported to the Registrar at DPLH for approvals advice before work can recommence.

If human skeletal remains are uncovered then **it is recommended** that the WA police should be informed under the *Coroners Act 1996*. Should the Police determine the remains to be of

Aboriginal origin then the proponent should report the matter to DPLH under section 15 of the AHA, and SWALSC under the NSHA.

**It is recommended** that all GHD and Aqwest staff and contractors should be informed of their obligations under the *Aboriginal Heritage Act 1972*.

**It is finally recommended** that GHD / Aqwest contact City of Bunbury about their proposed installation of waste-water pipelines in areas which are listed on the Municipal Inventory and may be subject to local planning laws.

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## **APPENDIX 1: DPLH ABORIGINAL HERITAGE SITES AND PLACES REGISTER SEARCH**

## List of Registered Aboriginal Sites

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### Search Criteria

No Registered Aboriginal Sites in Shapefile - Proposed\_Pipeline\_20m\_buffer

### Disclaimer

The *Aboriginal Heritage Act 1972* preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au) and we will make every effort to rectify it as soon as possible.

### South West Settlement ILUA Disclaimer

Your heritage enquiry is on land **within or adjacent to** the following Indigenous Land Use Agreement(s): Gnaala Karla Booja Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines, Industry Regulation and Safety (DMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at <https://www.wa.gov.au/organisation/departement-of-the-premier-and-cabinet/south-west-native-title-settlement>.

Further advice can also be sought from the Department of Planning, Lands and Heritage at [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au).

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### Coordinate Accuracy

Coordinates (Easting/Northing metres) are based on the GDA 94 Datum. Accuracy is shown as a code in brackets following the coordinates.



# Aboriginal Heritage Inquiry System

## List of Registered Aboriginal Sites

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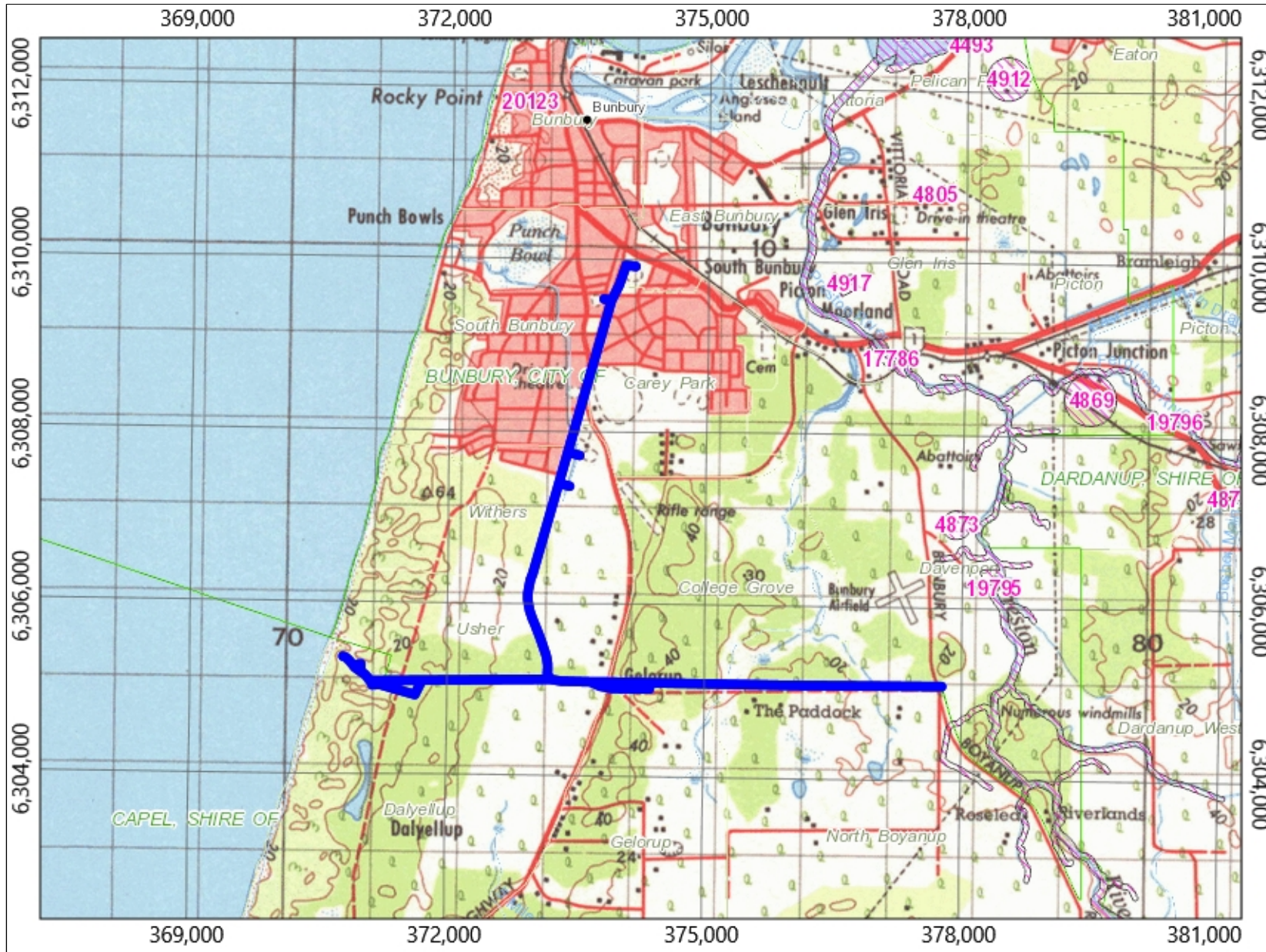
Satellite, Hybrid, Road basemap sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, HERE, DeLorme, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community.

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# Aboriginal Heritage Inquiry System

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 Department of Planning, Lands and Heritage's Disclaimer statement at  
<https://www.dph.wa.gov.au/about-this-website>

## Map of Registered Aboriginal Sites



**Legend**

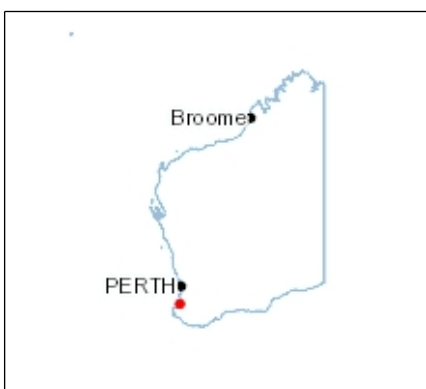
- Registered Aboriginal Site
- Search Area
- Town
- Road
- River
- Local Government Authority

2.67 kilometres  
 Map Scale 1 : 81,100  
 MGA Zone 50 (GDA94)

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## List of Other Heritage Places

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### Search Criteria

1 Other Heritage Places in Shapefile - Proposed\_Pipeline\_20m\_buffer

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Your heritage enquiry is on land within or adjacent to the following Indigenous Land Use Agreement(s): Gnaala Karla Booja Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines, Industry Regulation and Safety (DMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at <https://www.wa.gov.au/organisation/departement-of-the-premier-and-cabinet/south-west-native-title-settlement>.

Further advice can also be sought from the Department of Planning, Lands and Heritage at [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au).

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### Coordinate Accuracy

Coordinates (Easting/Northing metres) are based on the GDA 94 Datum. Accuracy is shown as a code in brackets following the coordinates.

## List of Other Heritage Places

---

Terminology (NB that some terminology has varied over the life of the legislation)

Place ID/Site ID: This a unique ID assigned by the Department of Planning, Lands and Heritage to the place.

Status:

- Registered Site: The place has been assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Other Heritage Place which includes:
  - Stored Data / Not a Site: The place has been assessed as not meeting Section 5 of the Aboriginal Heritage Act 1972.
  - Lodged: Information has been received in relation to the place, but an assessment has not been completed at this stage to determine if it meets Section 5 of the Aboriginal Heritage Act 1972.

Access and Restrictions:

- File Restricted = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the place is not restricted in any way.
- File Restricted = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the place is restricted if it is considered culturally sensitive. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the informants who provided the information. To request access please contact [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au).
- Boundary Restricted = No: Place location is shown as accurately as the information lodged with the Registrar allows.
- Boundary Restricted = Yes: To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km<sup>2</sup>) provides a general indication of where the place is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- Restrictions:
  - No Restrictions: Anyone can view the information.
  - Male Access Only: Only males can view restricted information.
  - Female Access Only: Only females can view restricted information.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place. This has been replaced by the Place ID / Site ID.

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# Aboriginal Heritage Inquiry System

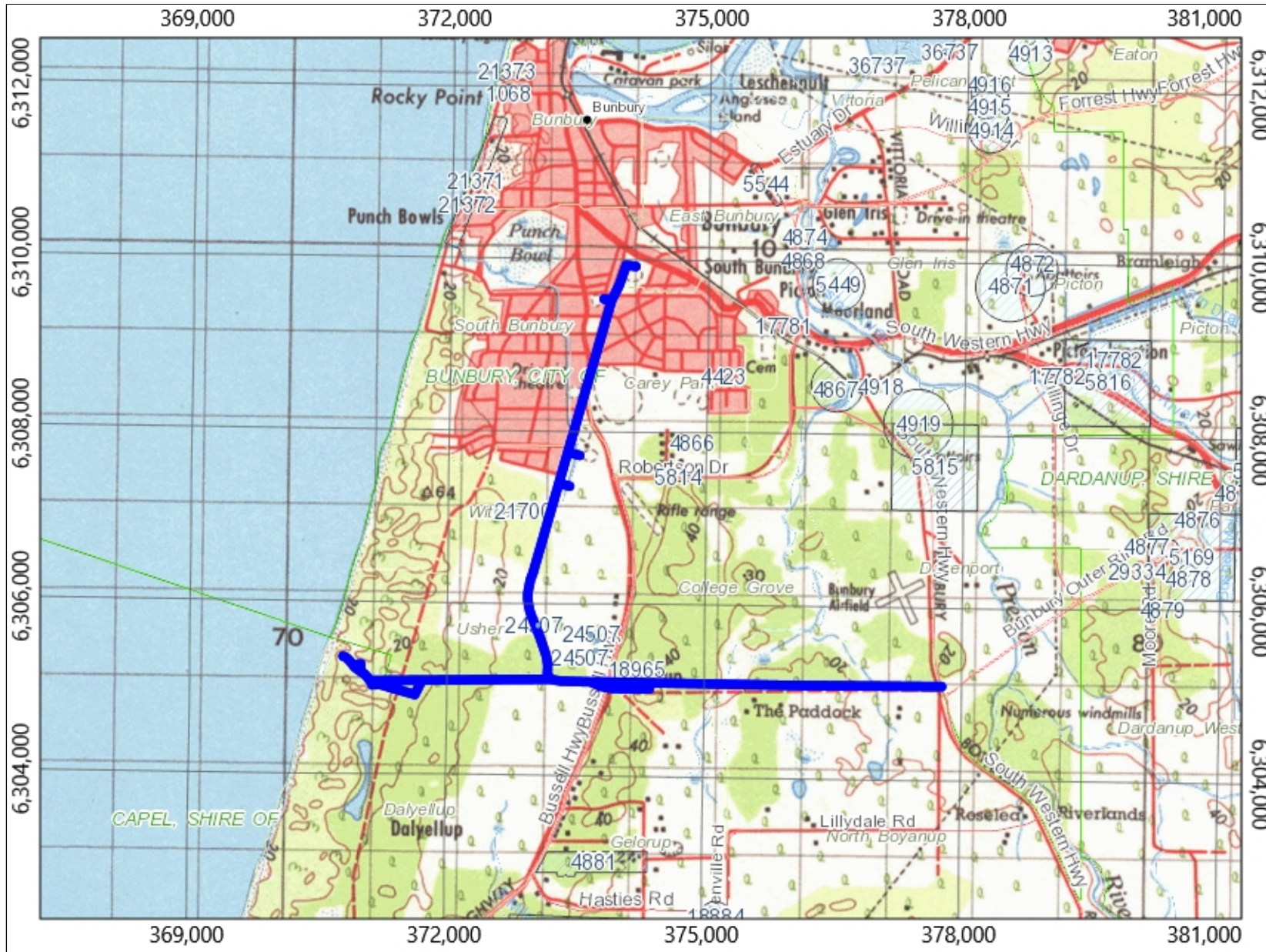
## List of Other Heritage Places

ID	Name	File Restricted	Boundary Restricted	Restrictions	Status	Type	Knowledge Holders	Coordinate	Legacy ID
24507	Bunbury 01-05-07/ISO-001 - ISO-005	No	No	No Gender Restrictions	Lodged	Artefacts / Scatter	*Registered Knowledge Holder names available from DAA	373543mE 6305624mN Zone 50 [Reliable]	

# Aboriginal Heritage Inquiry System



For further important information on using this information please see the  
 Department of Planning, Lands and Heritage's Disclaimer statement at  
<https://www.dph.wa.gov.au/about-this-website>

## Map of Other Heritage Places



**Legend**

- Other Heritage Place
- Search Area
- Town
- Road
- River
- Local Government Authority

2.67 kilometres   
 Map Scale 1 : 81,100   
 MGA Zone 50 (GDA94)

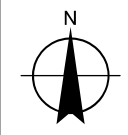
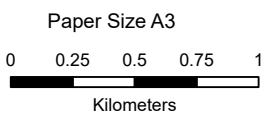
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## **APPENDIX 2: PROPONENT MAP OF THE PROPOSED ROUTES**



LEGEND	
WRRS Stage 1 Pipeline Route	WRRS Stage 2 DN400 Pipeline Route
Proposed alternative route	Proposed alternative route
Stage 1 route	Proposed options for routes
	Stage 2 route
Existing Aqwest Water Mains	HeaderTank
	BORR Designation Boundary (20190924)
	Cadastre Boundaries



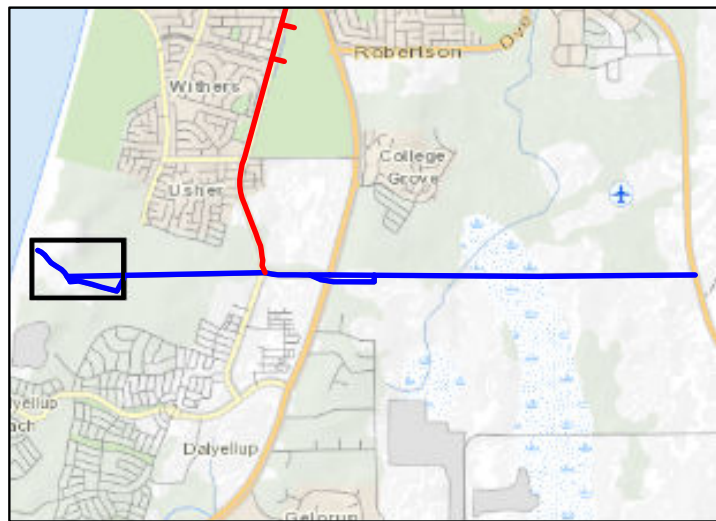
Aqwest  
Bunbury Water Resources Recovery Scheme

### Recommended Stage 1 and Stage 2 routes and alternative options

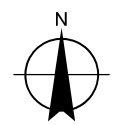
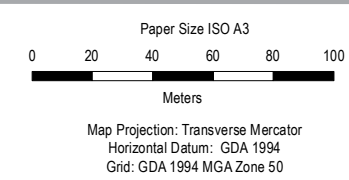
Job Number 12529697  
Revision C  
Date 27 Jun 2020

Figure 2

\\ghdnet.internal\ghd\AU\Perth\Projects\6112529697\GIS\Maps\Deliverables\Aqwest\_HayPark\Aqwest\_HayPark\_rev2.aprx  
© 2020. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.  
Data source: SLIP (cc-by); aerials; GHD: Proposed Pipeline route, 20200624, Proposed pipeline route WRRS Stage 1, 20200624. Created by:nrama



- Legend**
- Soccer\_Spur\_Line
  - Stage1\_20m\_buffer
  - ProposedPipelineRoute\_WRRS\_Stage\_1\_20200624
  - Stage2\_20m\_buffer
  - ProposedPipelineRoute\_WRRS\_Stage2\_route\_20200701
  - Header\_Tank\_Assumed\_Location



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**Bunbury Water Resources Recovery Schem**

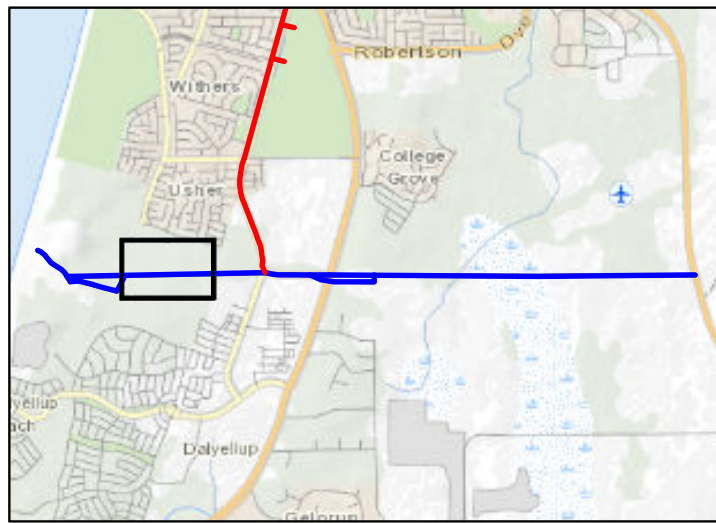
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Project No. **12537061**  
Revision No. **DRAFT**  
Date **27082020**

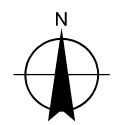
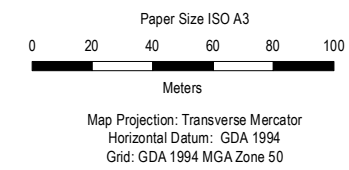
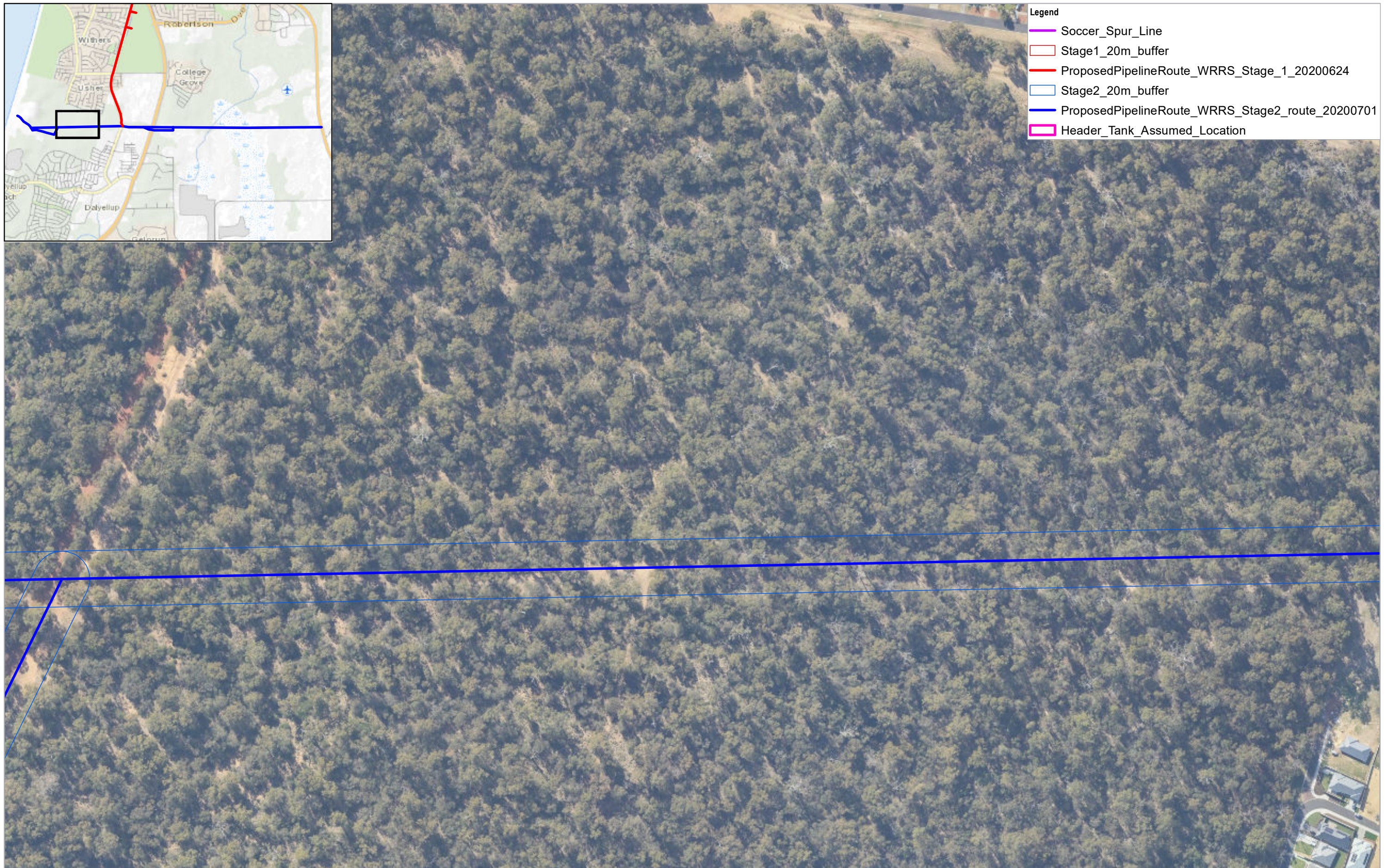
**FIGURE 1**

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Data source: Geoscience Australia, AusHydro Contributors (NSW Department Land and Property Information, Queensland Department of National Resources and Mines, Victorian Department of Environment, Land, Water and Planning, South Australia Department for Environment, Water and Natural Resources, Tasmanian Department of Primary Industries, Parks, Water and Environment and Western Australian Land Information Authority (Landgate)), OpenStreetMap (© OpenStreetMap contributors), Natural Earth Data, Australian Bureau of Statistics, Attorney General's Department (Territories of Australia), Department of



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Bunbury Water Resources Recovery Schem

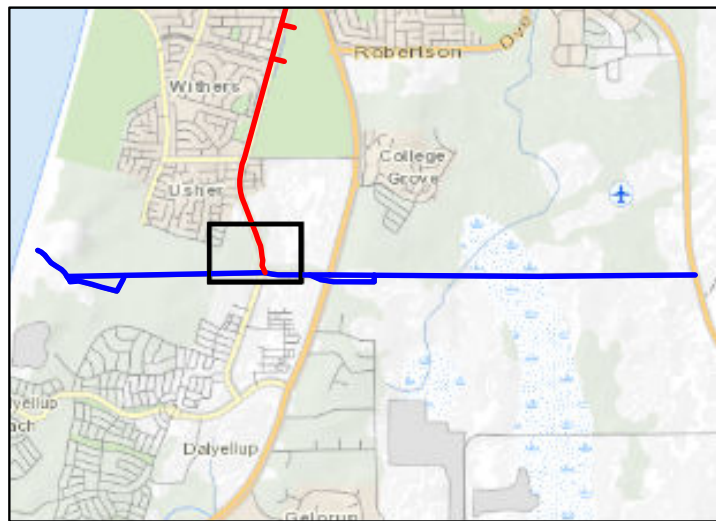
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Revision No. **DRAFT**  
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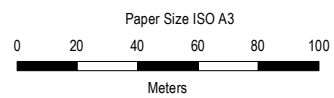
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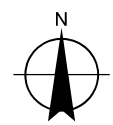
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Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 50



**Aqwest**  
 Bunbury Water Resources Recovery Schem

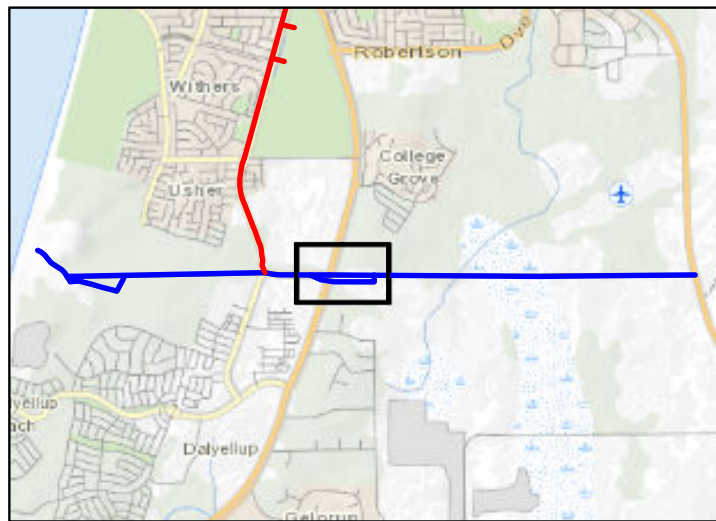
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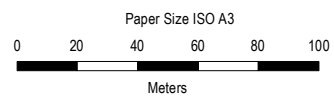
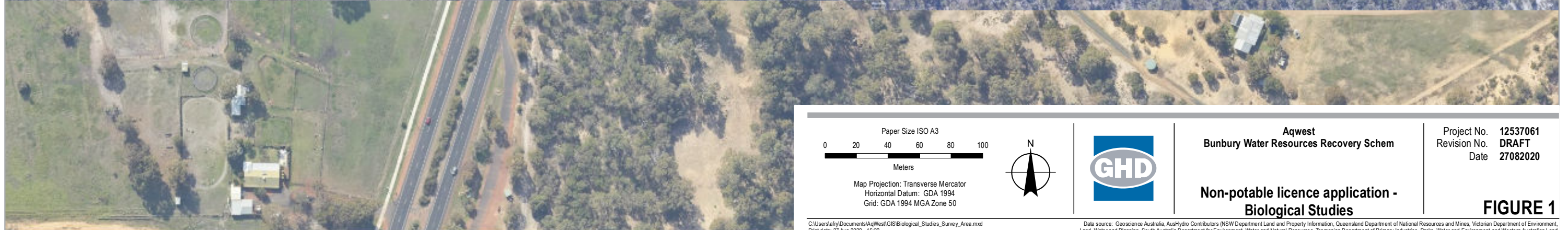
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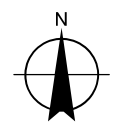
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Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 50



**Aqwest**  
 Bunbury Water Resources Recovery Schem

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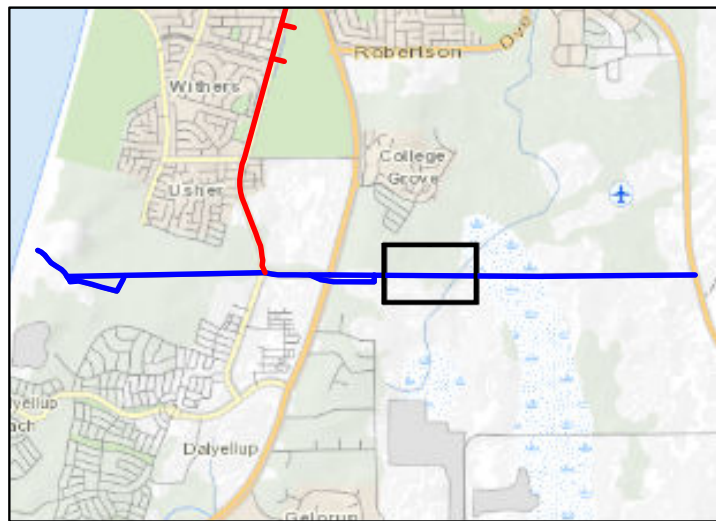
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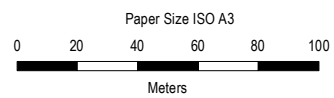
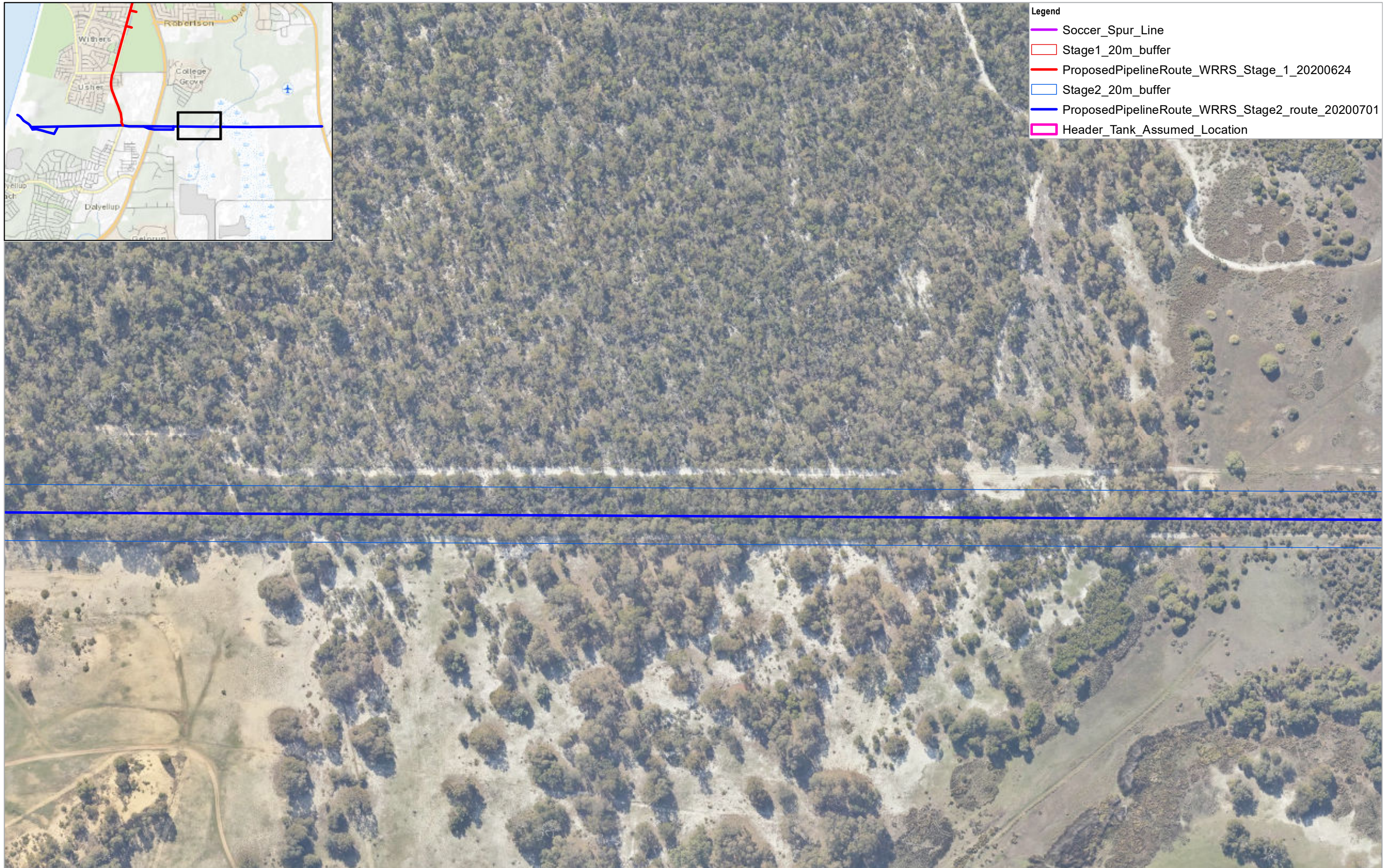
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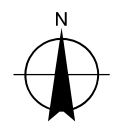




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Map Projection: Transverse Mercator  
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**Aqwest**  
**Bunbury Water Resources Recovery Scheme**

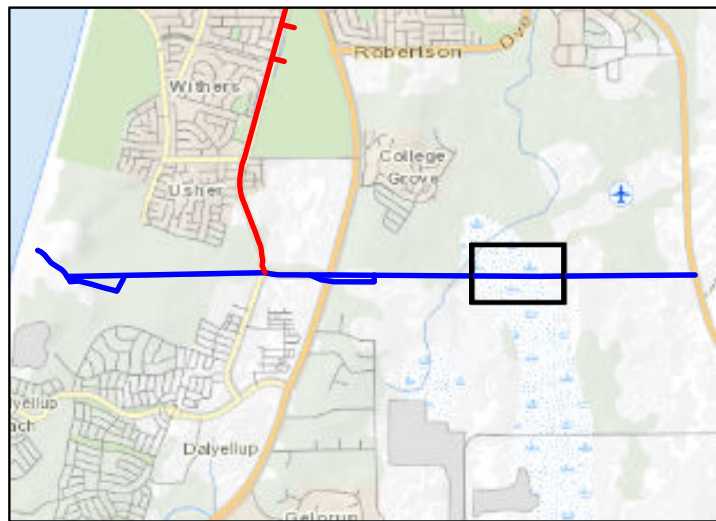
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Date **27082020**

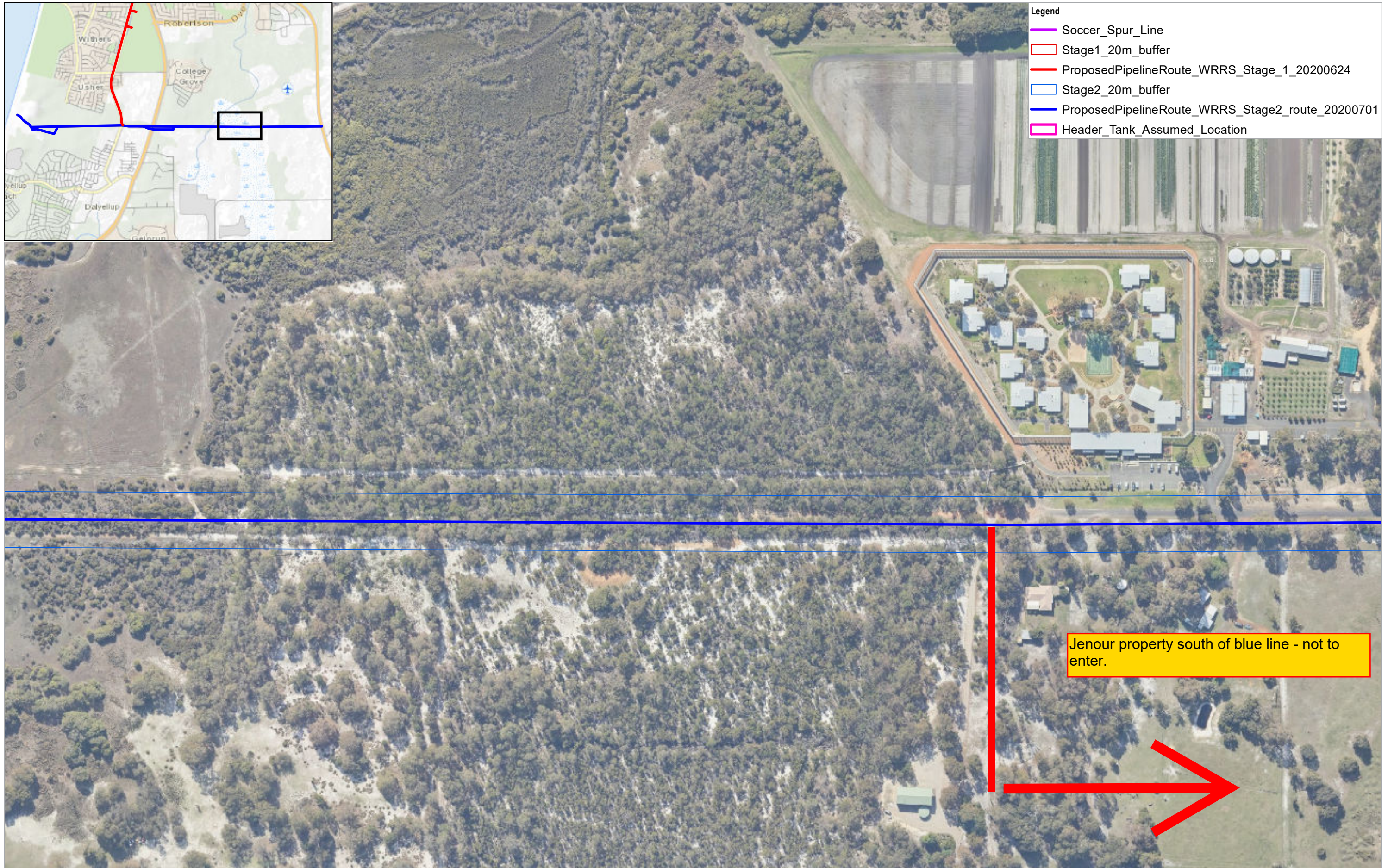
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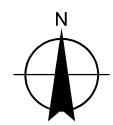
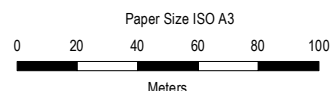
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Jenour property south of blue line - not to enter.



**Aqwest**  
Bunbury Water Resources Recovery Schem

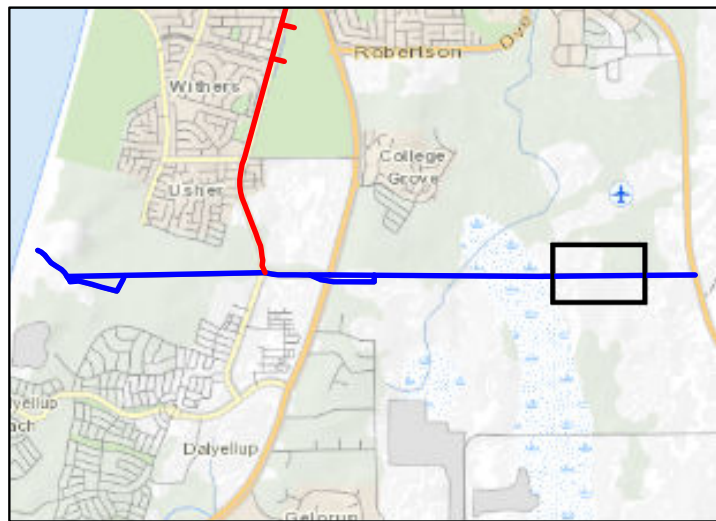
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**FIGURE 1**

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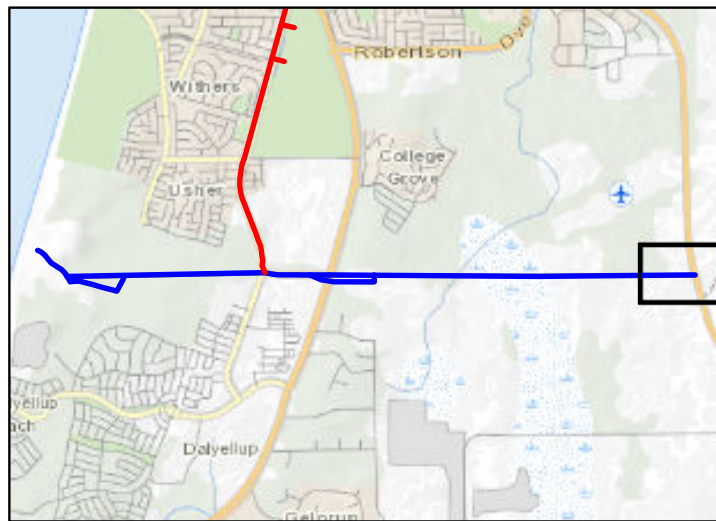
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<p>Paper Size ISO A3</p> <p>Meters</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 50</p>			<p><b>Aqwest</b> Bunbury Water Resources Recovery Schem</p> <p><b>Non-potable licence application - Biological Studies</b></p>	<p>Project No. <b>12537061</b> Revision No. <b>DRAFT</b> Date <b>27082020</b></p>
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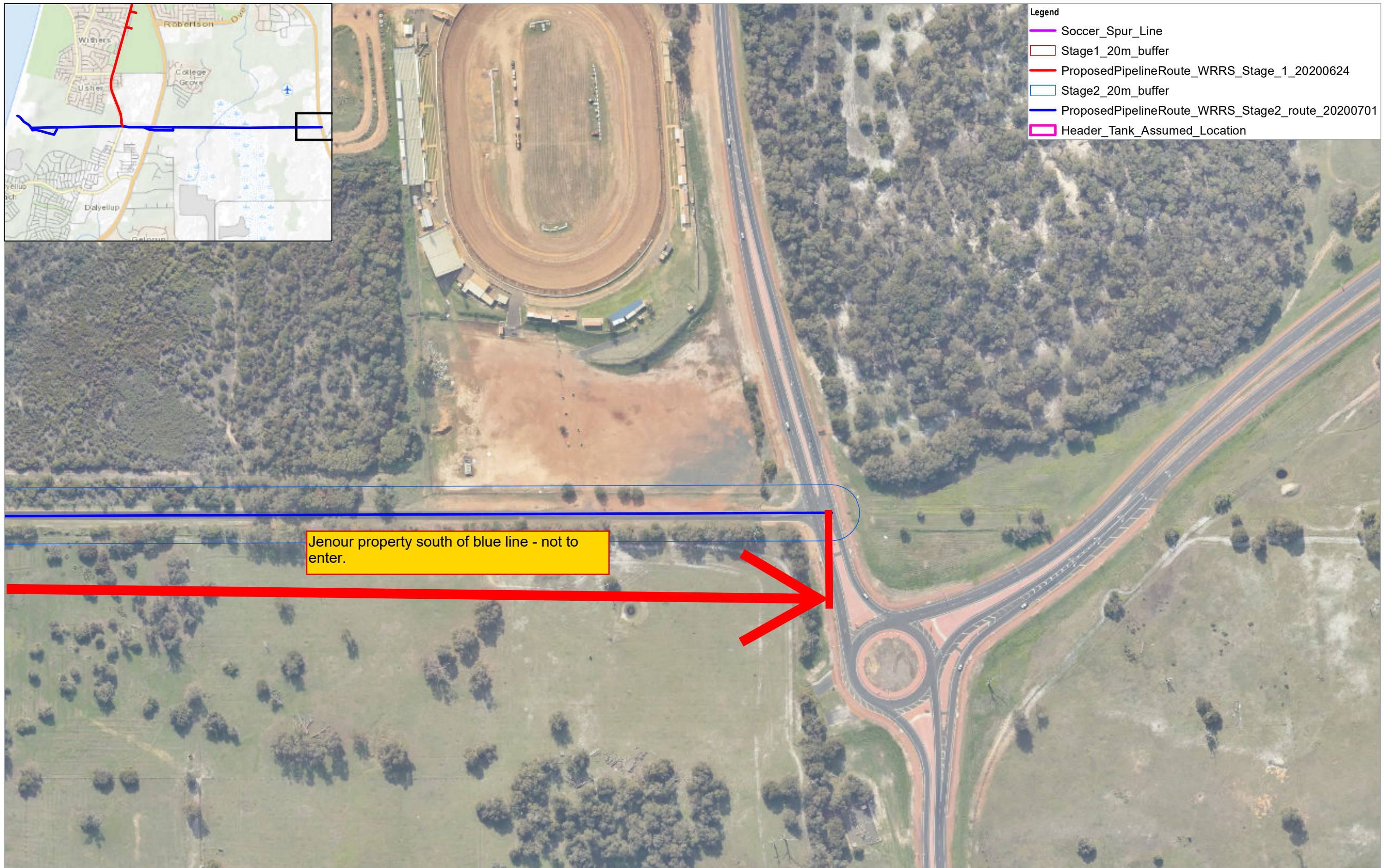
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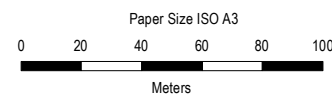
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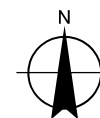
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Jenour property south of blue line - not to enter.



Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 50



**Aqwest**  
Bunbury Water Resources Recovery Schem

**Non-potable licence application -  
Biological Studies**

Project No. **12537061**  
Revision No. **DRAFT**  
Date **27082020**

**FIGURE 1**


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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	V Winton	F Hannon		J Foley		18/02/2021

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