



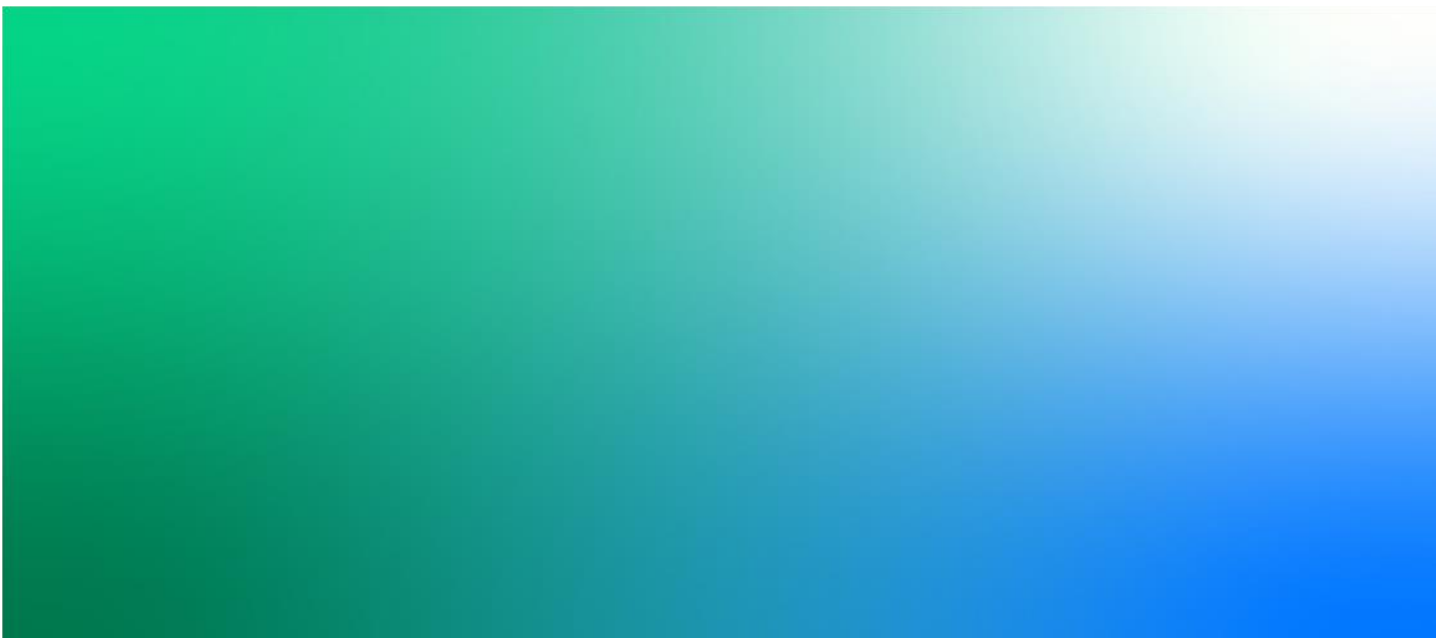
Victorian Murray Floodplain Restoration Project

Lindsay Island Historical Heritage Desktop Assessment

IS297792-CH-CH-RP-0001 | REV 1

13 August 2020

Lower Murray Urban and Rural Water Corporation



Victorian Murray Floodplain Restoration Project

Project No: IS297792
Document Title: Lindsay Island Historical Heritage Desktop Assessment
Revision: REV 1
Date: 13 August 2020
Client Name: Lower Murray Urban and Rural Water Corporation
Program Manager: John Myers
Author: Caroline Seawright
File Name: IS297792-CH-CH-RP-0001

Jacobs Group (Australia) Pty Limited and GHD Pty Ltd trading as R8 Joint Venture
 Floor 11, 452 Flinders Street
 Melbourne VIC 3000
 PO Box 312, Flinders Lane
 Melbourne VIC 8009 Australia
 T +61 3 8668 3000
 F +61 3 8668 3001

© Copyright 2019 The concepts and information contained in this document are the property of Jacobs Group (Australia) Pty Ltd and GHD Pty Ltd trading as R8 Joint Venture. Use or copying of this document in whole or in part without the written permission of R8 Joint Venture constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of R8 Joint Venture's client, and is subject to, and issued in accordance with, the provisions of the contract between R8 Joint Venture and the client. R8 Joint Venture accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document history and status

Revision	Date	Description	Author	Reviewed	Approved
A	29/05/20	Initial draft for issue to VMFRP	C. Seawright	R. Overberg T. Birt	M. Shaw
0	30/07/2020	2 nd draft for issue to VMFRP	C. Seawright	R. Overberg T. Birt	M. Shaw
1	13/08/2020	Final Report	C. Seawright	R. Overberg T. Birt	M. Shaw

Contents

Executive Summary.....	ii
1. Introduction	2
1.1 Project background.....	2
1.2 Project description	2
1.3 Project location.....	3
1.4 Purpose of assessment.....	3
1.5 Desktop assessment.....	4
1.6 Authorship.....	4
1.7 Assumptions and limitations.....	4
2. Desktop review	6
2.1 Heritage context.....	6
2.1.1 Register searches.....	6
2.1.2 Previous historical heritage assessments.....	7
2.2 Historical context.....	8
2.2.1 Historical background.....	8
2.2.2 Historical maps and aerial imagery review	10
2.3 Predictive statement.....	17
2.4 Summary of desktop findings.....	18
3. Impact assessment.....	20
3.1 Proposed works	20
3.1.1 Proposed infrastructure and works.....	20
3.1.2 Proposed inundation	20
3.2 Potential impacts	22
4. Approval requirements.....	24
5. Historical heritage recommendations	25
5.1 Recommendations and project risk.....	25
5.2 Site-specific recommendations.....	25
5.2.1 VHI sites.....	25
5.2.2 RNE place.....	25
5.2.3 Unregistered historical heritage place	26
6. Mitigation measures.....	27
7. References.....	29

List of figures

Figure 1.1: Location of the area of investigation and inundation area.....	5
Figure 2.1: Surveyor's map of Lindsay Island, with approximate area of investigation location in purple (Prichard 1850; 1851)	10
Figure 2.2: 1884 Millewa county map, with approximate location of the area of investigation outlined in purple (Department of Lands and Survey 1884)	11
Figure 2.3: 1912 Grazing Blocks Murray River Frontages tender rough sketch map, not to scale, with approximate location of the area of investigation outlined in purple (Butson 1912).....	12
Figure 2.4: 1925 Parish of Olney map, with approximate location of the area of investigation outlined in purple (Victoria Department of Crown Lands and Survey 1925).....	13
Figure 2.5: 1926 Millewa county map, showing allotments and approximate location of the area of investigation (Hilcke and Staveley 1926).....	13
Figure 2.6: 1929 Millewa county map, with an insert of section A and approximate location of the area of investigation outlined in purple (Department of Lands and Survey 1929)	14
Figure 2.7: 1930 Parish of Woolwoola map, with approximate location of the area of investigation outlined in purple (Victoria Department of Crown Lands and Survey 1930).....	14
Figure 2.8: 1946 aerial imagery with approximate location of the area of investigation outlined in purple (Aerial Survey of Victoria 1946a; 1946b; 1946c; 1946d; 1946e; 1946f; 1946g; 1946h).....	15
Figure 2.9: 1946 aerial imagery showing Berribee Homestead Complex (buildings indicatively circled in red) (Aerial Survey of Victoria 1946b)	16
Figure 2.10: 1946 aerial imagery showing Lock 7 near the confluence of Rufus River and the Murray River (Lock 7 and associated land-based facilities indicatively circled in red) (Aerial Survey of Victoria 1946c)....	16
Figure 2.11: 1946 aerial imagery showing the sand dune where several structures associated with the former Baggot's Cattle Station appear to have once been located (area of interest indicatively circled in red) (Aerial Survey of Victoria 1946f).....	17
Figure 2.12: Location of historical heritage places within proximity to the area of investigation and inundation area	19

List of tables

Table 1: Statutory requirements, mitigation measures and recommendations for heritage places within the area of investigation and inundation areas.....	5
Table 2.1: Historical heritage places within the inundation area	6
Table 2.2: Summary of the existing historical archaeology due diligence assessments	7
Table 3.1: Summary of proposed inundation for each water management area	21
Table 3.2: Potential impacts on historical heritage within the area of investigation and the inundation area	22
Table 4.1: Statutory requirements for heritage within the area of investigation.....	24
Table 6.1: Proposed project activities and specific management measures for the heritage places within the area of investigation and inundation areas.....	27

Abbreviations

CEMP	Construction Environmental Management Plan
CHL	Commonwealth Heritage List
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
the Heritage Act	<i>Heritage Act 2017</i>
HHA	Historical Heritage Assessment
HIA	Heritage Impact Assessment
HO	Heritage Overlay
HV	Heritage Victoria
LEP	Wentworth Local Environmental Plan 2011
LGA	Local Government Area
LMW	Lower Murray Urban and Rural Water Corporation
mAHD	metres above Australian Height Datum
Mallee CMA	Mallee Catchment Management Authority
NHL	National Heritage List
NT	National Trust of Australia (Victoria)
NSW	New South Wales
the project	Lindsay Island Floodplain Restoration Project
R8	R8 joint venture
RNE	Register of the National Estate
SHI	NSW State Heritage Inventory
SHR	NSW State Heritage Register
VHI	Victorian Heritage Inventory
VHR	Victorian Heritage Register
VMFRP	Victorian Murray Floodplain Restoration Project
WHL	World Heritage List
WMA	water management areas

Executive Summary

Project overview

This desktop historical heritage assessment has been prepared for the Lindsay Island Floodplain Restoration Project (the project), to support the preparation of referrals under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Victorian *Environment Effects Act 1978*. The project is one of nine discrete environmental works projects being undertaken as part of the Victorian Murray Floodplain Restoration Project (VMFRP), which is being implemented as part of Victoria's obligations under the Murray Darling Basin Plan. Lower Murray Urban and Rural Water Corporation (LMW) has been nominated by the partnership established to deliver VMFRP, as the project proponent for the purpose of submitting referrals and approval applications.

The project is located in north west Victoria, approximately 75 km west north west of Mildura and 30 km east of Renmark, South Australia. The project is located entirely within the Victorian local government area of Mildura Rural City Council, except for the minor works and inundation located within the NSW local government area of Wentworth Shire Council. The project is predominantly located within the Murray-Sunset National Park and in the localities of Murray-Sunset, Lindsay Point and Neds Corner in Victoria and the locality of Rufus in NSW.

The project involves works to facilitate managed inundation of approximately 4,845 ha of high ecological value floodplain in Victoria, mostly located on Lindsay Island. Lindsay Island is approximately 28 km long east to west and is enclosed by the Murray River in the north and the Lindsay River anabranch in the south. The project would also involve inundation of floodplain areas south of the Lindsay River, including Lake Wallawalla. In order to engage inflows to the Lindsay River, operation of the project would involve raising water levels along the Murray River behind Lock 7, which would also inundate some lower-lying billabongs and creeks on the NSW side of the Murray River. Approximately 263 ha of inundation would occur in NSW, most of which would be within the Murray River. The total inundation area for the project is 5,108 ha including inundation in Victoria and NSW. By restoring a more natural inundation regime, the project aims to mimic the impact of prior to river regulation natural flood events, improving the condition of vegetation communities, and providing seasonal aquatic habitat for native fauna.

The project comprises six main water management areas (WMAs):

- Berribee WMA – comprises a 3,507 ha inundation area in Victoria and 263 ha of inundation NSW
- Crankhandle WMA – comprises a 299 ha Upper Tier and a 17 ha Lower Tier inundation area
- Crankhandle West WMA comprises a 23 ha Upper Tier and a 72 ha Lower Tier inundation area
- Lindsay South WMA – comprises a 140 ha inundation area
- Wallawalla East WMA – comprises a 164 ha inundation area
- Wallawalla West WMA – comprises a 623 ha inundation area.

To facilitate environmental watering, the project involves construction of a large regulator on the Lindsay River near Berribee Homestead, additional regulators, containment banks and channels across the floodplain to distribute and retain floodwaters, two drop structures into the Lindsay River and one drop structure into the Murray River to enable controlled release of managed floodwaters, three temporary pump hardstands, a permanent pump suction line into Lake Wallawalla, along with access track works and temporary construction laydown areas near the Berribee Regulator. These project components are all included in the area of investigation assessed in this report.

In addition, a number of ancillary project components have also been identified as being required to facilitate the project works including the construction of boat ramps / barge wharves on the Lindsay River to facilitate construction of the Berribee Regulator, additional temporary laydown areas and temporary pump stations to source construction water supply at various locations, and installation of coffer dams to enable dewatering of work sites in the Lindsay River, Murray River and other locations where required to minimise the risk of

inundation during construction. Where practicable, it is understood that these ancillary activities would be located within the area of investigation.

The following terms are used throughout this report to describe the project:

- Area of investigation - this includes the development footprint, as well as a buffer around the construction footprint and access tracks.
- Development footprint - this is the area that the project infrastructure (e.g. regulators, drop structures, pump hardstands, containment banks, channels, spillways) will occupy, along with currently identified construction laydown areas. No construction working buffer or access tracks are included in the development footprint.
- Construction footprint - this includes the project infrastructure as well as the land required to construct the infrastructure. This includes a 5 m wide corridor along access tracks.
- Inundation area - area of land subject to flooding during managed events, up to a specific design water level.

Design is currently being refined as part of the design process and in response to environmental and heritage studies. The area of investigation that has been established and assessed in this report provides a buffer around the current design of the development footprint and access tracks to allow for future changes. Any changes occurring outside of this area of investigation would require further assessment to identify their potential to impact on historic heritage values.

Desktop review

There are no listed historical heritage places that intersect with the area of investigation, but three historical heritage places intersect with the inundation area: Lindsay Creek North Ferry Crossing (VHI H7129-0001), Lindsay Creek South Ferry Crossing (VHI H7129-0002), and Lock and Weir No 7 (RNE 101494). Unlike the Victorian Heritage Inventory (VHI), the Register of the National Estate (RNE) is a non-statutory listing. Prior historical heritage assessments indicate that the Berribee Homestead Complex intersects with the area of investigation, and that Berribee Station Barge and the area of the former Baggot's Cattle Station comprise potential historical heritage places that intersect with the inundation area.

There is moderate potential for previously unidentified historical heritage items to be present within the area of investigation and the inundation area, from the background history of the area. Site types most likely to be identified in the area of investigation and the inundation area would be heritage places or archaeological sites associated with early agricultural or pastoral activities, logging, river shipping, and water management practices.

Impact assessment

There are no listed historical heritage places that intersect with the area of investigation. However, works (Section 3.1) may impact upon the historical heritage values of the unlisted historical heritage place, Berribee Homestead Complex, as assessed by Bell (2013) and outlined in Table 2.2. This assessment is based on the inclusion of the Berribee Homestead Complex within the area of investigation assessed in this report as a potential location of construction laydown. However, following further review of constructability requirements and assessment findings, it is understood that it is no longer intended that this area would be used for construction laydown. Assessment of potential impacts and approval requirements relating to this unlisted historical heritage place within the area of investigation has been retained in this report for completeness.

The proposed inundation area (Section 3.1.2) may impact upon Lindsay Creek North Ferry Crossing (VHI H7129-0001), Lindsay Creek South Ferry Crossing (VHI H7129-0002), and Lock and Weir No 7 (RNE 101494), and the possible location of the Berribee Station Barge, and Baggot's Cattle Station, which may comprise the archaeological remains of E.M. Bagot's 1850-late 1800s cattle station as noted in Sections 2.2.1 and 2.2.2.

Additionally, the proposed works and inundation may impact upon previously unidentified historical heritage items or archaeological sites due to the moderate potential for such to be present within the area of investigation and inundation area.

Approvals, mitigation measures and recommendations

Table 1 contains a summary of statutory requirements, mitigation measures and recommendations for heritage places within the area of investigation and inundation area. If the scope of works changes to include features other than the heritage places detailed in Table 1, further heritage assessment would be required, and this assessment will need to be updated.

Table 1: Statutory requirements, mitigation measures and recommendations for heritage places within the area of investigation and inundation areas

Place	Statutory requirements	Recommendations	Mitigation measures
Entire area of investigation	<p>Discovery of archaeological sites - under Section 127 of the <i>Heritage Act 2017</i>, if an archaeological site is discovered during construction or excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to Heritage Victoria (HV).</p> <p>Under the NSW <i>Heritage Act 1977</i>, should any unexpected historical materials, features or deposits be discovered in NSW at any time prior to, or during, the project, the person in charge must stop work, protect item and inform Wentworth Shire Council and the Department of Premier and Cabinet (Heritage) as soon as practicable. The relic provisions in the <i>Heritage Act 1977</i> also require that an excavation permit be obtained from the Heritage Council of NSW prior to commencement of works if disturbance to a site with known or potential archaeological relics is proposed.</p>	<p>Due to the moderate potential for previously unidentified historical heritage items or archaeological sites to be present within the area of investigation and inundation area, as identified in Section 2.4, it is recommended that a Historical Heritage Assessment (HHA) be undertaken for the project.</p> <p>The HHA should include a field survey within the area of investigation to identify further historical archaeological sites and unidentified historical heritage places, and a significance assessment of these potential historical places.</p> <p>If any historical heritage items or archaeological sites are identified as part of the HHA, a Heritage Impact Assessment (HIA) would be required, including:</p> <ul style="list-style-type: none"> Assessment of impacts on all historical heritage sites Detailed identification of mitigation measures and approval requirements A Heritage Impact Statement. <p>All historical archaeological places are protected under the <i>Heritage Act 2017</i>, whether they are registered or not. Further historical research to ascertain the likely presence of any historical archaeological places or material within the area of investigation is recommended to reduce the risk of delays to the project. Such delays would include the stoppage of works to avoid damage or destruction of historical archaeological sites and materials while the appropriate approvals are sought. This would enable VMFRP to proactively consider the nomination of historical heritage archaeological deposits ahead of the works, which would provide VMFRP with more certainty in relation to timeframes and statutory obligations. The completion of the HIA for the project would mitigate these issues.</p> <p>In NSW, the <i>Heritage Act 1977</i> protects relics which are defined as: 'Any deposit, artefact, object or material evidence that relates to the settlement of the area that comprises NSW, not being Aboriginal settlement; and is of State or local heritage significance'.</p>	<p>General mitigation measures to be implemented across the area of investigation:</p> <ul style="list-style-type: none"> Historical heritage awareness training should be completed as part of the site induction for all personnel and/or contractors prior to the commencement of construction works to ensure: <ul style="list-style-type: none"> an understanding of where all heritage places are located within the area of investigation an understanding of the potential heritage places that may be impacted during the project the procedures required to be undertaken in the event of discovery of historical heritage material, features or deposits, or the discovery of human remains If an archaeological site is discovered in Victoria during construction or excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to HV If an archaeological relic is discovered in NSW during construction or excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to Wentworth Shire Council and the Department of Premier and Cabinet (Heritage) A copy of this report should be kept onsite and on file with the project records. All contractors and/or project staff should be made aware of the heritage status of the heritage places in the area of investigation prior to works taking place.

Place	Statutory requirements	Recommendations	Mitigation measures
Lindsay Creek North Ferry Crossing (VHI H7129-0001)	A Consent from Heritage Victoria may be required under s.124 of the Heritage Act for the works to proceed at Lindsay Creek North Ferry Crossing (VHI H7129-0001) and Lindsay Creek South Ferry Crossing (VHI H7129-0002).	Lindsay Creek North Ferry Crossing (VHI H7129-0001) and Lindsay Creek South Ferry Crossing (VHI H7129-0002) are located in the inundation area and may be impacted by inundation. These heritage sites may also be impacted by the boat ramps / barge wharves required for construction of the Berribee Regulator depending on their locations (which are not yet determined; however, it is understood that the project would avoid locating boat ramps/wharves in areas potentially impacting these historic features).	<p>As there is potential for the fabric and significance of archaeological sites Lindsay Creek North Ferry Crossing (VHI H7129-0001) and Lindsay Creek South Ferry Crossing (VHI H7129-0002) to be impacted by erosion from inundation, and from potential impact due to the construction of boat ramps / barge wharves (depending on their final locations), the following mitigation measures must be implemented to avoid any adverse impacts where practicable to the heritage values of the site:</p> <ul style="list-style-type: none"> It is recommended that advice be sought from a qualified hydrologist to determine the impact erosion would have on the historic crossings, and any implementation measures that could be implemented to avoid erosion of the historic ferry crossings It is recommended that the historic ferry crossings should be subject to a site inspection by a suitably qualified archaeologist prior to the start of works, and recommendations for further assessment will be provided after consultation with HV.
Lindsay Creek South Ferry Crossing (VHI H7129-0002)		As such, a qualified hydrologist should be engaged to assess the potential for impact from erosion on these archaeological sites. It is also recommended that these sites be inspected by a suitably qualified archaeologist to determine the extent of the archaeological potential of these places as part of the HHA, which should inform the selection of the boat ramp / barge wharf sites near the Berribee Regulator.	
Lock and Weir No 7 (RNE 101494)	As the RNE is a non-statutory listing, there is no statutory requirement to undertake further work for Lock and Weir No 7 (RNE 101494).	Lock 7 and the Weir are listed on the non-statutory RNE, which indicates that the item may have heritage values. As such, it is recommended that an inspection and heritage assessment should be undertaken of this item part of the HHA to assess the condition and to reassess the heritage values of the item. Impact to this item is unlikely as it will continue to be used for its intended purpose.	<p>If the place is determined to have heritage significance:</p> <ul style="list-style-type: none"> The Lock and Weir should be subject to a site inspection by a suitably qualified archaeologist during the HHA, and recommendations for further assessment will be provided after consultation with HV and the Department of Premier and Cabinet (Heritage).
Berribee Homestead Complex	This place is not listed on any heritage registers. However, this historical heritage place was assessed as having high local significance and was recommended for inclusion on the HO (Bell 2013).	<p>Although Berribee Homestead Complex is not listed on a heritage register, based on the assessment undertaken by Bell (2013), it is recommended that a site inspection be undertaken to record conditions and reassess its heritage significance. The place includes outbuildings (homestead, manager's cottage, woolshed, stockyards, garage and engine shed, stables and harness shed and meat safe).</p> <p>It is also recommended that consultation with the Mildura Rural City Council be undertaken to ascertain the status of these potential historical heritage places as they are not currently listed on the HO. Mildura Rural City Council are currently undertaking a Heritage Study in the northern part of the LGA. The extent and nature of the places being assessed in this Heritage Study is currently unknown. There is the potential that this item may be assessed or included in the Heritage</p>	<p>It is recommended that the project avoid all potential heritage fabric associated with the Berribee Homestead Complex.</p> <p>While the project intends to avoid works in this area, should works intersect with the site, it is recommended that the following mitigation measures be implemented to avoid any adverse impacts to the heritage values of the site, as assessed by Bell (2013):</p> <ul style="list-style-type: none"> The heritage fabric of the Berribee Homestead Complex should be avoided by erecting protective barrier fencing between the project areas and the homestead, manager's cottage, woolshed, stockyards, garage and engine shed, stables and harness shed and meat safe, and the remainder laydown area

IS297792-CH-CH-RP-0001

Important note about your report

The purpose of R8's engagement under the Victorian Murray Floodplain Rehabilitation Project (VMFRP) is to design infrastructure for VMFRP including regulators, levees, roads, access tracks and culverts. The designs are required to be suitable for construction pricing to inform business case prioritisation. The purpose of this infrastructure is to allow floodplains to be watered at the hydraulic design levels nominated by VMFRP. R8 is also engaged to provide Regulatory Approvals and Cultural Heritage Services. The purpose of these services is for VMFRP to lodge the necessary approvals documents for the project with the relevant approval authorities.

The sole purpose of this report and the associated services performed by R8 is to complete a Desktop Historical Heritage Assessment for VMFRP in accordance with the scope of services agreed between R8 and VMFRP.

R8 has prepared this report in accordance with the usual care and skill expected of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. However, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

In preparing this report, R8 has relied on the information provided by VMFRP. In particular, R8 is reliant on VMFRP's prior flood modelling work to define inundation levels and extents. R8 is not responsible for achievement of the project's desired operational ecological outcomes.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by R8 for use of any part of this report in any other context. This report has been prepared on behalf of, and for the exclusive use of VMFRP, and is subject to, and issued in accordance with, the provisions of the agreement between R8 and VMFRP. R8 accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

1. Introduction

1.1 Project background

The Lindsay Island Floodplain Restoration Project (the project) is one of nine discrete environmental works projects being undertaken as part of the Victorian Murray Floodplain Restoration Project (VMFRP), which is being implemented as part of Victoria's obligations under the Murray Darling Basin Plan. The VMFRP aims to restore a more natural inundation regime across more than 14,000 ha of high ecological value Murray River floodplain in Victoria through the construction of new infrastructure and modification of existing infrastructure.

The VMFRP is being implemented in partnership between Lower Murray Urban and Rural Water Corporation (LMW), Goulburn Murray Rural Water Corporation (GMW), Mallee Catchment Management Authority (Mallee CMA), North Central Catchment Management Authority (North Central CMA), Parks Victoria and the Department of Environment, Land, Water and Planning (DELWP), and is funded by the Commonwealth Department of Agriculture, Water and Environment (DAWE). LMW has been nominated by the partnership as the project proponent for the purpose of submitting referrals and approval applications.

R8 is a joint venture formed between Jacobs and GHD, which has engaged by LMW to deliver design, cultural heritage and approvals services for the VMFRP. This desktop historical heritage assessment has been prepared for the project to support the preparation of referrals under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Victorian *Environment Effects Act 1978*.

1.2 Project description

The project involves works to facilitate managed inundation of approximately 4,845 ha of high ecological value floodplain in Victoria, mostly located on Lindsay Island and floodplain areas south of the Lindsay River, including Lake Wallawalla. In order to engage inflows to the Lindsay River, operation of the project would involve raising water levels along the Murray River behind Lock 7, which would also inundate some lower-lying billabongs and creeks on the NSW side of the Murray River. Approximately 263 ha of inundation would occur in NSW, most of which would be within the Murray River. The total inundation area is 5,108 ha. By restoring a more natural inundation regime, the project aims to mimic the impact of prior to river regulation natural flood events, improving the condition of vegetation communities, and providing seasonal aquatic habitat for native fauna.

The project comprises six main water management areas (WMAs):

- Berribee WMA – comprises a 3,507 ha inundation area in Victoria and 263 ha of inundation NSW
- Crankhandle WMA – comprises a 299 ha Upper Tier and a 17 ha Lower Tier inundation area
- Crankhandle West WMA comprises a 23 ha Upper Tier and a 72 ha Lower Tier inundation area
- Lindsay South WMA – comprises a 140 ha inundation area
- Wallawalla East WMA – comprises a 164 ha inundation area
- Wallawalla West WMA – comprises a 623 ha inundation area.

Within the WMAs, the project involves construction of four large regulators (including the primary Berribee Regulator on the Lindsay River near Berribee Homestead), 16 small regulators, two un-gated culverts, two drop structures into the Lindsay River, one drop structure into the Murray River, 9 km of containment banks, 1.6 km of new excavated channels, three temporary pump hardstands at the Lindsay South, Wallawalla East and Wallawalla West WMAs, one permanent pump suction pipeline into Lake Wallawalla for the Wallawalla West WMA, a 50 m x 50 m secure storage compound on the northern bank of the Lindsay River near the Berribee Regulator, construction of 5 km of new access track and maintenance / upgrades to approximately 82 km of existing access tracks, and establishment of three temporary construction laydown areas near the Berribee Regulator. These project components are all included in the area of investigation assessed in this report (see Figure 1.1).

In addition, a number of ancillary project components have also been identified as being required to facilitate the project works including the construction of boat ramps / barge wharves on the Lindsay River to facilitate construction of the Berribee Regulator, additional temporary laydown areas and temporary pump stations to source construction water supply at various locations, and installation of coffer dams to enable dewatering of work sites in the Lindsay River, Murray River and other locations where required to minimise the risk of inundation during construction. Where practicable, it is understood that these ancillary activities would be located within the area of investigation.

Design is currently being refined as part of the design process and in response to environmental and heritage studies. The area of investigation that has been established and assessed in this report provides a buffer around the current design of the development footprint and access tracks to allow for future changes. Any changes occurring outside of this area of investigation would require further assessment to identify their potential to impact on historic heritage values.

Further description of the proposed works is provided in Section 3.1.1 and proposed inundation is provided in Section 3.1.2.

1.3 Project location

The project is located in north west Victoria, approximately 75 km west north west of Mildura and 30 km east of Renmark, South Australia. Floodplain areas targeted for restoration by the project are mostly located on Lindsay Island. Lindsay Island is approximately 28 km long east to west and is enclosed by the Murray River in the north and the Lindsay River anabranch in the south. The project also involves targeted inundation of floodplain areas south of the Lindsay River, including Lake Wallawalla.

The project is located entirely within the Victorian Local Government Area (LGA) of Mildura Rural City Council, except for the minor works and inundation located within the NSW LGA of Wentworth Shire Council. The project is located in the localities of Murray-Sunset, Lindsay Point and Neds Corner in Victoria and the locality of Rufus in NSW.

The following terms are used to describe the project area (refer to Figure 1.1):

- Area of investigation - this includes the development footprint, as well as a buffer around the construction footprint and access tracks.
- Development footprint - this is the area that the project infrastructure (e.g. regulators, drop structures, pump hardstands, containment banks, channels, spillways) will occupy, along with currently identified construction laydown areas. No construction working buffer or access tracks are included in the development footprint.
- Construction footprint - this includes the project infrastructure as well as the land required to construct the infrastructure. This includes a 5 m wide corridor along access tracks.
- Inundation area - area of land subject to flooding during managed events, up to a specific design water level.

1.4 Purpose of assessment

The purpose of this desktop historical heritage assessment is to:

- Identify registered historic heritage places potentially impacted by construction works or managed inundation
- Identify likelihood of unregistered historic heritage being encountered in construction areas
- Describe likely approval requirements
- Describe further investigations and/or recommended management measures.

1.5 Desktop assessment

This desktop assessment involved the following activities:

- Register searches
- Review of previous heritage reports and local heritage studies, site cards and other site information (including a review and update of the existing historical archaeology due diligence assessment previously prepared for the project by Jo Bell Heritage Services (Bell 2013))
- Background historical research including historical maps and plans
- Synthesis of background information to identify known heritage places both in the area of investigation and within the inundation areas, and areas with potential for previously unidentified heritage places
- Summary of potential impacts and mitigation measures
- Identifying further heritage investigation required to meet legislative requirements and to minimise project risk
- Identifying approvals requirements under the *Heritage Act 2017* (Victoria), *Heritage Act 1977* (NSW), local planning schemes, and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.6 Authorship

This report was prepared by Caroline Seawright (Project Archaeologist, R8). Mapping was prepared by Nicole Kiely (Senior Consultant – Spatial and Information Services, R8). A technical review was undertaken by Rose Overberg (Principal Heritage Consultant, R8).

1.7 Assumptions and limitations

The constraints are as follows:

- The assessment was undertaken using the area of investigation and inundation area based on the IFR design current at and provided on 28 April 2020 by Milos Pelikan (Principal Spatial Analyst, R8)
- No field investigation was undertaken
- The register searches were undertaken on 7 May 2020 and any findings within this report are based on those search results. As such, this report is accurate as to the date of that generation.
- The NSW inundation area is located mostly within the Murray River and former Lake Victoria State Forest, within the Berribee WMA. VMFRP are currently engaging with the Murray-Darling Basin Authority (MDBA) around the raising of the Lock 7 weir pool and how the proposed Lock 7 operating regime compares to the current operating regime. Impacts associated with changes to the operating regime of Lock 7 and the resultant inundation area in NSW have therefore not yet been assessed. This report identifies listed heritage places (if present) in the NSW inundation areas. However, further assessment, including background historical research, will need to be carried out in relation to the potential for unlisted heritage places to occur in the NSW inundation area and if present, the potential for impacts on unlisted heritage places.

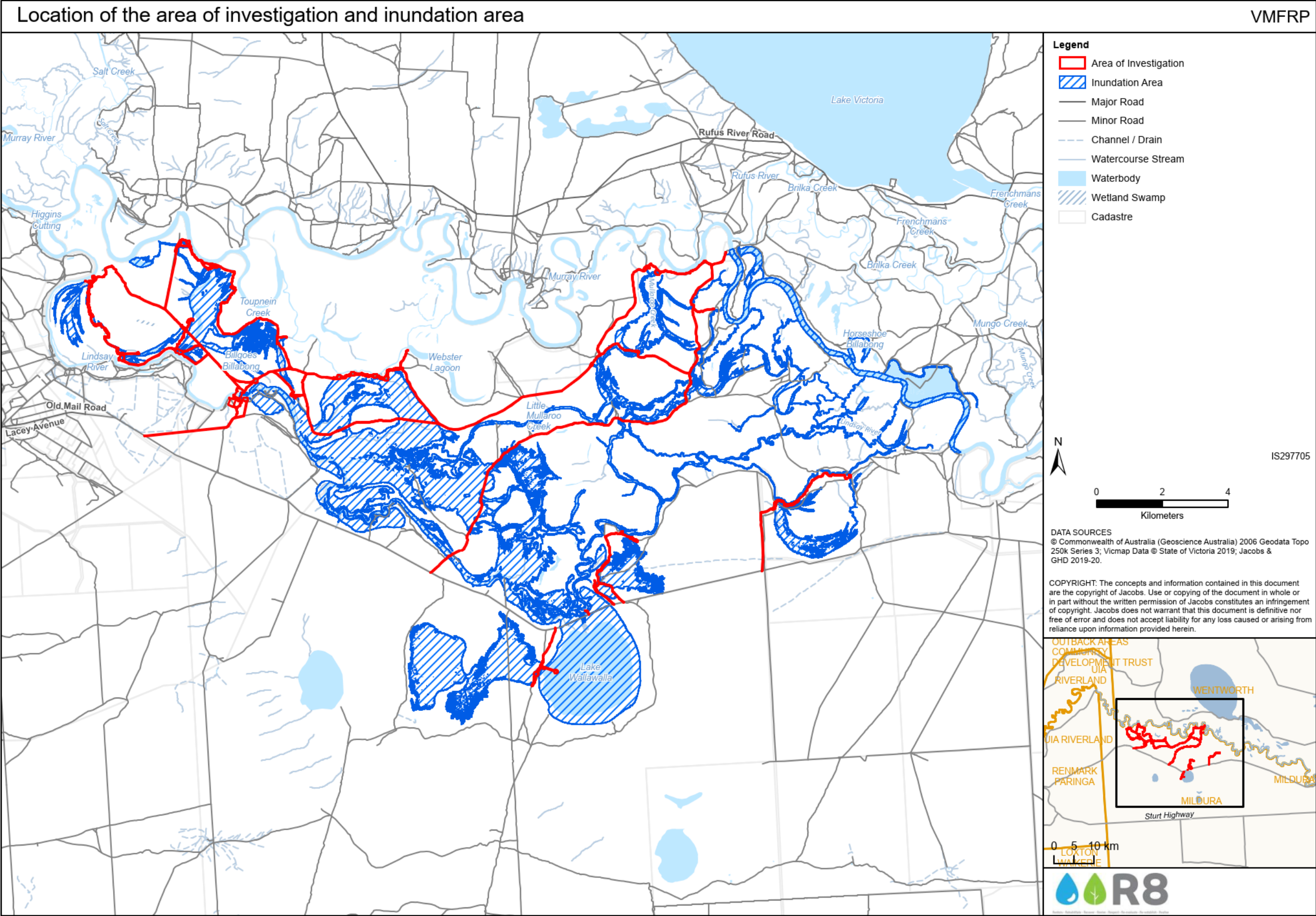


Figure 1.1: Location of the area of investigation and inundation area

2. Desktop review

2.1 Heritage context

2.1.1 Register searches

The following heritage registers were searched on 7 May 2020 by Caroline Seawright (Project Archaeologist, R8) to determine whether any known historical heritage places were present within or in proximity to the area of investigation and to the inundation area:

- Victorian Heritage Register (VHR)
- Victorian Heritage Inventory (VHI)
- Mildura Planning Scheme Heritage Overlay (HO)
- NSW State Heritage Inventory (SHI)
- NSW State Heritage Register (SHR)
- Wentworth Local Environmental Plan 2011 (LEP)
- Commonwealth Heritage List (CHL)
- National Heritage List (NHL)
- World Heritage List (WHL)
- Register of the National Estate (RNE)
- National Trust of Australia (Victoria) (NT).

The RNE was formerly compiled as a record of Australia's natural, cultural and Aboriginal heritage places worth keeping for the future. The RNE was frozen on 19 February 2007, which means that no new places have been added or removed since that time. The RNE is maintained on a non-statutory basis as a publicly available archive. For the purposes of this historical heritage desktop assessment, only RNE places with historical heritage values will be examined.

There are no listed historical heritage places that intersect with the area of investigation, but three historical heritage places intersect with the inundation area: Lindsay Creek North Ferry Crossing (VHI H7129-0001), Lindsay Creek South Ferry Crossing (VHI H7129-0002), and Lock and Weir No 7 (RNE 101494) (Table 2.1, Figure 2.12).

Table 2.1: Historical heritage places within the inundation area

Heritage database	Register number	Name	Address	Description	Distance from inundation
VHI	H7129-0001	Lindsay Creek North Ferry Crossing	Sandford Track, Murray-Sunset	Ferry crossing	Intersecting
VHI	H7129-0002	Lindsay Creek South Ferry Crossing	Channel Track, Lindsay Point	Ferry crossing	Intersecting
RNE	101494	Lock and Weir No 7	Rufus River, NSW	Lock and weir	Intersecting

According to the VHI site cards (Kenderdine 1993a; 1993b), threats to the Lindsay Creek Ferry Crossing sites in 1993 include inundation during high river levels. The site card for VHI H7129-0001 states that the site comprises the 'extant remains of mechanisms of crossing, including pulley, iron piping, pulley remains, wire rope and many piles', and VHI H7129-0002 comprises a 'cutting in bank and several piles'. As such, they are both significant as sites that demonstrate the needs of crossing stock and passengers across the physical barrier that the river represents to transport and communication.

2.1.2 Previous historical heritage assessments

There have been three historical heritage investigations undertaken in proximity to the area of investigation (Table 2.2). In addition, the Stage 1 Draft Thematic Environmental History of the *Mildura Heritage Study (Part B)* is currently being undertaken by Context Pty Ltd, and is currently unavailable for review (Mildura Rural City Council 2020).

Table 2.2: Summary of the existing historical archaeology due diligence assessments

Author	Summary
Andrew Ward and Associates (1988)	<p>The Conservation Study for the City and Shire of Mildura was undertaken in 1986 by Andrew Ward and Associates, for the City and Shire of Mildura, the Federal Government's National Estate Program, and the Historic Buildings Council. Three conservation precincts were identified within the City of Mildura, at Deakin Avenue, Chaffey Avenue and Lemon Avenue, and six within the Shire of Mildura at Psyche Bend and pumping station, Kings Billabong pumping station, Red Cliffs town centre, Merringur township, Millewa South railway, and at Kulnine station, Lock 9 and Millewa A pumping station. Additionally, 57 individual heritage places were identified within the City of Mildura, and 50 within the Shire of Mildura. None of these heritage places or conservation precincts were within the localities of Murray-Sunset, Lindsay Point or Neds Corner.</p> <p>None of these historical heritage places intersect with the current area of investigation or inundation area.</p>
Hyett and Rhodes (2001)	<p>Terra Culture completed an archaeological desktop study of Wallpolla Island and Lindsay Island on behalf of Egis Consulting and Goulburn-Murray Water. It was undertaken to provide a preliminary identification of heritage issues within the two study areas, as part of a water management planning study. Due to time constraints, the historical portion of the assessment was desktop only and based on data obtained from heritage registries and Heritage Victoria. The study area comprised Lindsay Island and Wallpolla Island, 50 kilometres to the east. Both are part of the floodplains of the Murray River.</p> <p>The desktop study noted that both areas were public land which had been subject to past grazing leases. Wallpolla Island, as part of the Wallpolla State Forest, had been logged for hardwood, while Lindsay Island is part of the Murray-Sunset National Park.</p> <p>The study identified two VHI-listed sites on Lindsay Island, both relating to a punt crossing of the Lindsay River situated near Berribee Homestead: Lindsay Creek North Ferry Crossing (H7129-0001) and Lindsay Creek South Ferry Crossing (H7129-0002). The site on the northern bank comprises the remains of the crossing mechanism, consisting of a pulley, piping, wire rope and wooden piles. The remains of unidentified ferries were also extant on both sides of the river. On the southern bank, the site consists of a cutting in the bank and several piles. These sites are regarded as of historic significance, being the most substantial ferry crossing remains found during a study of River Shipping in the area.</p> <p>The predictive model for historical heritage suggested that:</p> <ul style="list-style-type: none"> Historic archaeological sites relating to river shipping may be found along the major streams in the area Sites relating to prior non-Aboriginal use of the land in the pastoral industry and timber getting may be found across all landforms. <p>This predictive model is directly applicable for the current area of investigation.</p>
Bell (2013)	<p>Jo Bell Heritage Services undertook an historic due diligence assessment on behalf of the Mallee Catchment Management Authority (CMA) as part of proposed water management options for the Lindsay Island floodplain. The report was prepared for the proposed regulator sites, track raising and embankments situated on the Lindsay Island floodplain. The purpose of the report was for it to be used as a planning tool in identifying historic archaeological values to influence the design process for the proposed structures. Since then, the area of investigation has changed, and the areas assessed in the report only intersect with small sections of the current area of investigation. As such, the entire current area of investigation has not been assessed.</p> <p>A register search identified Lindsay Creek North Ferry Crossing (H7129-0001) and Lindsay Creek South Ferry Crossing (H7129-0002). No predictive model for archaeological potential was included in the report.</p> <p>The site inspection comprised an investigation area of 100 m radius around each of the proposed structures. The site inspection indicated that logging was evident throughout the area. Berribee Station Homestead Complex was inspected, and noted as including a highly modified timber homestead and timber cottage, the remains of the stables and harness shed, post and rail yards and shearing shed (woolshed) outside the assessment area. All that remained of the two asbestos-constructed cottages that were within the assessment area was a portion of broken concrete slab.</p>

Author	Summary
	<p>The assessment for Berribee Station Homestead Complex, which was not included by HV on the VHI although a site card was submitted, stated:</p> <p>‘This place represents an excellent example of an early-mid C20th pastoral station with most outbuildings remaining, including the homestead, manager’s cottage, woolshed, stockyards, garage and engine shed, stables and harness shed and meat safe. It is a true reflection of the early-mid C20th pastoral industry in the Millewa region.</p> <p>‘The place is assessed as having high local significance against Criteria A, C, D and G’ (Bell 2013, p. 25).</p> <p>Additionally, two historical features were identified during the site inspection as being recorded within 100 m of a proposed structure, which are not included in the VHI listings, or noted on any other heritage register. Both archaeological sites were associated with river transport and pastoralism. These comprised a ‘Berribee Station Barge’, which is associated with the Berribee Homestead Complex, was identified near the Berribee Regulator and is approximately 170 m to the north east of the homestead:</p> <p>‘This place comprises the remains of a stock-carrying barge dating from the mid-late 20th century and is associated with the pastoral industry and river transport. Used to carry sheep over the Lindsay Island for grazing, it is submerged in the area where it was used. As such, the place retains its aesthetic value. The social and historic value of the place is embodied in its association with Berribee Station, which was a major player in the early Millewa pastoral industry. The barge was stripped prior to its sinking and while only a little of the bow remains above water, it is unlikely that there will be any archaeological deposits associated with the place. It is unclear how much remains intact below the water line.</p> <p>The place is assessed as having high local significance against Criteria A and G’ (Bell 2013, p. 53).</p> <p>And the ‘North West Lindsay Punt Landing’, which is situated approximately 950 m east of Lindsay Point farmland, and is not within or adjacent to the area of investigation:</p> <p>‘This place comprises the remains of a landing site for a punt, probably used to carry people across the Lindsay River. A few steel pylons, two steel stringers and some steel cable is all that remains. The landing is situated on an alluvial flat associated with the south bank of the Lindsay River. Whilst the place demonstrates the use of river transport, very little remains. It is unlikely to contain any associated archaeological deposits. Episodic flooding and the removal of any (potential) associated infrastructure means that the place has little aesthetic, social or historic value. It has no scientific value.</p> <p>The place is assessed as having low local significance against Criterion G’ (Bell 2013, p. 53).</p> <p>However, the report also noted that HV had chosen not to include these features on the VHI.</p> <p>No further areas of potential sensitivity were identified for historic archaeological sites during the site inspection. The report further stated that as many known historical structures were located on waterways or flood ways, not all of them are readily accessible. As such, few historic sites have been identified away from the main access of the Lindsay River.</p>

2.2 Historical context

2.2.1 Historical background

Non-Aboriginal settlement of the Lindsay Island region first occurred after Charles Sturt’s exploratory expedition along the Murray River in 1830, and Major Thomas Mitchell’s Australia Felix exploration in 1836 (Bell 2013, p. 17). Sturt named Lindesay River (now known as Lindsay River) on 27 January 1830 after his commanding officer, Colonel Patrick Lindesay (Cumpston 1951; Feeken 2019). An 1838 map of the South Eastern Portion of Australia and Mitchell’s three expeditions show that Mitchell crossed to the north side of the Murray River on 15 June 1836, to the east of the area of investigation near the confluence of the Murray and Murrumbidgee Rivers, and continued westwards along the Murray River before headed northwards along the Darling River after 30 May 1836 (Mitchell 1838).

In 1848, Lindsay Island was gazetted as its own pastoral run (called ‘Lindsaye Island’ in the *Argus* (12 December 1848, p. 4)) covering approximately 64,000 acres of land, with a grazing capacity of 600 cattle. The Woolwolla (called ‘Woolwolla’ in the *Argus* (12 December 1848, p. 4)) pastoral run occupied approximately 86,000 acres along Lindsay Island’s southern border, with a grazing capacity of 8,000 sheep (Craig 2013; Spreadborough and Anderson 1983). George Tingcombe was the original licensee of both the Lindsay Island and Woolwolla runs from 1847 (Context Pty Ltd 2013, pp. 10–11).

By 1850, Lindsay Island had become Agricultural College Reserve 85.A14978 (Figure 2.1). At the time, Lindsay Island Station was occupied by E.M. Bagot, who ran 'Baggots Cattle Station' from 1850 into the late 1800s (Whitworth 1870). Lindsay Island Reserve was noted in the 1895 balance sheets of the Trustees of Agricultural Colleges and the Council of Agricultural Education. As such, the land on Lindsay Island was being rented out by the Agricultural College in the late 1800s (Agricultural Education 1895a; 1895b), after having been permanently reserved as endowments for State Agricultural Colleges and Experimental Farms by Orders of the Council on 9 December 1885 (Victorian Government 1912, pp. 27-29); this appears to be in response to Lindsay Island being put up for auction in 1884 (Figure 2.2). In these orders, Lindsay Island was described as:

'Forty-two thousand acres, more or less, county of Millewa, being the land bounded on the north by the Murray River, and on the south and southwest by the Lindsay River, and known as Lindsay Island. Excepting allotment A, parish of Warina' (Victorian Government 1912, p. 29).

The Lindsay Island permanent reservation was revoked in 1912, allowing the land to be used for other purposes (Victorian Government 1912, pp. 27-29). The former Lindsay Island and Woolwoola runs, along with runs to Woolwoola's south, were then subdivided into grazing block allotments and put out for tender. Lindsay Island itself, apart from a small allotment to the north of Lake Wallawalla adjacent the Murray River (Figure 2.3), was divided into allotments 2 (133,092 acres), 3 (114,431 acres) and 4 (82,489 acres). No townships or villages appear to have been settled within the area of investigation.

In 1915, Lindsay Island was proclaimed a State Forest under the 1915 Forest Act. By the 1920s, land within the Parish of Olney had been subdivided to the west and southwest of Lindsay Island, with a telephone line having been installed to the west of Lindsay Island. However, land adjacent to the Lindsay River was Crown Land that had been reserved for public purposes (Figure 2.4-Figure 2.5). In 1915, the River Murray Commission was established by the Victorian, New South Wales, South Australian, and Commonwealth governments to regulate utilisation of the Murray River. It was not until 1917 that regulating structures, such as weirs and locks, were constructed along the Murray River; the first to be completed was Lock 1 in 1922. The remaining locks and weirs were constructed progressively, with Yarrawonga Weir being the last to be built in 1939. Weir and Lock 7, on Lindsay Island opposite the confluence of the Rufus and Murray Rivers, were completed in 1934 (Encyclopædia Britannica 2020; Murray-Darling Basin Authority 2017).

The closest Victorian settlement to Lindsay Island comprises the rural village of Meringur, approximately 30 km southeast of the island. Meringur was settled during the closer settlement period in the mid-1920s. A railway line was established between Red Cliffs and Meringur in 1925, followed by the opening of a school in 1927. A town hall, church, and stores were established during the late 1920s. The Meringur to Morkalla section of the railway line opened in 1931. In the 1930s, Meringur established an open-air theatre, several sports teams, a country race track, and a golf club. In 1964, the Meringur to Morkalla section of the railway line was closed due to reductions in the railway service to the area, and by the 1970s stores and land offices at Meringur also began to close. Meringur railway station was closed in 1988. The school closed in 1998. Today, the village hosts a post office and the Millewa Pioneer Park (Context Pty Ltd 2013, pp. 46-47, 62; Victorian Places 2015). Today, only 67 people live in the locality of Meringur (Australian Bureau of Statistics 2016).

The largest town within proximity to Lindsay Island is Renmark, across the South Australian border, approximately 26 km to the west. Renmark was established in 1887 by the Canadian-born Chaffey Brothers, and had been invited from America, where they had successfully founded several Californian irrigated colonies, by Victorian parliamentarian (and later Prime Minister), Alfred Deakin, to open a similar settlement along the Murray River. Renmark was the first irrigated settlement in Australia. Irrigation was transferred to the Renmark Irrigation Trust after the Chaffey Brothers' enterprise folded. The township of Renmark was proclaimed, and the local government was formed in 1904. The first winery and distillery in the region, Angove's, was opened at Renmark in 1911; this was followed by the opening of a winery cooperative, Renmano Winery, which was founded in 1914 under the name of Chateau Tanunda before being bought out by a group of local growers in 1916. Today, Renmark produces citrus and stone fruits, grapes and wine, vegetables, wheat and wool (State Library of South Australia 2010).

Today, much of the area of investigation comprises part of the Murray-Sunset National Park, and is within a public conservation and resource zone. While the majority of Lindsay Island comprises the Murray-Sunset National Park, the island has been subject to past grazing leases (Hyett and Rhodes 2001, p. 1). Lindsay Island was used for sheep and cattle grazing until 1990, and did not form part of the wheat industry (Bell 2013, p. 17; Mallee CMA 2016, p. 22). However, timber cutting, paddle boats, and the river trade also had an impact on the Lindsay Island forest (Mallee CMA 2016, p. 24). In 1991, the Lindsay Island pastoral run became part of the Murray-Sunset National Park, and the land use changed from grazing to conservation and recreational activities (Mallee CMA 2016, p. 22).

2.2.2 Historical maps and aerial imagery review

In 1850-1851, the assistant surveyor's maps of the Murray River at Lindsay Island shows the present-day area of investigation and inundation area as comprising reeds, flooded gums, open forest and salt bush plains, eucalypts near the waterways, box and scrub, box and shrubs, polygonum flats, open forests that were lightly timbered, box saplings, open plains, open gum forests, red sand hills, box forests, and reeds along the Lindsay River from east to west. Along Mullaroo Creek, the region comprised reeds, box forest, and open gum forest. Likewise, the Murray River on Lindsay Island contained reeds, flooded gums, shrubs and bushes, reed beds and flooded ground, gum forest, box forests, gum flats, salt bush, box scrub, salt bush plains, gum timber, and reeds. Lake Wallawalla held reeds and polygonum surrounded by red sand hills. Significant features marked on the map include brushyards (a brush fence enclosure composed of brushwood) and a stockyard along the Murray River, and a crossing place and a ford were marked across Mullaroo Creek and Lindsay River respectively. Additionally, a hut and stockyard, which were part of 'Baggot's Cattle Station', were noted along Lindsay River to the north of Lake Wallawalla (Figure 2.1).

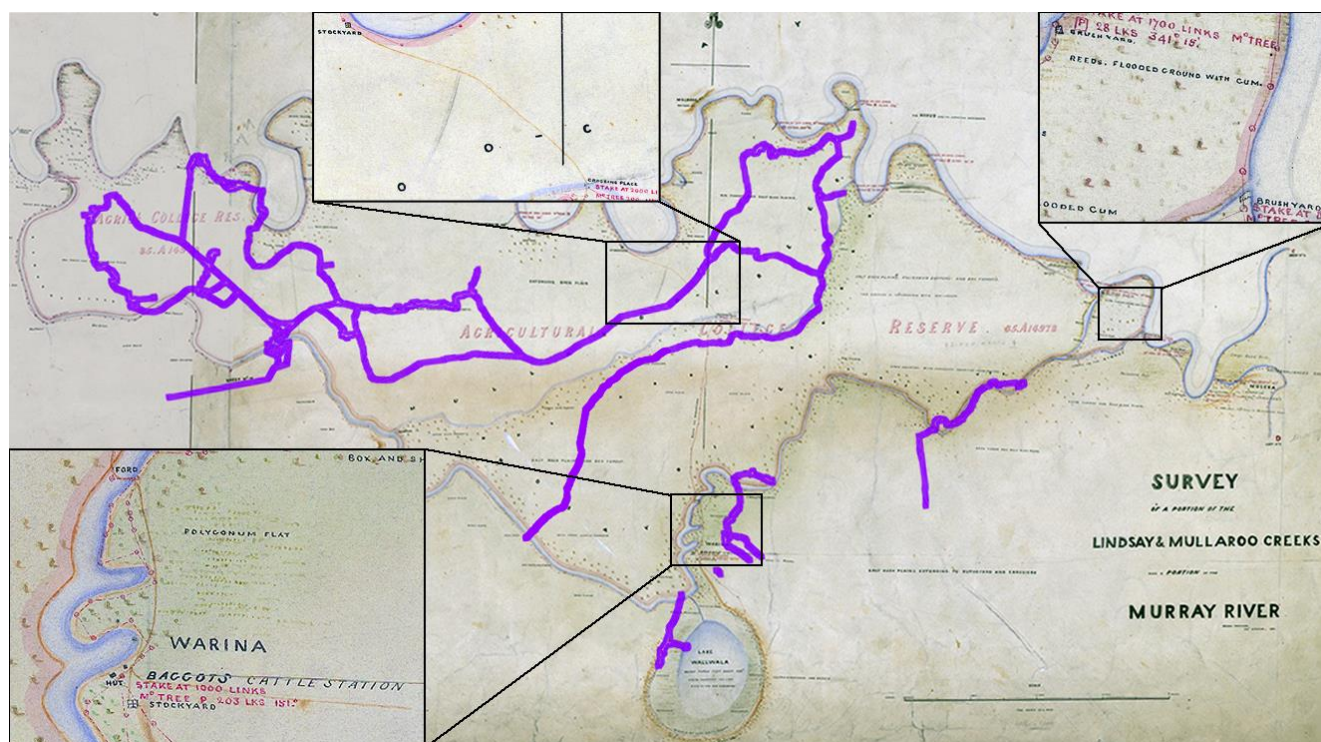


Figure 2.1: Surveyor's map of Lindsay Island, with approximate area of investigation location in purple (Prichard 1850; 1851)

The presence of Baggot's cattle station, the ford and crossing area, and the brushyards and stockyard shows that Lindsay Island was used for pastoral purposes at the time, related to Lindsay Island Station. None of these places are within the area of investigation, although the current location of the WE_A Regulator and Containment Bank is within proximity to the former Baggot's cattle station.

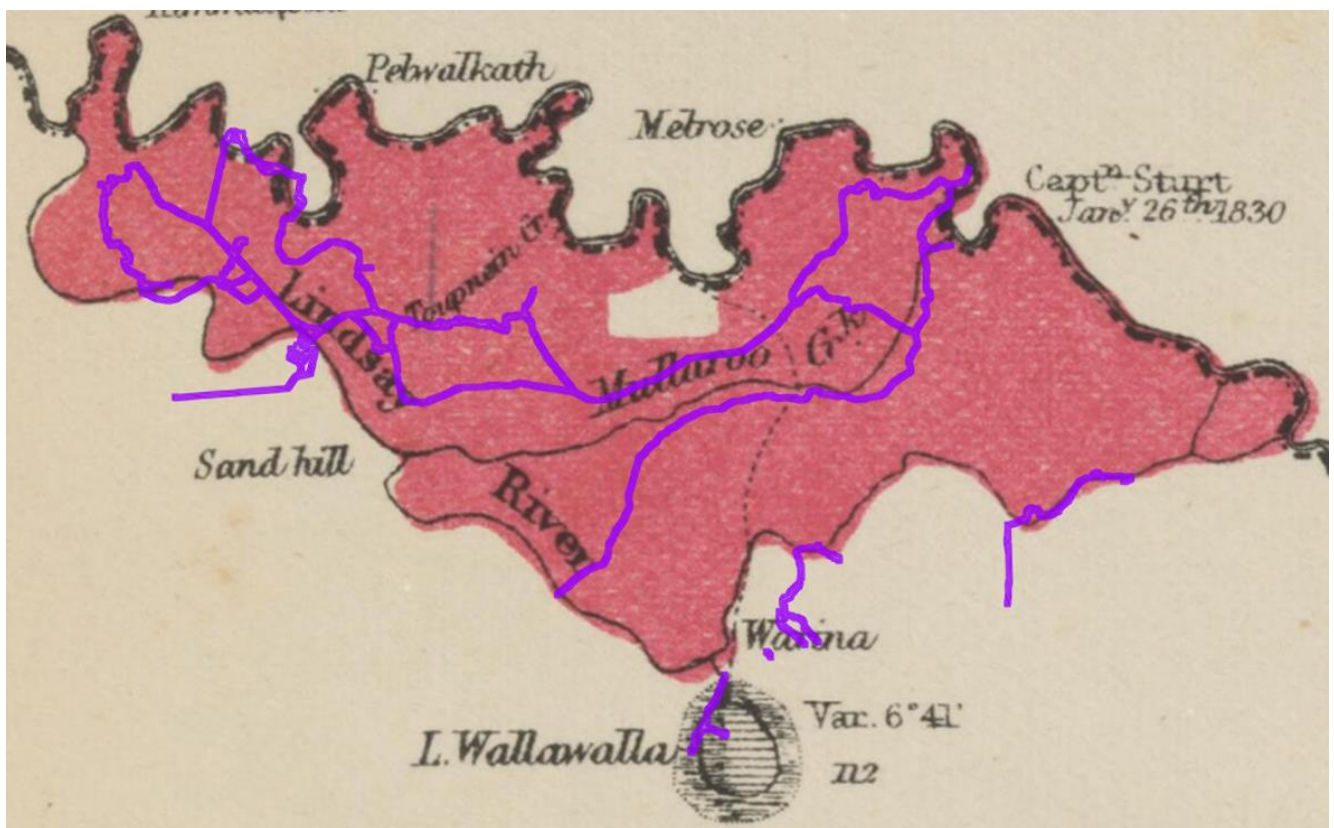


Figure 2.2: 1884 Millewa county map, with approximate location of the area of investigation outlined in purple (Department of Lands and Survey 1884)

The County of Millewa map from 1884 show that there were no townships extant on Lindsay Island or near the area of investigation, although there was an accessway between Lake Wallawalla northwards to the Murray River and the private allotment which is shown as being adjacent the Murray River. However, it shows the locations of natural features such as Lindsay River, Toupnein Creek, Mullaroo Creek, Lake Wallawalla, crossing the area of investigation, and sandhills to the southwest of the area of investigation (Figure 2.2).

A 1912 map of Murray River frontage grazing blocks shows that the area of investigation intersected with three large allotments used for grazing: allotments 2, 3 and 4. There are four small allotments adjacent to the Murray River that are excluded from these grazing allotments, with two adjacent to allotments 2 and 3, one within allotment 4, and the final one partially within allotment 4. The map calls Lindsay Island 'Wall Wall Island', and shows a stockyard paddock to the northeast of 'Lake Wall Wall' (Lake Wallawalla). Along the Murray River, it shows 'Nunnerys Plain' paddock to the northeast of the area of investigation, Wharparinga paddock to its west, two adjacent allotments that had been excised from the grazing blocks to the north of Lake Wallawalla, Punt paddock to the east of the allotment, Sharp Point paddock to the north of Punt paddock, and Lindsay paddock immediately west at the western end of Lindsay Island. The private allotment detailed in 1884 is extant, shown as two allotments situated between Punt paddock and Wharparinga paddock. There are no structures mapped within proximity to the area of investigation (Figure 2.3).

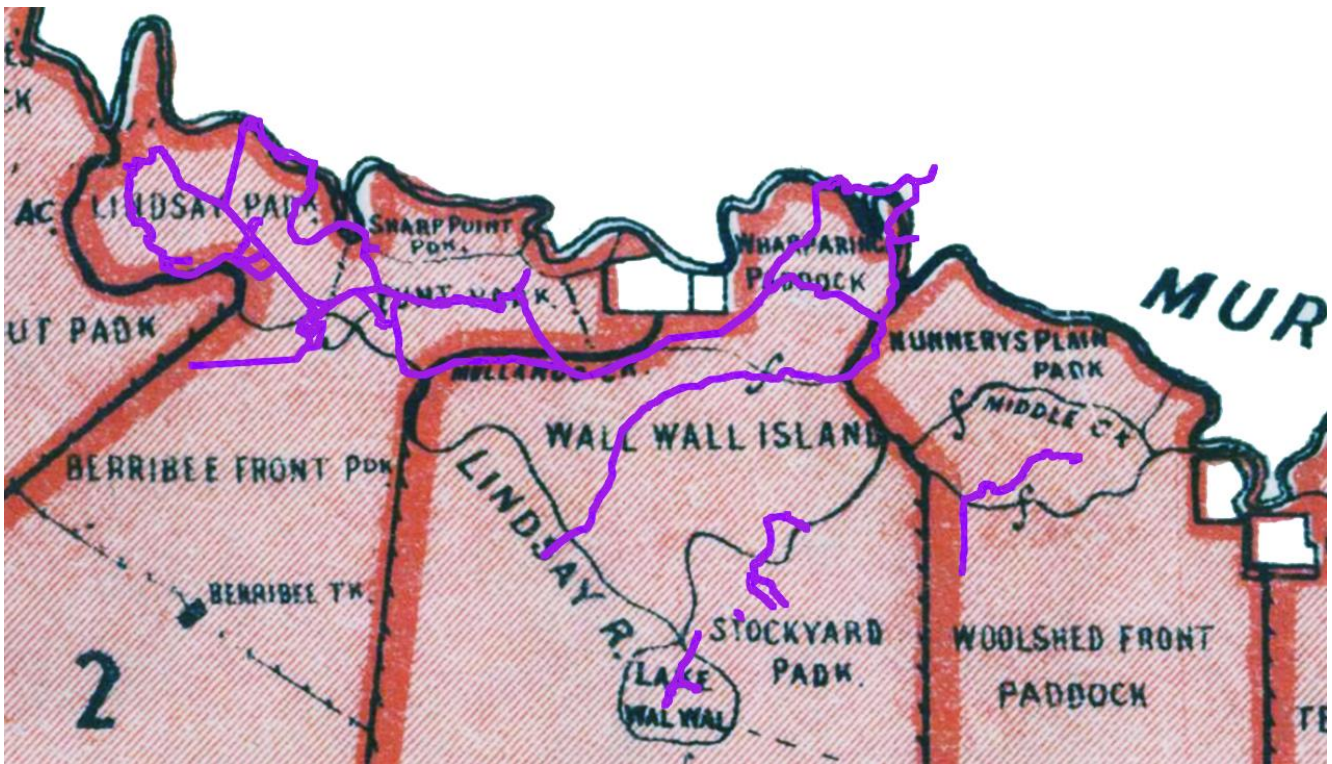


Figure 2.3: 1912 Grazing Blocks Murray River Frontages tender rough sketch map, not to scale, with approximate location of the area of investigation outlined in purple (Butson 1912)

By the mid-1920s, historical maps show that only the Parish of Olney (immediately west of Lindsay Island) had been subdivided into smaller allotments for sale, with a telephone line established across the northern section of the Parish (Figure 2.4).

In contrast, County of Millewa maps dating to 1926 and 1929 (Figure 2.5-Figure 2.6) show that the Parishes of Toupnein (to the southwest), Woolwolla (to the south and southeast), and Warina (covering Lindsay Island itself) comprise large swaths of land, with only a single small allotment within Warina (allotment A, comprising the private land adjacent the Murray River on Lindsay Island as detailed on the 1884 and 1912 maps), and two small allotments in Woolwolla (allotment A, 'Woolwolla East', and the adjacent allotment B, aligning with the remaining two on the 1912 map), adjacent to the Murray River.

Several features are noted across the 1926 county map, including Berribee Tank in Toupnein, a proposed landing ground and air route in Woolwolla, and Lindsay Island State Forest in Warina. Lindsay River, Mullaroo Creek, and Lake Wallawalla are all shown. Annotations on the 1926 map show that much of the Parish of Toupnein had been taken up by Berribee Pastoral Company Pty Ltd, while Neds Corner Pastoral Company Pty Ltd had taken up much of the Parish of Woolwolla.

An insert in the 1929 County map shows that allotment A, the private land on Lindsay Island, was taken up by JF Cudmore and RB Smith, and comprised saltbush and box, and dense lignum swamp, with tracks, fence lines and a yard. However, the 1929 map also shows later annotations that indicate that Lindsay Island lost its State Forest status, and that much of the island had been purchased by RP and LM Murphy. The location of Lock 7 is delineated as a permanent reserve, situated opposite the joining of the Rufus River with the Murray River in NSW.

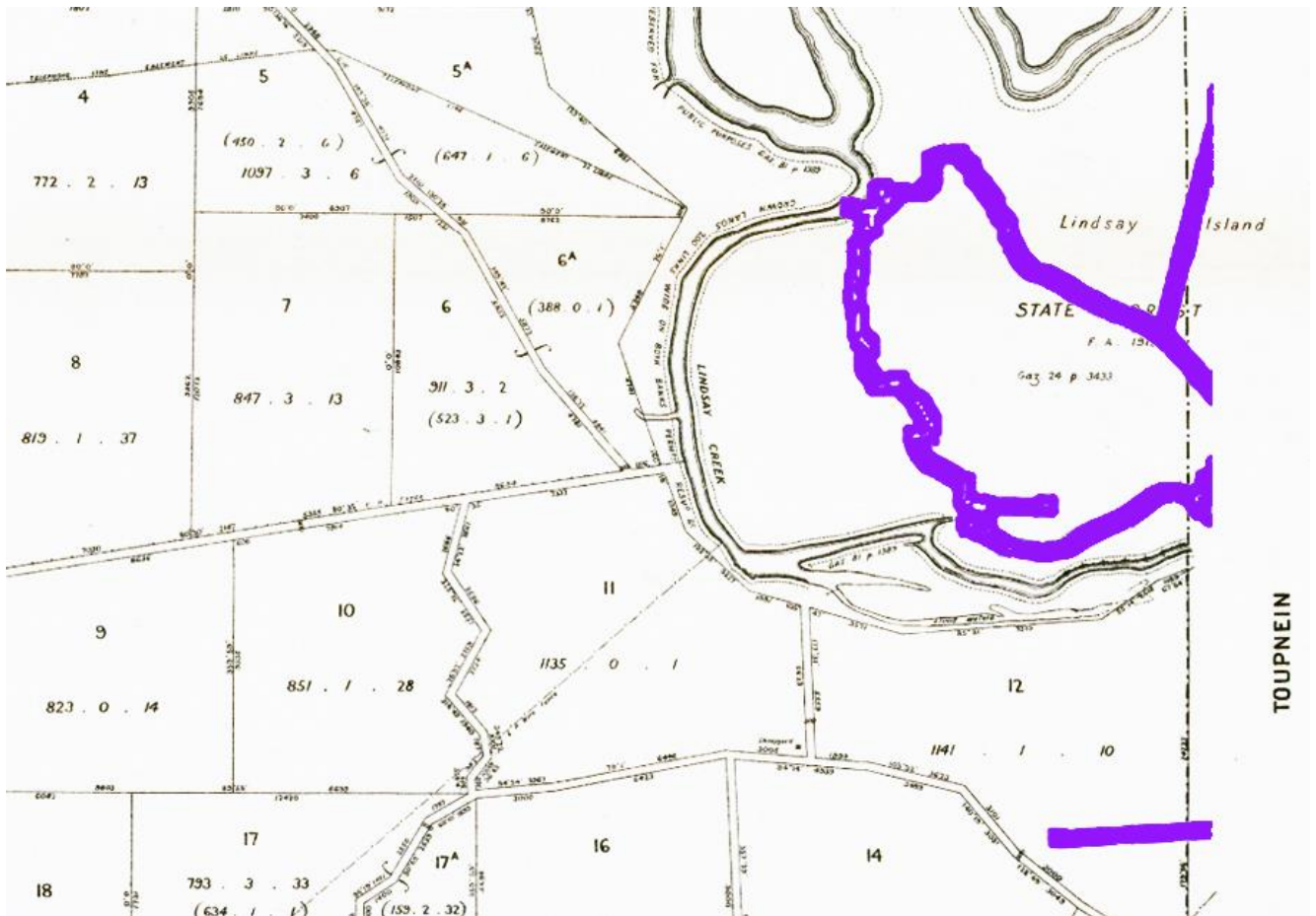


Figure 2.4: 1925 Parish of Olney map, with approximate location of the area of investigation outlined in purple (Victoria Department of Crown Lands and Survey 1925)

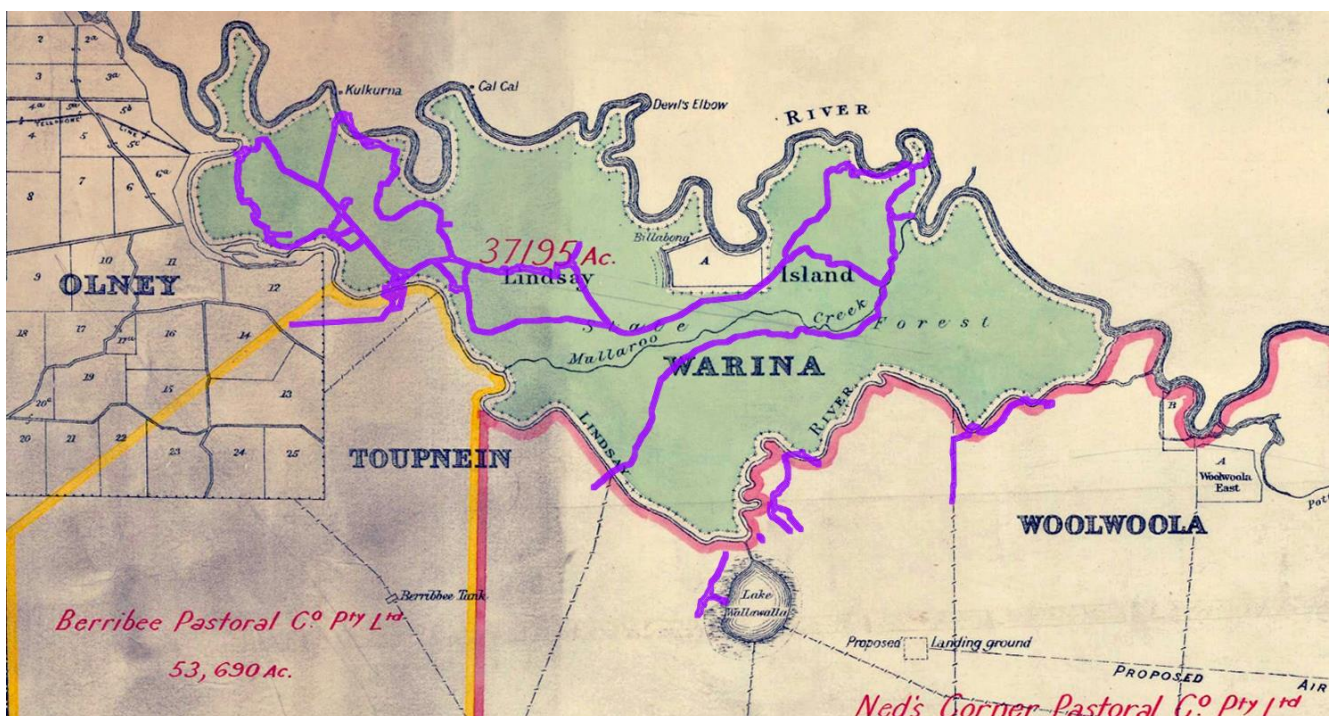
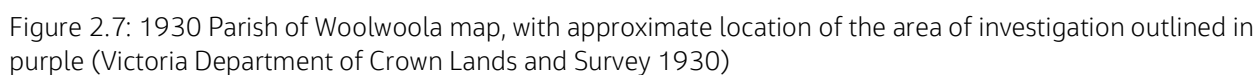
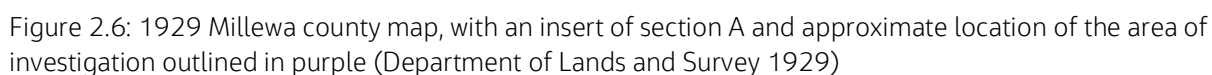


Figure 2.5: 1926 Millewa county map, showing allotments and approximate location of the area of investigation (Hilcke and Staveley 1926)



By 1930, the Parish of Woolwolla had been subdivided into small allotments for sale; not all of the land had been taken up. Allotment 33, which is adjacent to the area of investigation in the southeast, was detailed as being subject to inundation, with lignum and saltbush plains and lignum swamp. The original Woolwolla allotments shown on the earlier maps, to the east of the area of investigation, were still extant. Both allotments A (Woolwolla East) and B were noted as having been sold (Figure 2.7).

Aerial imagery from 1945 shows that area of investigation comprises floodplain between the Murray River and the Lindsay River, with smaller waterways between the two, including Toupnein Creek towards the west, Mullaroo Creek bisecting the area in the centre, and lagoons and billabongs throughout. Lake Wallawalla is visible to the south of Lindsay Island. Lindsay Island appears to be relatively treeless, except along waterways, and within allotment A. Some tracks are visible on Lindsay Island, with further tracks clearly visible to the south of Lindsay River on what appears to be scrubland. There may have been bridges present where tracks cross creeks and other waterways (Figure 2.8).

There are no clearly visible structures that intersect with the area of investigation, except at the extant Berribee Homestead Complex (Figure 2.9), and those at Lock 7 (Figure 2.10). A sand dune is visible in the location of the former Baggot's Cattle Station (Figure 2.11).

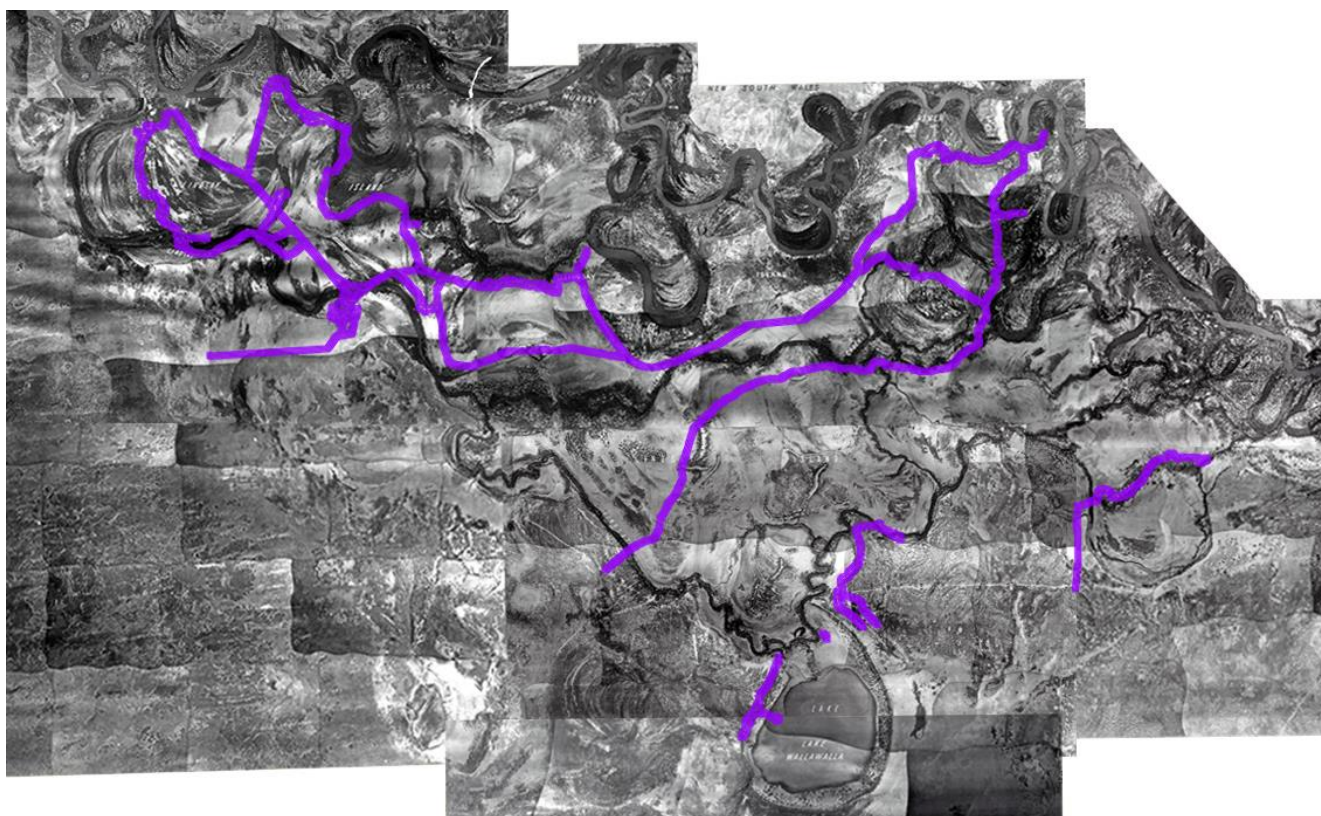


Figure 2.8: 1946 aerial imagery with approximate location of the area of investigation outlined in purple (Aerial Survey of Victoria 1946a; 1946b; 1946c; 1946d; 1946e; 1946f; 1946g; 1946h)



Figure 2.9: 1946 aerial imagery showing Berribee Homestead Complex (buildings indicatively circled in red) (Aerial Survey of Victoria 1946b)

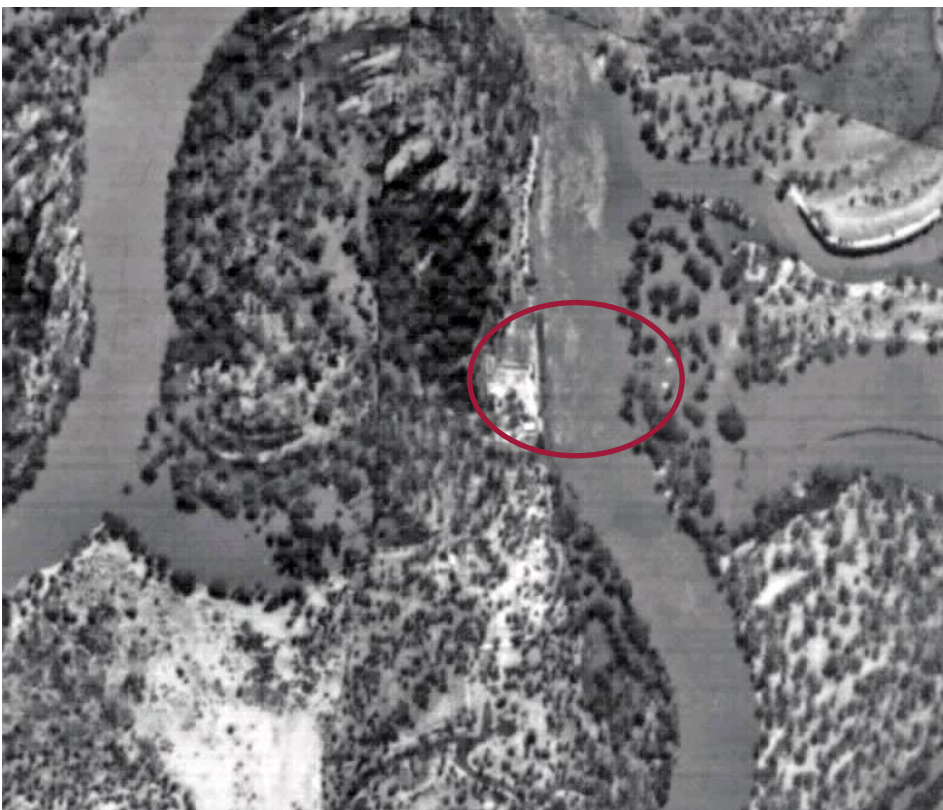


Figure 2.10: 1946 aerial imagery showing Lock 7 near the confluence of Rufus River and the Murray River (Lock 7 and associated land-based facilities indicatively circled in red) (Aerial Survey of Victoria 1946c)



Figure 2.11: 1946 aerial imagery showing the sand dune where several structures associated with the former Baggot's Cattle Station appear to have once been located (area of interest indicatively circled in red) (Aerial Survey of Victoria 1946f)

Today, modern aerial imagery shows little large-scale farmland in the area, except to the southwest of the area of investigation at Lindsay Point. Other land to the south of Lindsay Island typically comprises scrubland, with some farming evident surrounding Berribee Homestead Complex. Lindsay Island itself comprises floodplain, with treed areas concentrated along the waterways on the island. Lake Wallawalla is evident to the south of Lindsay Island, adjacent to the main track (Old Mail Road) that crosses to the south of Lindsay Island between Neds Corner in the east and Lindsay Point in the west. The area of investigation predominantly follows extant tracks, both named (including Sanford Track, Kulkurna Cliffs Track, Berribee Homestead Track, and Bridge Track) and unnamed. This also includes works at the Berribee Homestead Historic Reserve. There are a number of structures visible at Lock 7, immediately adjacent to the area of investigation. Baggot's Cattle Station comprised a hut, a stockyard and at least one other building when it was mapped in 1851. Today, this area consists of a small portion of land that appears to be a sand dune, which it is understood has been the subject of restoration / revegetation works, to the south of the appropriate bend in the Lindsay River, north of Lake Wallawalla. No additional structures appear to be present on the scrubby floodplains or amongst the medium-to-dense tree cover found across the area of investigation.

2.3 Predictive statement

Following a search of the above registers, review of the previous literature and analysis of relevant reports, the following predictive statements can be made in relation to the area of investigation and the inundation area:

- The most likely site type in the area of investigation would be places associated with early agricultural or pastoral activities, logging, river shipping, and water management practices
- There is moderate potential for previously unidentified historical heritage to be present within the area of investigation, due to the possibility of structures on Lindsay Island within, or close to, the area of investigation as per the 1851 survey map, and possible pastoral or rural heritage places associated with the former rural landscape that intersects with the area of investigation.

2.4 Summary of desktop findings

There are no listed historical heritage places that intersect with the area of investigation, but three historical heritage places intersect with the inundation area: Lindsay Creek North Ferry Crossing (VHI H7129-0001), Lindsay Creek South Ferry Crossing (VHI H7129-0002), and Lock and Weir No 7 (RNE 101494). However, unlike the VHI, the RNE is a non-statutory listing. Prior historical heritage assessments indicate that Berribee Homestead Complex intersects with the area of investigation, and that Berribee Station Barge and the area of the former Baggot's Cattle Station comprise potential historical heritage places that intersect with the inundation area.

There is moderate potential for previously unidentified historical heritage items to be present within the area of investigation and the inundation area, from the background history of the area. Site types most likely to be identified in the area of investigation and the inundation area would be heritage places or archaeological sites associated with early agricultural or pastoral activities, logging, river shipping, and water management practices.

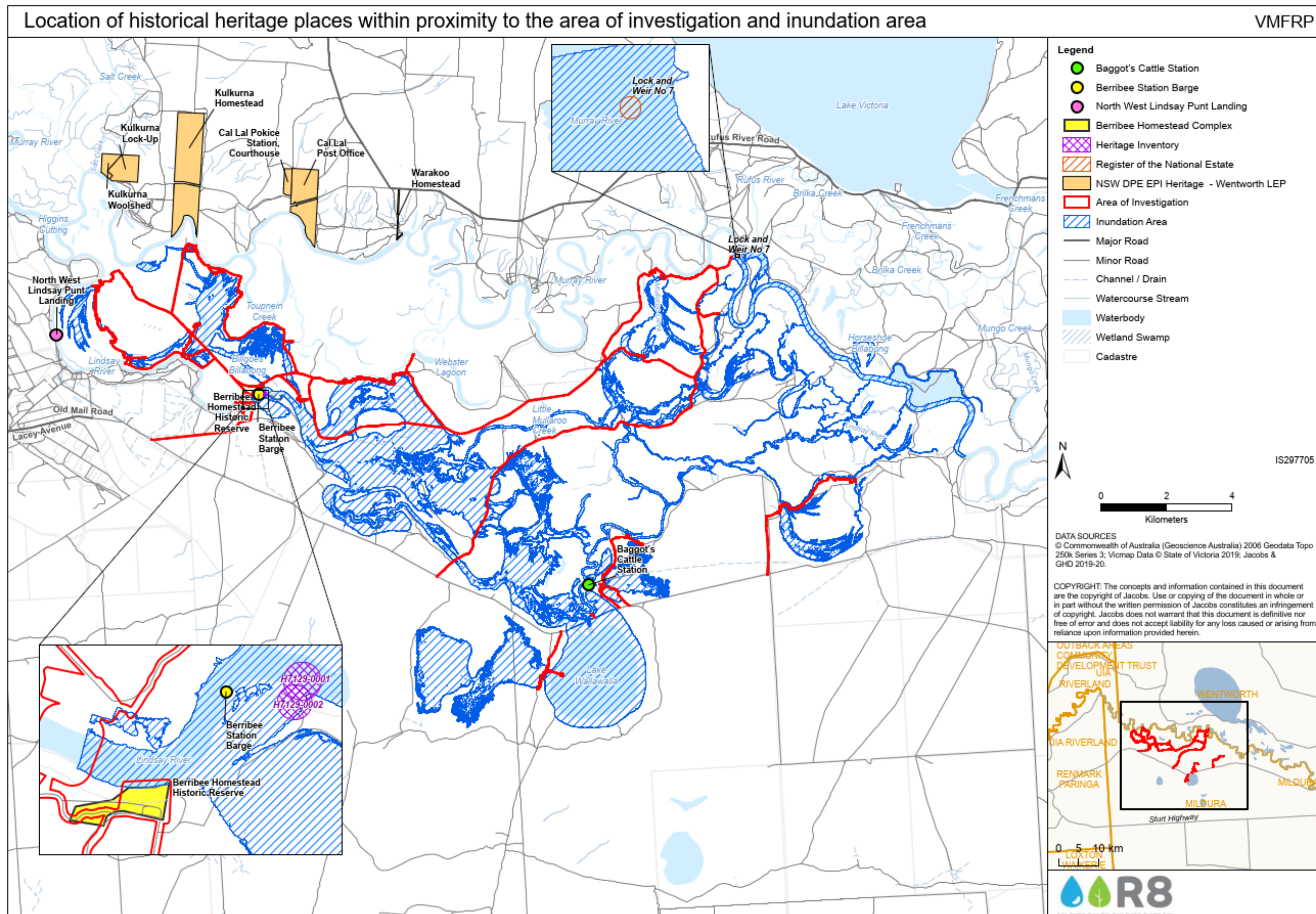


Figure 2.12: Location of historical heritage places within proximity to the area of investigation and inundation area

3. Impact assessment

3.1 Proposed works

3.1.1 Proposed infrastructure and works

The project involves the construction of:

- Four large regulators (Regulator BERR_A also referred to as Berribee Regulator, and Regulators BERR_F, CR_A and CW_B1)
- Sixteen small regulators (Regulators BERR_B, BERR_C, BERR_D, BERR_E, CR_B, CR_C, CR_D, CR_E, CR_F, CW_A, CW_B2, LS_A, LS_B, WE_A, WW_A1 and WW_A2)
- Two un-gated culverts (BERR_G, WE_D)
- Two drop structures into the Lindsay River (CW_A and CW_B1) and one drop structure into the Murray River (CR_D)
- Approximately 9 km of containment banks incorporating overflow spillways where required
- Approximately 1.6 km of new excavated channel (CR_G and CW_D)
- Three hardstands for temporary pumping (WE_D, WW_B, LS_C), and one permanent suction line into Lake Wallawalla (WW_B)
- Approximately 5 km of new access track and 82 km of maintenance / upgrades to other existing access tracks
- A 50 metre by 50 metre secure, fenced compound on the northern bank of the Lindsay River at the Berribee Regulator site to provide for the storage of equipment and materials during maintenance and operation of the Berribee Regulator
- Three temporary laydown areas near the Berribee Regulator, two on the southern side of the Lindsay River and one on the northern side of the Lindsay River, which would provide the primary location for site offices, vehicle parking, storage of equipment and materials, during construction of the project.

Each of the above components are located in the area of investigation identified in Figure 1.1.

The design and location of project structures, laydown areas and extent of access track upgrades is currently being refined through the design process. In addition, the location of some other temporary construction activities is yet to be determined, including additional, smaller construction laydown areas likely to be required at other work sites, the location of boat ramps / barge wharves required for construction of the Berribee Regulator, and the location of temporary pump stations to supply water for construction purposes. Where practicable, it is understood that design changes to the proposed infrastructure and temporary construction activities will be contained within the area of investigation. However, where this is not able to be achieved and for other activities such as borrow pits where the location is currently unknown, further historic heritage assessment will be required.

3.1.2 Proposed inundation

The project would involve managed inundation across the following six WMAs:

- Berribee WMA (3,507 ha (Victoria), 263 ha (NSW)) – Encompasses the Lindsay River east / upstream of the proposed regulator near Berribee Homestead, along with Mullaroo Creek and associated tributaries, Lake Wallawalla and the central parts of the Lindsay River floodplain north to Toupnein Creek (but not including the creek). Includes areas of NSW inundation. Except for Lake Wallawalla, this WMA is located on the northern side of Old Mail Road.

- Crankhandle WMA (Upper Tier (299 ha) and Lower Tier (17 ha)) – Located on the floodplain in the north west portion of Lindsay Island, north of the Lindsay River and extending to the Murray River, downstream of Berribee Homestead and the Berribee WMA, encompassing Billgoes and Scotties Billabongs.
- Crankhandle West WMA (Upper Tier (23 ha) and Lower Tier (72 ha)) – Located on the floodplain in the far north west portion of Lindsay Island, north of the Lindsay River but not extending to the Murray River, downstream of the Crankhandle WMA.
- Lindsay South WMA (140 ha) – Located on the floodplain south of the Lindsay River and north of Old Mail Road, connects to the Lindsay South Creek upstream of Wallawalla East WMA, on private land known as Neds Corner.
- Wallawalla East WMA (164 ha) – Located on the floodplain south of the Lindsay River and mostly north of Old Mail Road, connects to the Lindsay River downstream of Lindsay South WMA.
- Wallawalla West WMA (623 ha) – Located on the highest part of the floodplain west of Lake Wallawalla and south of Old Mail Road, connects to the Lindsay River via Lake Wallawalla.

Each WMA has a different target inundation water level and the areas are designed to cascade water to extend the inundation benefits by reusing water (see Table 3.1). Inundation of the proposed inundation areas requires to the coordinated operation of the Lock 7 weir pool and the proposed Berribee Regulator. To achieve the design water level at Berribee WMA, the Lock 7 weir pool needs to be raised by up to 1.1 m to provide the necessary driving head of water. All other WMAs are filled from the inundation area of the Berribee WMA either by gravity release (Crankhandle, Crankhandle West) or pumping (Lindsay South, Wallawalla East, Wallawalla West).

Table 3.1: Summary of proposed inundation for each water management area

WMA	Proposed frequency	Proposed duration	Proposed timing
Seasonal Fresh	Annual	3 months	September to December
Berribee – Intermediate (22.1 mAHD to 23.1 m AHD) (Flood Capture or Regulated)	4 in 10 years (excludes Berribee - Maximum)	Maintain at target water level for 2 months (for 1 event) and 4.5 months (for 3 events). After 2 months, drawdown water levels to Crankhandle WMA or the Lindsay River. Close Wallawalla Regulators when receding below 22.35 mAHD to retain water in Lake Wallawalla and allow to fall through evaporation and seepage.	June to February
Berribee – Maximum (23.2 mAHD) (Flood Capture or Regulated)	3 in 10 years	Maintain at target water level for 2 months. After 2 months, drawdown water levels to Crankhandle WMA or the Lindsay River. Close Wallawalla Regulators when receding below 22.35 mAHD to retain water in Lake Wallawalla and allow to fall through evaporation and seepage.	June to February
Crankhandle (Upper - 22.6 mAHD, Lower – 21.6 mAHD) (Flood Capture or Regulated)	5 in 10 years	Maintain at target water level for 2.5 months, then drawdown water levels in Crankhandle (Upper Tier) to Crankhandle West WMA or Lindsay River. Water is retained in Crankhandle (Lower Tier) and allowed to fall through evaporation and seepage.	June to February
Crankhandle West (Upper – 22.2 mAHD, Lower – 21.7 mAHD)	5 in 10 years	Maintain at target water level for 2.5 months, then drawdown water levels to Lindsay River.	June to February

WMA	Proposed frequency	Proposed duration	Proposed timing
(Flood Capture or Regulated)			
Wallawalla East (25.2 mAHd) (Flood Capture or Pumped)	2 in 10 years	Maintain at target water level for 1 month, then drawdown water levels to the Lindsay River.	September to February
Lindsay South (24.4 mAHd) (Flood Capture or Pumped)	2 in 10 years	Maintain at target water level for 1 month, then drawdown water levels to the Lindsay South Creek.	September to February
Wallawalla West (24.7 mAHd) (Flood Capture or Pumped)	2 in 10 years	Maintain at target water level for 1 month, then allow to fall through evaporation and seepage.	September to February

Operating scenarios described in Table 3.1 would be subject to change and refinement in response to the findings of hydro-modelling, ecological monitoring and adaptive management to achieve the project's ecological objectives.

3.2 Potential impacts

The potential impacts from proposed works and from the inundation are outlined in Table 3.2.

Table 3.2: Potential impacts on historical heritage within the area of investigation and the inundation area

Heritage place	Impact assessment
Lindsay Creek North Ferry Crossing (VHI H7129-0001)	Inundation area The physical location of the Lindsay Creek North Ferry Crossing is on the north bank of the Lindsay River near Billgoes Billabong. The physical remains of the site consist of the remnants of the crossing mechanism, consisting of a pulley, piping, wire rope and wooden piles. The remains of an unidentified ferry are also extant nearby. As such, the heritage place may be impacted by erosion from the inundation which is further detailed in Section 3.1.2. Site-specific recommendations for further assessment and management of potential impacts are provided in Section 5.2.1.
Lindsay Creek South Ferry Crossing (VHI H7129-0002)	Inundation area The physical location of the Lindsay Creek South Ferry Crossing is on the south bank of the Lindsay River near Berribee Homestead Complex. The physical remains of the site consist of a cutting in the bank and several piles. The remains of an unidentified ferry are also extant nearby. As such, the heritage place may be impacted by erosion from the inundation which is further detailed in Section 3.1.2. Site-specific recommendations for further assessment and management of potential impacts are provided in Section 5.2.1.
Lock and Weir No 7 (RNE 101494)	Inundation area The physical location of the Lock and Weir No 7 is situated at the end of Lock Seven Road on the Murray River. This comprises an operational lock and weir on the Murray River, with the lock and weir system designed to raise the water level to improve navigability of the river via the lock. As such, there will be no impact upon the heritage values or fabric of the heritage place from the inundation, which is further detailed in Section 3.1.2. Site-specific recommendations for further assessment and management of potential impacts are provided in Section 5.2.2.

Heritage place	Impact assessment
Berribee Homestead Complex	<p>Proposed works</p> <p>Proposed works may impact upon the historic significance (Table 2.2) of Berribee Homestead Complex, as identified by Bell (2013), which comprises an example of an early-mid C20th pastoral station with most of its outbuildings remaining. This includes the physical fabric of the homestead, manager's cottage, woolshed, stockyards, garage and engine shed, stables and harness shed and meat safe. These structures may be impacted by works without appropriate mitigation.</p> <p>As such, the proposed laydown area (Section 3.1) may impact upon the physical fabric of the extant buildings associated with this potential historical heritage place.</p> <p>Inundation area</p> <p>The physical location of the Berribee Homestead Complex is on the south bank of the Lindsay River. The complex comprises the homestead and outbuildings within the setting of an early-mid C20th pastoral station. However, the historical structures are located to the south of the inundation area. As such, there will be no impact upon the heritage values or fabric of the heritage place from the inundation, which is further detailed in Section 3.1.2.</p> <p>Site-specific recommendations for further assessment and management of potential impacts are provided in Section 5.2.3.</p>
Berribee Station Barge	<p>Inundation area</p> <p>The physical location of the Berribee Station Barge is on the south bank of the Lindsay River, to the northeast of Berribee Homestead Complex. The barge comprises the remains of a sunken barge, with a little of the bow remaining above water; it is unlikely that there will be any archaeological deposits associated with the place. As such, the physical remains of the barge may be impacted by erosion from the inundation which is further detailed in Section 3.1.2. Site-specific recommendations for further assessment and management of potential impacts are provided in Section 5.2.3.</p>
North West Lindsay Punt Landing	<p>The physical location of the North West Lindsay Punt Landing is approximately 370 m west of the inundation area, and 1.3 km west of the area of investigation. As such, it will not be examined further.</p>
Baggot's Cattle Station	<p>Inundation area</p> <p>The physical location of the Baggot's Cattle Station was situated adjacent to the Lindsay River, north of Lake Wallawalla, near a sand dune which it is understood has been subject to restoration / revegetation works. As such, the heritage place may be impacted by erosion from the inundation which is further detailed in Section 3.1.2. Site-specific recommendations for further assessment and management of potential impacts are provided in Section 5.2.3.</p>

4. Approval requirements

The approvals requirements for potential archaeological sites within the area of investigation is provided in Table 4.1.

If the scope of works changes, this heritage assessment will need to be updated.

Table 4.1: Statutory requirements for heritage within the area of investigation

Project element	Statutory requirements
Entire area of investigation	<p>Discovery of archaeological sites in Victoria – under Section 127 of the <i>Heritage Act 2017</i>, if an archaeological site is discovered during construction or excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to HV.</p> <p>Under the <i>Heritage Act 1977</i>, should any unexpected historical materials, features or deposits be discovered in NSW at any time prior to, or during, the project, the person in charge must stop work, protect item and inform Wentworth Shire Council and the Department of Premier and Cabinet (Heritage) as soon as practicable. The relic provisions in the Act also require that an excavation permit be obtained from the Heritage Council of NSW prior to commencement of works if disturbance to a site with known or potential archaeological relics is proposed.</p>
Lindsay Creek North Ferry Crossing (VHI H7129-0001)	A Consent from Heritage Victoria may be required under s.124 of the <i>Heritage Act 2017</i> for the works to proceed at Lindsay Creek North Ferry Crossing (VHI H7129-0001) and Lindsay Creek South Ferry Crossing (VHI H7129-0002).
Lindsay Creek South Ferry Crossing (VHI H7129-0002)	
Lock and Weir No 7 (RNE 101494)	As the RNE is a non-statutory listing, there is no statutory requirement to undertake further work for Lock and Weir No 7 (RNE 101494).
Berribee Homestead Complex	This place is not listed on any heritage registers. However, , this historical heritage place was assessed as having high local significance and was recommended for inclusion on the HO (Bell 2013).
Berribee Station Barge	There are no statutory requirements for this place.
Baggot's Cattle Station	There are no statutory requirements for this place.

5. Historical heritage recommendations

5.1 Recommendations and project risk

Whilst there are no registered historical heritage places that intersect with the area of investigation, there are three historical heritage places that intersect with the inundation area. As such, there is moderate potential for previously unidentified historical heritage items or archaeological sites to be present within these areas. Therefore, due to the possibility for unidentified historic archaeology to be impacted, it is recommended that a Historical Heritage Assessment (HHA) be undertaken for the project.

This should include a field survey within the area of investigation to inspect the area of investigation for any unidentified historical heritage places, and prepare a significance assessment of these historical places.

If any historical heritage items or archaeological sites are identified as part of the HHA, a Heritage Impact Assessment (HIA) would be required, including:

- Assessment of impacts on all historical heritage sites
- Detailed identification of mitigation measures and approval requirements
- A Heritage Impact Statement.

All historical archaeological places are protected under the *Heritage Act 2017*, whether they are registered or not. In NSW, the *Heritage Act 1977* protects relics which are defined as: 'Any deposit, artefact, object or material evidence that relates to the settlement of the area that comprises NSW, not being Aboriginal settlement; and is of State or local heritage significance'.

Undertaking a field survey to ascertain the likely presence of any historical archaeological places or material within the area of investigation is recommended to reduce the risk of delays to the project. Such delays would include the stoppage of works to avoid damage or destruction of historical archaeological sites and materials while the appropriate approvals are sought.

The completion of the HIA for the project would mitigate these issues.

5.2 Site-specific recommendations

5.2.1 VHI sites

Lindsay Creek North Ferry Crossing (VHI H7129-0001) and Lindsay Creek South Ferry Crossing (VHI H7129-0002) are located in the inundation area and may be impacted by inundation. These heritage sites may also be impacted by the construction of the boat ramps / barge wharves required for construction of the Berribee Regulator, depending on their locations (which are not yet determined; however, it is understood that the project would avoid locating boat ramps/wharves in areas potentially impacting these historic features).

As such, a qualified hydrologist should be engaged to assess the potential for impact from erosion on these archaeological sites. It is also recommended that these sites be inspected by a suitably qualified archaeologist to determine the extent of the archaeological potential of these places as part of the HHA, which should inform the selection of the boat ramp / barge wharf sites near the Berribee Regulator.

5.2.2 RNE place

Lock 7 and the Weir are listed on the non-statutory RNE, which indicates that the item may have heritage values. As such, it is recommended that an inspection and heritage assessment should be undertaken of this item as part of the HHA to assess the condition and to reassess the heritage values of the item. Impact to this item is unlikely as it will continue to be used for its intended purpose.

5.2.3 Unregistered historical heritage place

Although Berribee Homestead Complex is not listed on any heritage register, based on the assessment undertaken by Bell (2013) it is recommended that a site inspection be undertaken to record conditions and reassess its heritage significance. The place includes outbuildings (homestead, manager's cottage, woolshed, stockyards, garage and engine shed, stables and harness shed and meat safe).

Although Berribee Station Barge is not listed on any heritage register, based on the assessment undertaken by Bell (2013) it is a heritage feature currently situated within the Lindsay River, adjacent to the bank, with little potential for archaeological features to be present. However, it is recommended that this site be inspected by a suitably qualified archaeologist to determine its exact location, which should inform the selection of the boat ramp / barge wharf sites near the Berribee Regulator.

It is also recommended that consultation with the Mildura Rural City Council be undertaken to ascertain the status of these potential historical heritage places as they are not currently listed on the HO. Mildura Rural City Council are currently undertaking a Heritage Study in the northern part of the LGA. The extent and nature of the places being assessed in this Heritage Study is currently unknown. There is the potential that this item may be assessed or included in the Heritage Study. Further consultation with Council would be required to confirm this.

Although Baggot's Cattle Station is not listed on any heritage registers, based on background research (Section 2.2), it is recommended that this site be inspected by a suitably qualified archaeologist, to determine the archaeological potential at the site.

6. Mitigation measures

High level mitigation measures recommended for the project are outlined in Table 6.1. These can be confirmed after the HHA.

Table 6.1: Proposed project activities and specific management measures for the heritage places within the area of investigation and inundation areas

Proposed activities	Project element	Mitigation measures
General activities	Entire area of investigation	<p>General mitigation measures to be implemented across the area of investigation:</p> <ul style="list-style-type: none"> Historical heritage awareness training should be completed as part of the site induction for all personnel and/or contractors prior to the commencement of construction works to ensure: <ul style="list-style-type: none"> an understanding of where all heritage places are located within the area of investigation an understanding of the potential heritage places that may be impacted during the project the procedures required to be undertaken in the event of discovery of historical heritage material, features or deposits, or the discovery of human remains If an archaeological site is discovered in Victoria during construction or excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to HV If an archaeological relic is discovered in NSW during construction or excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to Wentworth Shire Council and the Department of Premier and Cabinet (Heritage). A copy of this report should be kept onsite and on file with the project records. All contractors and/or project staff should be made aware of the heritage status of the heritage places in the area of investigation prior to works taking place.
Laydown area works	Berribee Homestead Complex	<p>It is recommended that the project avoid all potential heritage fabric associated with the Berribee Homestead Complex.</p> <p>While the project intends to avoid works in this area, it is recommended that, should works intersect with the site, the following mitigation measures be implemented to avoid any adverse impacts to the heritage values of the site, as assessed by Bell (2013):</p> <ul style="list-style-type: none"> The heritage fabric of the Berribee Homestead Complex should be avoided by erecting protective barrier fencing between the project areas and the homestead, manager's cottage, woolshed, stockyards, garage and engine shed, stables and harness shed and meat safe, and the remainder laydown area If impact to the buildings and structures within the Berribee Homestead Complex is unavoidable, then liaison with Mildura Rural City Council should be undertaken to ascertain whether they intend to include the place the HO. <p>Consideration should also be given to the potential for impacts on the potential heritage fabric associated with the Berribee Homestead Complex due to construction vibration.</p>
Inundation area Temporary boat ramps / barge wharves	Lindsay Creek North Ferry Crossing (VHI H7129-0001)	<p>As there is potential for the fabric and significance of archaeological sites Lindsay Creek North Ferry Crossing (VHI H7129-0001) and Lindsay Creek South Ferry Crossing (VHI H7129-0002) to be impacted by erosion from inundation, and from potential impact due to the construction of boat ramps / barge wharves (depending on their final locations), the following mitigation measures must be implemented to avoid any adverse impacts where practicable to the heritage values of the site:</p>

Proposed activities	Project element	Mitigation measures
	Lindsay Creek South Ferry Crossing (VHI H7129-0002)	<ul style="list-style-type: none"> It is recommended that advice be sought from a qualified hydrologist to determine the impact erosion would have on the historic crossings, and any implementation measures that could be implemented to avoid erosion of the historic ferry crossings It is recommended that the historic ferry crossings should be subject to a site inspection by a suitably qualified archaeologist prior to the start of works, and recommendations for further assessment will be provided after consultation with HV.
	Berribee Station Barge	As there is potential for the fabric of the Berribee Station Barge to be impacted from erosion from inundation and from potential impact due to the construction of the temporary boat ramps / barge wharves (depending on their final locations), it is recommended that the should be subject to a site inspection by a suitably qualified archaeologist prior to the start of works. The place has been submitted to HV, but as it was not registered, consultation with HV will be required to determine registration status and therefore consent requirements.
Inundation area	Lock and Weir No 7 (RNE 101494)	<p>If the place is determined to have heritage significance:</p> <ul style="list-style-type: none"> The Lock and Weir should be subject to a site inspection by a suitably qualified archaeologist during the HHA, and recommendations for further assessment will be provided after consultation with HV and the Department of Premier and Cabinet (Heritage).
	Baggot's Cattle Station	If the Baggot's Cattle Station is identified after the site inspection as an archaeological site, it may be at risk of impact from erosion from inundation. If that is the case, then consultation with HV will be required to determine VHI registration and consent requirements.

7. References

- Aerial Survey of Victoria 1946a *Lindsay A1, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785A1.jpg>.
- Aerial Survey of Victoria 1946b *Lindsay A3, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785A3.jpg>.
- Aerial Survey of Victoria 1946c *Lindsay A4, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785A4.jpg>.
- Aerial Survey of Victoria 1946d *Lindsay B3, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785B3.jpg>.
- Aerial Survey of Victoria 1946e *Lindsay C1, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785C1.jpg>.
- Aerial Survey of Victoria 1946f *Lindsay C2, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785C2.jpg>.
- Aerial Survey of Victoria 1946g *Lindsay C4, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785C4.jpg>.
- Aerial Survey of Victoria 1946h *Lindsay D1, Zone 6*. Retrieved 20 April 2020 from <http://services.land.vic.gov.au/photomaps/LINDSAY/785D1.jpg>.
- Agricultural Education 1895a *Accounts of the Trustees of Agricultural Colleges and the Council of Agricultural Education, from 1st January, 1894, to 30th January, 1894*, Agricultural Education, Melbourne.
- Agricultural Education 1895b *Accounts of the Trustees of Agricultural Colleges and the Council of Agricultural Education, from 1st July, 1894, to 31st December, 1894*, Agricultural Education, Melbourne.
- Andrew Ward and Associates 1988 *City and Shire of Mildura Conservation Study: Volume 1*, Andrew Ward and Associates, Melbourne.
- Australian Bureau of Statistics 2016 *2016 Census QuickStats: Meringur*. Retrieved 9 April 2020 from https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC21646.
- Bell, J. 2013 *Mallee Environmental Watering Projects, Lindsay Island Floodplain, Northwest Victoria: Due Diligence Assessment Historical Archaeology*. A report to Mallee Catchment Management Authority, Jo Bell Heritage Services, Euroa.
- Butson, W.J. 1912 *Grazing blocks Murray River frontages*. Melbourne: Victoria Department of Crown Lands and Survey.
- Context Pty Ltd 2013 *Mildura (Former Shire of Walpeup) Heritage Study Stage 2: Vol 1 Mildura Rural City Thematic Environmental History with Addendum*. Prepared for Mildura Rural City Council, Context Pty Ltd,, Brunswick.
- Craig, R. 2013 *Wentworth: Information on Early Wentworth and Surrounding Areas*, Rusheensweb.com.
- Cumpston, J.H.L. 1951 *Charles Sturt - His Life and Journeys of Exploration*. Melbourne: Georgian House.
- Department of Lands and Survey 1884 *County of Millewa*. Melbourne: Department of Lands and Survey.

Department of Lands and Survey 1929 *County of Millewa*. Melbourne: Department of Lands and Survey.

Encyclopædia Britannica 2020 *Murray River*. Retrieved 20 April 2020 from <https://www.britannica.com/place/Murray-River>.

Feeken, E. 2019 *European Discovery and Exploration of Australia*: Xlibris.

Hilcke, F. and C. Staveley 1926 *Millewa*. Melbourne: Department of Lands and Survey.

Hyett, J. and D. Rhodes 2001 *Wallpolla Island and Lindsay Island: Archaeological Desktop Study*. Draft Report Prepared for Egis Consulting, Terra Culture, Northcote.

Kenderdine, S. 1993a *Lindsay Creek Ferry Crossing (North) Site Card (VHI H7129-0001)*, Melbourne.

Kenderdine, S. 1993b *Lindsay Creek Ferry Crossing (South) Site Card (VHI H7129-0002)*, Melbourne.

Mallee CMA 2016 *Sustainable Diversion Limit Adjustment - Phase 2 Assessment, Supply Measure Business Case: Lindsay Island Floodplain Management Project*, Mallee Catchment Management Authority.

Mildura Rural City Council 2020 *Mildura Heritage Study (Part B) Stage 1: Current Status*. Retrieved 6 April 2020 from <https://www.mildura.vic.gov.au/Services/Building-Planning/Strategic-Planning/Strategic-Planning-Projects-Strategies/Current-Strategic-Planning-Projects/Mildura-Heritage-Study-Part-B-Stage-1>.

Mitchell, T. 1838 *The South Eastern Portion of Australia Shewing the routes of the three Expeditions and the surveyed territory*. London: T and W Boone.

Murray-Darling Basin Authority 2017 *Weirs and locks*. Retrieved from <https://www.mdba.gov.au/river-information/running-river-murray/weirs-locks>.

Prichard, O. 1850 *Survey of a Portion of the Lindsay and Mullaroo Creeks and a Portion of the Murray River: Murray River 26*. Melbourne: Assistant Surveyor.

Prichard, O. 1851 *Survey of a Portion of the Lindsay River also a Part of the Murray River to the Adelaide Boundary: Murray River 29*. Melbourne: Assistant Surveyor.

Spreadborough, R. and H. Anderson 1983 *Victorian Squatters*. Ascot Vale: Red Rooster Press.

State Library of South Australia 2010 *River Murray Towns: Renmark*. Retrieved 9 April 2020 from <https://www.samemory.sa.gov.au/site/page.cfm?u=1343>.

Victoria Department of Crown Lands and Survey 1925 *Olney, County of Millewa*. Melbourne: Department of Lands and Survey.

Victoria Department of Crown Lands and Survey 1930 *Woolwoola, County of Millewa*. Melbourne: Department of Lands and Survey.

Victorian Government 1912 *Anno Secundo: Georgii Quinti Regis: No. 2354*, Victorian Government, Melbourne.

Victorian Places 2015 *Meringur*. Retrieved 9 April 2020 from <https://www.victorianplaces.com.au/meringur>.

Whitworth, R.P. 1870 *Bailliere's Victorian Gazetteer and Road Guide: Containing the Most Recent and Accurate Information as to Every Place in the Colony, Edition 2*. Melbourne: F.F. Bailliere,.