**SAHC Agenda Item: 7.2** **File No.: 26576**

**Public Nomination**

**NOOKAMKA NO. 1 (LAKE BONNEY) PUMPING STATION DAM WALL RUIN**

**LOT 18, QUEEN ELIZABETH DRIVE, BARMERA**

**ACTION:**

For Decision

**BACKGROUND:**

1. On 7 November 2023, a nomination was received from a member of the public for the Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin, Lot 18, Queen Elizabeth Drive, Barmera (CR 6168/652 Allotment Pieces 18 and 19 D9422, Cobdogla Irrigation Area, Nookamka Division, Out of Hundreds). The nominator believes that the Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin meets criteria (a), (c), (f) and (g) under s16 of the *Heritage Places Act 1993* (the Act) for listing as a State Heritage Place in the South Australian Heritage Register (the Register).
2. The nominator indicated that the place is under imminent threat of demolition.
3. Ms Sandy Verschoor, Chair of the South Australian Heritage Council (the Council) considered the nomination and triage information provided by Heritage South Australia and determined that the place did not need to be provisionally listed under s17(2)(b) of the Act, to protect it while it was assessed.
4. In Status of Assessments Agenda Paper (7 December 2023) distributed to the Council on 30 November 2023, a week prior to the meeting, Heritage South Australia recommended that the Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin be assigned Priority 3 at number 48 in the order of assessment, given that the Ruin was highly unlikely to meet any of the criteria under s16 of the Act.
5. On 6 December 2023 a newspaper article on the proposed demolition of the Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin appeared in the *Murray Pioneer*, reporting that the demolition of the Ruin had been postponed pending the outcome of the 15 February 2024 meeting of the South Australian Heritage Council (this meeting).

6. Resulting from the appearance of this story in the media, the Council requested an expedited assessment and a short form or agenda paper assessment be prepared for the Council's consideration at the 15 February 2024 meeting (this agenda paper).

7. Investigations into the potential significance of the Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin have since taken place. The assessment found that the place is not considered to meet any of the s16 criteria for listing as a State Heritage Place and it is recommendation that the Council reject the nomination. Supplementary information, including the Heritage Survey Data Sheet (**Attachment A**), Extracts from published histories (**Attachment B**), and the nomination (**Attachment C**) are provided to support the Council's decision making.

**DISCUSSION:**

**Past consideration for heritage listing**

8. The Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin (hereafter the Dam Wall Ruin) was identified and considered in two heritage surveys. The first was prepared in 1984 and the second in 2013. The Dam Wall Ruin was recommended for listing as a Local Heritage Place only in both surveys.

9. The Dam Wall Ruin was first identified in 1984, in the *Heritage of the River Murray* Summary Survey prepared by John Dallwitz and Susan Marsden for the Department of Environment and Planning. As the place was considered to be of Local heritage significance, no survey sheet was prepared at that time.

10. In 2014, a Heritage Survey was conducted by McDougall & Vines for Berri Barmera Council and the Dam Wall Ruin was again identified as a place of Local heritage significance. The survey sheet is provided as Attachment B.

11. The Berri Barmera Council does not have a Local Heritage list.

**Brief background to proposed demolition**

12. Berri Barmera Council is the custodian of the Dam Wall Ruin, which stands on the shore of Lake Barmera/Lake Bonney, Riverland within the Lake Bonney Caravan and Holiday Park.

13. The Dam Wall Ruin was assessed by a structural engineer in May 2012. The resulting structural report noted a 'major collapse' of approximately 60% of the western side of the wall and a 'major crack' approximately 75mm wide at the north-eastern corner, caused by outwards soil pressure and water undermining the wall base. The report also noted rising damp and 'many longitudinal cracks at the formwork joints.' The structural report considered that if no remedial action were undertaken, the Dam Wall Ruin would continue to deteriorate and collapse in stages.

14. A subsequent structural inspection, undertaken in June 2022, found that the major

crack in the north-eastern corner had expanded by an estimated 25mm. The resulting structural report recommended removing the upper 1.3m of the northern and eastern walls of the Dam Wall Ruin, leaving a 1.2m maximum height wall 'tapering down in a southerly direction.'

15. The Dam Wall Ruin was further damaged by rising floodwater during the November 2022-February 2023 River Murray flood, causing the crack in the north-eastern corner to expand significantly. The Dam Wall Ruin is currently fenced to prevent public access as it may collapse at any time.

16. The condition of the Dam Wall Ruin is such that Berri Barmera Council are unwilling to fund its repair and are proceeding with demolition.

17. On 31 December 2023, Berri Barmera Council approved demolition of the Dam Wall Ruin followed by site remediation, subject to approval of a budget bid for the 2023/2024 financial year. It is proposed that a small section of wall be retained as a monument, with interpretive signage installed on the site.

18. Once a member of the local community became aware that the demolition of the Dam Wall Ruin was approved, they decided to prepare a nomination for the Council's consideration for State Heritage listing.

**Brief History**

19. The Nookamka No. 1 (Lake Bonney) Pumping Station was built in 1914 replacing an earlier, portable pumping station which began working in 1912. The Nookamka No. 1 (Lake Bonney) Pumping Station served as a temporary and expedient way to supply water to pasture growing lucerne fodder, intended for draught horses and beef cattle and to further develop the Cobdogla Irrigation Area. The Dam Wall was built around the Pumping Station in December 1917 as an emergency measure to protect the machinery from rising floodwaters. After the Nookamka No. 1 (Lake Bonney) Pumping Station was replaced by the permanent Nookamka No. 2 (Lake Bonney) Pumping Station in 1920, the first Pumping Station was removed and space behind the Dam Wall (subject of this assessment) was later filled with earth to serve as an informal recreational jetty.

20. See Attachments A and B for additional supporting history.

## 21. Chronology

| Year | Event |
|---|---|
| 1830 | Charles Sturt visits the Barmera area on his journey down the Murray. |
| 1838 | Lake Bonney named by Joseph Hawdon for his friend Charles Bonney, during the first cattle overlanding trip from New South Wales. |
| c.1841 | Edward John Eyre installs an irrigation system at Moorundie on the River Murray. |
| 1846 | John Chambers leases the Cobdogla-Lake Bonney area from the crown for pastoral occupation. |
| 1856 | Eyre's Moorundie irrigation system is abandoned. |
| 1886 | South Australian Attorney General John William Downer engages the Canadian Chaffey Brothers to establish an irrigation scheme at Renmark. |
| 1892 | Proposals for a co-operative settlement scheme and irrigation colony at Barmera do not proceed. |
| 1894-1895 | Thirteen village irrigation settlements established along the Murray, including a settlement at Waikerie. |
| 1894 | Waikerie Pumping Station opens (Former Pumping Station Chimney, SHP 13823). |
| 1903 | Village irrigation settlements dissolved. |
| 1908 | *Irrigation and Reclamation Lands Act* 1908 provides for government irrigation areas and for irrigation to be extended along the Murray upstream from Morgan. |
| 1911 | First Government pumping station at Berri begins operation. |
| 1912 | Cobdogla Irrigation Area proposed by Samuel McIntosh, Director of Irrigation.<br><br>Survey of land and planning for a town south of Lake Bonney commences.<br><br>Temporary pumping station consisting of a portable steam traction engine powering a centrifugal pump established on the Lake Bonney foreshore to water lucerne fodder paddocks. |

Second Government pumping station at Berri begins operation.

**1914** **Temporary Nookamka No. 1 (Lake Bonney) Pumping Station established on the southern edge of Lake Bonney, replacing portable pumping station, to water lucerne fodder paddocks.**

Drought leads to Lake Bonney drying out and a crop of barley is sown on the lake bed as fodder.

**1915** **Rotting barley straw chokes the Nookamka No. 1 (Lake Bonney) Pumping Station inlet for some months.**

Temporary No. 1 (Cobdogla) Pumping Station established.

1917 Samuel McIntosh requests services of Government Town Planner Charles Reade to plan a Garden City at Lake Bonney, later known as Barmera.

July, first solid building constructed in Barmera.

**December, rushed construction of Dam Wall (subject of this assessment) to protect Nookamka No. 1 (Lake Bonney) Pumping Station from rising floodwaters.**

**1920** **Temporary Nookamka No. 1 (Lake Bonney) Pumping Station replaced by permanent Nookamka No. 2 (Lake Bonney) Pumping Station. First pumping station dismantled.**

December, first portion of Barmera surveyed and pegged.

Loveday Pumping Station (Water Supply Structure – Brick Boiler Stack, SHP 13765) commences operation.

1928 Nookamka No. 2 (Lake Bonney) Pumping Station closes, superseded by the Cobdogla Pumping Station.

Second Cobdogla Pumping Station (Humphrey Pumps, SHP 10275) opens.

**1950s-2020s** **Former Temporary Nookamka No. 1 (Lake Bonney) Pumping Station is filled with earth to serve as an informal recreational jetty.**

**Comparability / Rarity / Representation**

22. There are 15 places associated with pumping stations entered in the Register as State Heritage Places, including:

- Humphrey Pumps, Trussell Terrace, Cobdogla (SHP 10275),
- Water Supply Structure - Brick Boiler Stack, Morris Street, Loveday (SHP 17236),
- Former Pumping Station Chimney, Scenic Lookout Reserve, Waikerie (SHP 13823),
- Holder Irrigation Pumping Station Ruins, Holder Bottom Road near Waikerie (SHP 13819),
- Water Supply Structure - Pump Site and Feeder Tank, Sturt Highway, Kingston-on-Murray (SHP 13770),
- Gillen Pumping Station Site, near Waikerie (SHP 13817).

**Heritage Significance of the Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin (the Dam Wall Ruin)**

23. The Dam Wall Ruin has been considered below against each of the s16 criteria of the Act. It is recommended that the Dam Wall Ruin does not meet any of the criteria for the following reasons:

**(a) it demonstrates important aspects of the evolution or pattern of the state's history.**

The Dam Wall Ruin is associated with two historic themes, 'Peopling places and landscapes' and 'developing South Australia's economies'. The relevant subthemes are adapting to diverse environments, and developing primary production (pastoralism, agriculture, bio-security). However, while the Dam Wall Ruin is associated with these themes and subthemes it has only a local and narrow association with them.

Nookamka No. 1 (Lake Bonney) Pumping Station was built during the early development of the Cobdogla Irrigation Area as a temporary and expedient ways to water lucerne fodder necessary to feed draught horses and beef cattle associated with the Scheme. In turn, the Dam Wall Ruin was built to protect the Nookamka No. 1 (Lake Bonney) Pumping Station from a flooding event in November 1917. The Pumping Station itself was soon after removed when a replacement pumping station was constructed in 1920.

While development of the Cobdogla Irrigation Area played a significant part in South Australian history, the Dam Wall Ruin is a peripheral component of a temporary structure that was removed over a century ago. The Dam Wall Ruin demonstrates only tangential associations with the Scheme. Other places are

considered to have clear, direct associations with the Scheme, notably the Humphrey Pumps (SHP 10275).

The Dam Wall Ruin is not considered to meet criterion (a).

**(b) it has rare, uncommon or endangered qualities that are of cultural significance.**

The Dam Wall Ruin is a simple concrete dam or retaining wall, a commonplace structure similar to many other such structures built across South Australia. Consequently, the Dam Wall Ruin is not considered to possess rare, uncommon or endangered qualities that are of cultural significance to South Australia.

**(c) it may yield information that will contribute to an understanding of the state's history, including it natural history**

There is no evidence to suggest that the Dam Wall Ruin will yield meaningful information about the history of South Australia that is not currently known. The Dam Wall Ruin is well documented by other sources, including images, books and newspaper articles. Further, the structure is a commonplace concrete wall, typical of its type built across the State and is well documented in those other physical examples.

The Dam Wall Ruin is not considered to meet criterion (c).

**(d) it is an outstanding representative of a particular class of place of cultural significance.**

The Dam Wall Ruin belongs to the class of place known as pumping stations, which include several components most notably pumps and the structures that house them. The Nookamka No. 1 (Lake Bonney) Pumping Station, of which the Dam Wall Ruin was once a part, was removed from the site c.1920. The Dam Wall Ruin is a single component of the class and therefore cannot be considered to be an outstanding representative of it.

The Dam Wall Ruin is not considered to fulfill criterion (d).

**(e) it demonstrates a high degree of creative, aesthetic or technical accomplishment or is an outstanding representative of particular construction techniques or design characteristics.**

The Dam Wall Ruin is a simple concrete dam or retaining wall, poured in a typical construction process involving a series of formwork 'lifts'. The Dam Wall Ruin is also an improvised structure, built in 1917 as an emergency response to rising floodwaters and with no pretension to architectural expression.

The Dam Wall Ruin is not considered to meet criterion (e).

**(f) it has strong cultural and spiritual associations for the community or a group within it.**

Dam Wall Ruin may have an association for some members of the Cobdogla Steam Friends Society Inc due to its association with the irrigation of the Riverland region. However, Cobdogla Steam Friends Society Inc. is likely to have stronger attachments to many other places associated with the irrigation of the Riverland region, most notably the Humphrey Pumps (SHP 10275), which the organisation cared for as part of its Cobdogla Irrigation and Steam Museum until December 2022.

Some members of the Barmera community, and some members of the broader South Australian community who have holidayed at Barmera since the 1950s, may also have an association with the Dam Wall Ruin due to its function as an informal recreational jetty and beachfront landmark. While the Barmera community and Barmera holidaymakers may be considered groups that resonate broadly across the State, there is no evidence to suggest these groups collectively have strong cultural or spiritual connections with the Dam Wall Ruin. Any subset of these larger groups, with such a connection, would not be considered to resonate broadly across the State as a group.

The Great Western Bridge is not considered to meet criterion (f).

**(g) It has a special association with the life or work of a person or organisation or an event of historical importance.**

The Dam Wall Ruin was built by the Government of South Australia in 1917 as an emergency measure to prevent the temporary pump at Barmera from flooding and as such is associated with the work of the Government of South Australia. The Dam Wall Ruin is one of hundreds of commonplace structures built by the government to facilitate irrigation across South Australia. Consequently, it is not considered to have a special association with the work of the Government of South Australia.

The Dam Wall Ruin is not considered to meet criterion (g).

24. As it is considered that the Dam Wall Ruin does not meet any of the s16 criteria for listing as a State Heritage Place, it is recommended that the Council rejects the nomination.

**Legal Basis**

This action is proposed in accordance with Section 17 of the *Heritage Places Act 1993*:

(1) The Council may, on its own initiative or on application by any person, consider whether a particular place within the State should be entered in the Register.
(2) If the Council is of the opinion –
    (a) that a place is of heritage significance

it may provisionally enter the place in the Register.

**RECOMMENDATIONS:**

That the South Australian Heritage Council:

1. **Rejects** the nomination for State-listing of the **NOOKAMKA NO. 1 (LAKE BONNEY) PUMPING STATION DAM WALL RUIN**, **Lot 18, Queen Elizabeth Drive, Barmera (CR 6168/652 Allotment Pieces 18 and 19 D9422, Cobdogla Irrigation Area, Nookamka Division, Out of Hundreds)**, as it does not meet any of the s16 criteria in the *Heritage Places Act 1993*.

[redacted]

**Beverley Voigt**

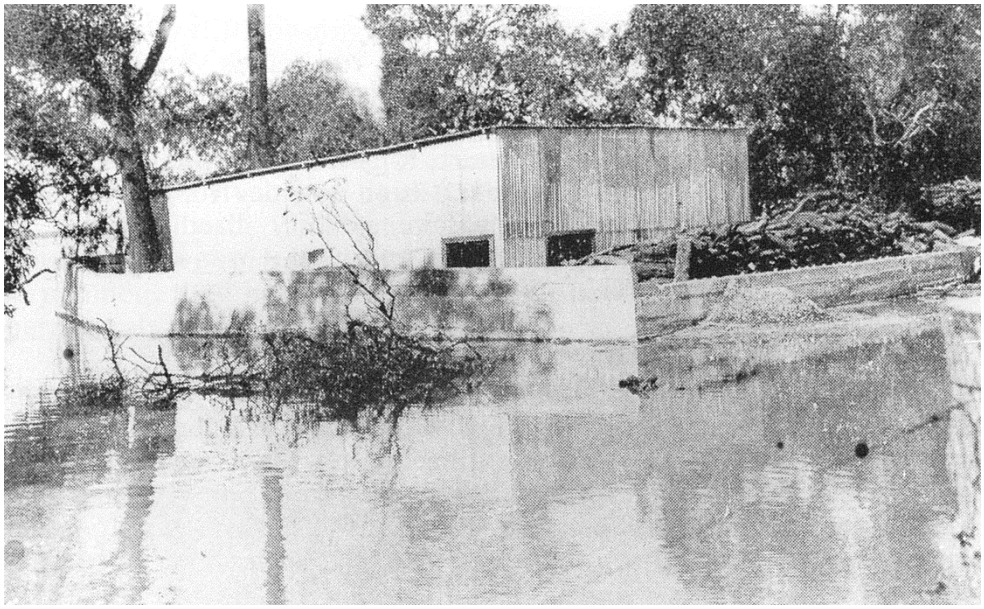
**Manager Heritage South Australia**

**Date:** 22 January 2024

**List of Attachments**

**Attachment A** Heritage Survey Data Sheet
**Attachment B** Extracts from published histories
**Attachment C** Nomination

## Appendix A – Images



**Nookamka No. 1 (Lake Bonney) Pumping Station showing dam wall and floodwaters, view looking east from shore of Lake Bonney c. December 1917.**

Source: *David Mack, Irrigation Settlement: some historic aspects in South Australia on the Murray 1838-1978* (2003) Cobdogla SA: Cobdogla Irrigation and Steam Museum in association with the Cobdogla Steam Friends Society p. 253

**Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin, c.2023**

Source: EnvMaps

**Nookamka No. 1 (Lake Bonney) Pumping Station Dam Wall Ruin, showing damage to northeastern corner, c.2012**

Source: Berri Barmera Council

## CONCRETE WALL (FIRST PUMPING STATION)

**Address:** Foreshore Reserve, Barmera

**Certificate of Title:**

**Use:** Recreational

**HCZ Area:**

**Other Assessments:** *1984-5 Region 5 Survey Heritage Assessment, Habitable Places, 2012*

**HISTORY AND DESCRIPTION:**

This wall is all that remains of the first pumping station which was constructed on the banks of Lake Bonney in 1912 by Joseph Joyce. The steam driven pumps which were installed were used for irrigating lucerne on the neighbouring flats. In 1914 a steam plant was then installed by Frank Kimba on higher ground using an engine built by James Martin Gawler. A drought caused Lake Bonney to dry up as soon as the pump had been installed, and a crop was planted on the Lake bed which was then inundated in 1915. Floods threatened the pumping station in 1916 and a wall was constructed around the pumping station, these sections of the wall remain on the Lake foreshore.

A substantial new permanent pump house was constructed 250 metres to the east of the first pumping station and this remains as the Lake Bonney Yacht Club. The only remnants of the first pumping station is this section of the wall constructed to protect it from floods in 1917.

The wall is constructed of massed concrete poured in situ between wooden shuttering. The thickness is very uneven and varies between 270 and 350mm, reflecting the haste in which the wall was constructed due to the threat of floods. At beach level the wall is up to 2.8 metres high.

The remaining wall is a landmark on the shore of Lake Bonney as it is the only substantial structure that projects across the beach and into the water. It now provides a focus for recreation activities.

**STATEMENT OF HERITAGE VALUE:**

The concrete walls of the first pumping station on Lake Bonney are a tangible record of the initial settlement and development of irrigation in the Barmera area.

**RELEVANT CRITERIA (Under Section 23(4) of the *Development Act 1993*):**

**(a)** The remains of the first pumping station display historic and economic themes of significance to the local area as they are indicative of the establishment of irrigation in the district and the creation of Barmera.

**(c)** The pumping station wall has played an important part in the recreational activities of the community and visitors to the Lake Bonney foreshore.

**(f)** The first pumping station 1917 wall is a notable landmark along the foreshore of Lake Bonney.

**EXTENT OF LISTING:**

The remaining fabric of the 1917 concrete retaining wall and its setting. No additions or alterations should be undertaken apart from the conservation work recommended in the 2012 Heritage Assessment.

**REFERENCES**


- Site visit, April 2013
- *First Pump Station, Lake Bonney, Heritage Assessment,* Habitable Places Architects, 2012

**CONCRETE WALL (FIRST PUMPING STATION),** Foreshore Reserve, Barmera (cont)

First pump station at the height of the flood in 1917

(Source: *First Pump Station, Lake Bonney, Heritage Assessment,* Habitable Places Architects, 2012)

## Appendix B Extracts from Published Histories

- Phil Cole, with contributions and assistance from Keith Watson, Greg Cock, Gerrit Schrale and Don Plowman, *History of irrigation development in the Riverland* (February 2015) PIRSA https://www.pir.sa.gov.au/aghistory/natural_resources/water_resources_ag_dev/irrigated_agriculture/irrigation_development_and_management_in_the_sa_riverland
- David Mack, *Irrigation Settlement: some historic aspects in South Australia on the Murray 1838-1978* (2003) Cobdogla SA: Cobdogla Irrigation and Steam Museum in association with the Cobdogla Steam Friends Society pp.

**History of irrigation development in the Riverland**

Irrigation of horticultural crops in the Riverland commenced in a significant way with the establishment of Renmark by the Chaffey Brothers in 1887. Such large scale irrigation was dependent on pumps that could lift water a few metres from the river to channels, through which water could be supplied (on roster) to each farm in the district. The Chaffey's had themselves developed new steam powered pumps, which they had built in England where the necessary skills and engineering resources were available. When installed at Renmark (and at Mildura in Victoria) these pumps were world-leading technology. Within farms water was distributed along channels, by gravity, and applied to crops by furrow or flood irrigation.

Subsequently, as other irrigation districts were developed in the first half of the 20th century, a similar framework was utilized. This comprised a pumping facility on the river, steam, diesel or, later, electric powered, lifting water to a community irrigation district (generally 20–30 metres above the river) which may have some hundreds of farms. Water was distributed using a gravity dependent channel system to each farm, and gravity distribution and application within the farm.

Apart from Renmark, which was managed by a Trust, and the Village Settlements of around 1894, generally the South Australian Government constructed and operated the water supply schemes that delivered water to each farm in the community irrigation districts. Individual farmers were responsible for their on farm irrigation infrastructure (for a history of irrigation development along the River Murray see Irrigation Settlement – some historic aspects in South Australia on the River Murray 1838–1978, DB Mack, 2003, and Irrigation and Settlement in the South Australian Riverland, BJ Menzies and PN Gray, Department of Agriculture Technical Paper 7, 1983).

The village settlements were: Gillen, Pyap, Lyrup, Murtho, New Era, Waikerie, Ramco, Holder, Kingston, Moorook (all established in 1894) and New Residence (established in 1895). Most of the settlements had difficulty in pumping water from the river; some were abandoned, while some absorbed into subsequent State Government developed irrigation districts. Lyrup continues today; and despite enormous difficulties demonstrated that village settlement irrigation schemes could be successfully established.

After 1909 the South Australian Government developed irrigation districts, and installed pumps and water distribution systems, at Waikerie (from 1909), Berri (from 1910), Moorook (from 1911), Cobdogla (from 1912), Kingston (from 1913), Mypolonga (from1913), Cadell (from 1919), and Chaffey (from 1922). After World War 2, the Commonwealth Government established irrigation districts at Cooltong and Loxton.

Downstream of Mannum from around 1881, semi-permanent wetlands adjacent to the river were re-claimed by both private developers and the South Australian Government, for irrigated pastures.

By the mid 2000s all irrigation districts managed by the State Government had been rehabilitated (that is, supply channels replaced by pipelines and the water distribution pumps replaced or upgraded) and were self-managed, through the Central Irrigation Trust.

Private investment has also been significant. From the 1950s (some development occurred earlier), private development utilised electric pumps to lift water to pipeline water distribution systems and applied water through sprinkler or drip irrigation systems. Private development includes both individual irrigation farms (pumps, distribution system and irrigated land as one entity) and community development (where the pumps and distribution system provide water to a number of farms, that may be separately owned).

Until the 1970s little effort or resource was applied to farm level irrigation management, or to research, development or extension. An early attempt in 1905 to establish a Government Experimental Orchard at Waikerie as an annex to Roseworthy Agricultural College failed (Roseworthy didn't develop comprehensive irrigation training or courses until the 1980s). Samuel McIntosh, appointed in 1910 as Director of Irrigation in the newly established Department of Irrigation and Reclamation, prepared advisory material some of which was published by the Department of Agriculture (for example see Bulletin 58 (1910) Hints to Intending Irrigationalists – Erection of Pumping Plants). In 1928 the Director of Agriculture (Arthur Perkins) enquired of both the Council for Scientific and Industrial Research (CSIR) and the Waite Institute of their interest in placing a soil chemist at the Berri Experimental Farm (presumably due to salinity and soil concerns). However, the responses received indicated that services would be developed at other Centres (including Merbein, Griffith and Waite) and that a scientific officer with broader responsibilities would be a more appropriate Riverland appointment. CSIR, and later CSIRO did undertake a number of soil surveys in the irrigation districts, but there was little local scientific support to farmers in irrigation technology or water management.

## PUMPING PLANTS - COBDOGLA IRRIGATION AREA

4. The Company had intended that Mr. Nicholls, their most competent engineer, would go to Australia to supervise the installation, but he had *"met with sudden death recently, having fallen from a ladder and broken his neck. We have not a single engineer left to send abroad and will need to obtain and train more engineers".*

The Director promptly released the Company from the contract in a letter of 26.4.1915 (in those years it took a long time for letters to travel from England to Cobdogla), so the Humphrey pumps were never installed on Lake Bonney (it was fortunate they were not installed as will be seen later in this chapter). But all was not lost to the Company, for they had proved to Mr. M$^{c}$Intosh (as a result of his trip abroad when he inspected the Company's work and was impressed with their efficiency, as a result of which, Mr. M$^{c}$Intosh had become very pro-Humphrey) that their pumping system was highly successful, so the Department honoured the Company with a new contract after the war to install two pumps at Cobdogla.

### HUMPHREY PUMP IDEAS NOT ABANDONED 1915.

However, as it happened, even if war (1914-1918) and the Humphrey Company's request had not caused the cancellation of the installation of Humphrey pumps at Lake Bonney, they would never have been installed there, for by late 1914, Mr. M$^{c}$Intosh was forced to scrap the idea that the Humphrey pumps would be installed at Lake Bonney. He must have given a great sigh of relief when he received the unexpected request from the Company, for this solved a serious problem for Mr. M$^{c}$Intosh. The is no known documented proof, but it is apparent that when the 1914-15 drought caused the lake to become dry (refer page 254), this proved that his planning was faulty and he found himself in difficulties.

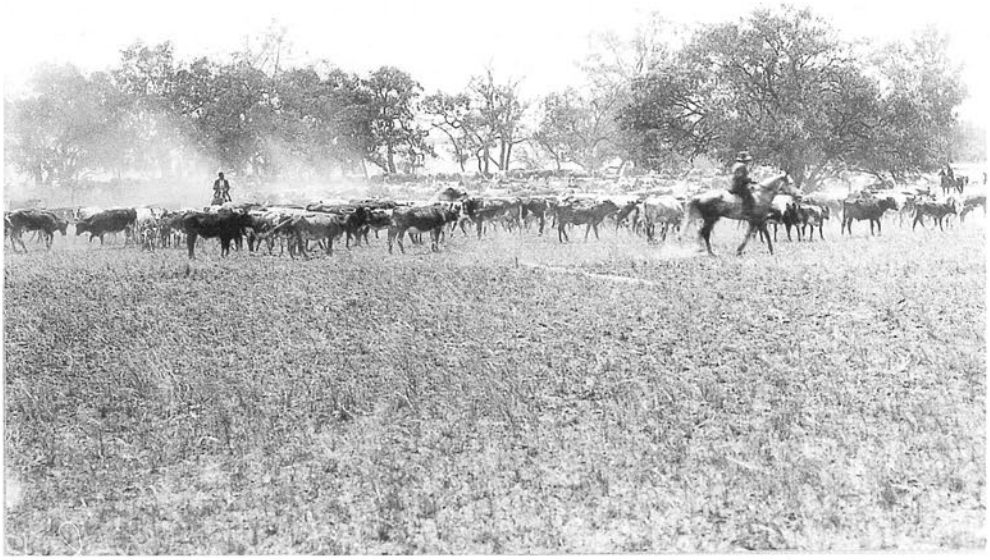
He would have had only two choices - involve his Department in possible litigation in trying to cancel the contract without justifiable reason or accept the pumps. If he had been forced to accept the two 500,000 gph pumps, he would have had nowhere to use them, for he was already preparing Cobdogla (including an intake canal and a very big supply channel to carry up to 3,000,000 gph) for the installation of two 1,500,000 gph Humphrey pumps, which volume would be required for the future Cobdogla and Loveday Divisions. One can only ponder what he would have done with those 500,000 gph pumps. Also, it was fortunate that those two pumps were not installed anywhere for one other reason, for they were an earlier rather more crude design of 1912, which was inferior to those installed later.

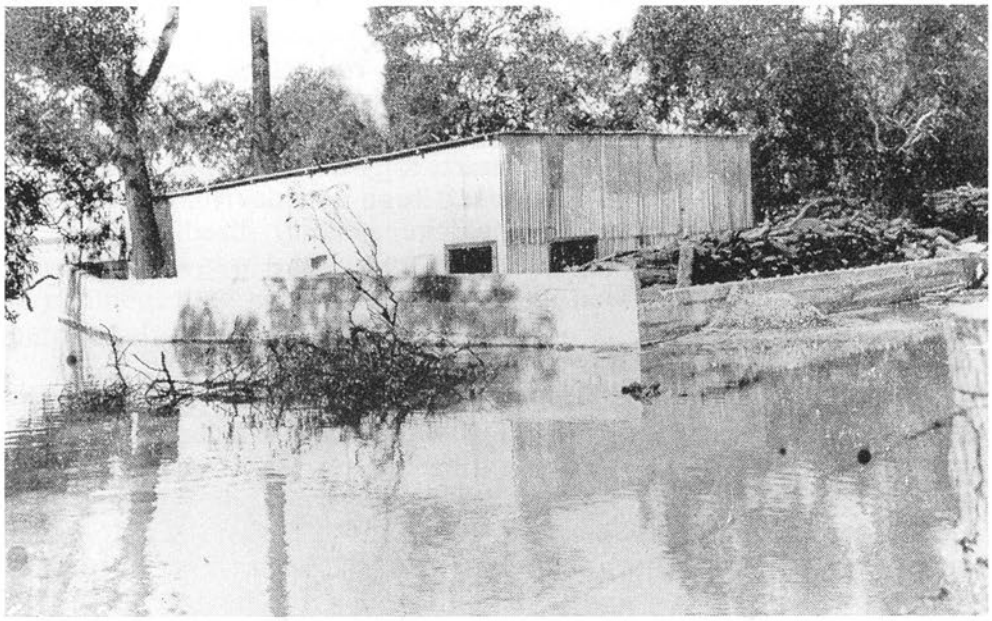
In retrospect, it was fortunate the earlier Humphrey pumps were not installed at Lake Bonney in 1915, for within about six years, they would have become useless due to the intrusion of saline seepage water into the lake. Moving such massive pumps to another site would not have been possible, for they would have been sited 40' to 50' deep into the ground and built *in situ* with everything except the two combustion chambers encased in about 2000 tons of concrete. There would have been no alternative but to scrap them, so Cobdogla may not have received their later Humphrey pumps after such a fiasco. World War I solved quite a number of problems for Mr. M$^{c}$Intosh when it caused that contract to be cancelled.

### FIRST TEMPORARY PUMPING PLANT AT LAKE BONNEY 1912.

In 1911, the Irrigation and Reclamation Works Department commenced the survey of blocks on the river flats between Cobdogla and Lake Bonney. This was completed in 1915, but there were no significant horticultural plantings until 1918. In the meantime, a need developed for pastures and fodder for the growing number of Government horses and cattle (253A). The horses provided the motive power for development and the cattle provided fresh meat and milk for the army of construction workers as well as being sold when suitable prices were obtained.

# PUMPING PLANTS - COBDOGLA IRRIGATION AREA





TOP: GOVERNMENT CATTLE. (Refer pages 252 and 254).

CENTRE: THE FIRST PUMPING STATION, SOUTH LAKE BONNEY, under threat from flood in November 1917. (Refer page 254).

BOTTOM: VAST LUCERNE PADDOCKS AND 30' CHANNEL,

All photos at Lake Bonney November 1917. (Refer page 254). Author's collection

## PUMPING PLANTS - COBDOGLA IRRIGATION AREA

To provide fodder for the livestock, pumping first started from south Lake Bonney in late 1912, using a steam traction engine powering a Worthington 120,000 gph centrifugal pump on the foreshore to water lucerne paddocks (253C) to the west of the future town of Barmera. The pumping site was near the eastern end of the present caravan park. This temporary unit was very suitable at that time, for being mobile, it could follow the water level in the lake as it rose and fell (before the locking of the river).

ROBEY STEAM, NOOKAMKA N° 1 PLANT, 1914.

In 1914, the first pumping station in the (yet to be named) Cobdogla Irrigation Area, was installed on the southern edge of Lake Bonney, adjacent to the present entrance to the caravan park. It was only intended to be a temporary station as it was installed solely for the purpose of supplying water to a channel for irrigating the 127 acre lucerne paddocks. The channel started at the north east corner of Section 1 and its route continued to be used in the following sixty or so years along the northern edge of the Sturt Highway to the west of the town (along the famous avenue of cotton palms). The engine, previously used in a Gawler flour mill, was a Robey slow speed (100-140 rpm), two cylinder horizontal 260 hp steam engine, supplied by James Martin & Co of Gawler, which drove via ropes an 18" Kelly and Lewis centrifugal pump of 250,000 gph capacity. The pump delivered to a portion of the future Nookamka [§] Division to a lift of about 30' through a 26" wooden stave rising main bound with ¼" steel rod bands, totalling about 680' in length. The plant was later designated Nookamka N° 1 plant.

This station experienced problems from the start, for no sooner was it installed, than the big drought of 1914-15 occurred and it was left high and dry for about twelve months from early 1914. During this period, as the lake steadily dried out, the Department progressively planted a crop of barley on the lake bed, and it was eventually mowed and carted away as loose hay for the stock.

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[§] The correct meaning is uncertain. Sam M°Intosh said it was the native name for the lake.
Other historians state it means lake of shining water, or the name of the tribe who occupied the southern shore.

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PUMPING STATION N° 2 ON LAKE BONNEY (Refer page 255) in 1920. From 1936-1947, it housed the council electric generating plant and later was occupied by the Lake Bonney Yacht Club. The view is over the site of Barmera. The new Nookamka channel, woodstacks, store and staff cubicles are evident.
Author's collection.

## PUMPING PLANTS - COBDOGLA IRRIGATION AREA

In mid 1915, the river began to rise and fill the lake. But the pumping plant (253B) could still not be used, for the rotting barley straw choked the pump intake for some months. Then in December 1916 and in December 1917, the plant ran into further difficulties, for it was almost put out of action by the high levels of the river, as it was only a crude galvanized iron building (253B). It was just saved by a rushed installation of high concrete walls around the outside of the building (these walls are all that remains of N° 1 station). The area inside the walls was later filled with earth. The walls are still standing and are used by fishermen as a jetty and as a play area by children.

THOMPSON STEAM, NOOKAMKA N° 2 PLANT, 1920.

The only permanent pumping station that pumped from Lake Bonney, was built in 1920, to the east of the temporary N° 1 station. In the design of the Cobdogla Irrigation Area, it had been intended that the Nookamka Division would be supplied with water from Lake Bonney, but two evils (one known, one unknown) caused a change of plans in the early 1920s.

The known evil was, until Lock 3 on the river came into being (in 1925), the great fluctuations in the level of the lake water. At times it dried up (as in 1914) and at other times, rises of up to 30' above the 1914 river level were encountered (as in 1916, 1917 and 1921). A permanently sited pumping station cannot easily cope with such fluctuations. When the river is too low, the pump intake cannot reach the water, and the design of a centrifugal pump often prevents it from pumping efficiently even if it can reach the water. High rivers, of course, threaten a station with flooding, both by the flood water and also by the intrusion of the large quantity of seepage water forced under the outer barrier. It would seem that as the Irrigation Department knew that the locks were being planned, they hoped for no further fluctuating river problems after the locks became operational.

The unknown evil was that serious problem that bedevils all the irrigation areas and the river itself - saline seepage water. It is well known now that within about seven years after commencing to irrigate typical saline mallee sands and riverine clays, a water 'table' rises alarmingly and gravitates to the lowest area. This occurred in the Nookamka area where irrigation created a localized 'perched' rising water table by about 1925, which gravitated as very saline water into the lowest point- Lake Bonney. By then, it was obvious that pumping from the lake would have to cease and it was decided to close the Nookamka pumping station as soon as possible.

In 1920, a substantial reinforced concrete building was completed to house the new Nookamka N° 2 pumping plant. The engine installed was a Thompson vertical three cylinder triple expansion compound steam engine (N° 566), cylinders 11½", 17½" and 27", stroke 10", 380 hp, speed 428 rpm. The pump was a 24" Thompson centrifugal designed to deliver 540,000 gph with a lift [§] of about 75'-85' (depending on the level in the lake), delivering to a receiving basin at about RL 210', near the south eastern corner of Section 321. There was also a delivery point at the 55' lift to a spur channel leading easterly around the southern perimeter of the then town.

There are no records concerning the boiler nor what became of the pump. The boiler probably was made by Hawke & Co of Kapunda, for this make of boiler was used to power the engine when it was shifted to Loveday in 1930, where it was coupled to an electric generator (refer page 297 for further detail).

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[§] The 85' lift commanded 1524 acres, the 55' lift 578 acres. By 1924, there were 1514 acres of vines, 61 acres of citrus and 90 acres deciduous trees.

## PUMPING PLANTS - COBDOGLA IRRIGATION AREA

The Nookamka N° 2 pumping station on Lake Bonney was closed on 22.2.1928. By then, the salt content of the lake water was excessive, and the Nookamka Division was supplied via a 30" pipe linking it with the Loveday system. This system was supplied by the Loveday pumping station, which was a relift station solely dependent on the Cobdogla pumping station for its supply of water.

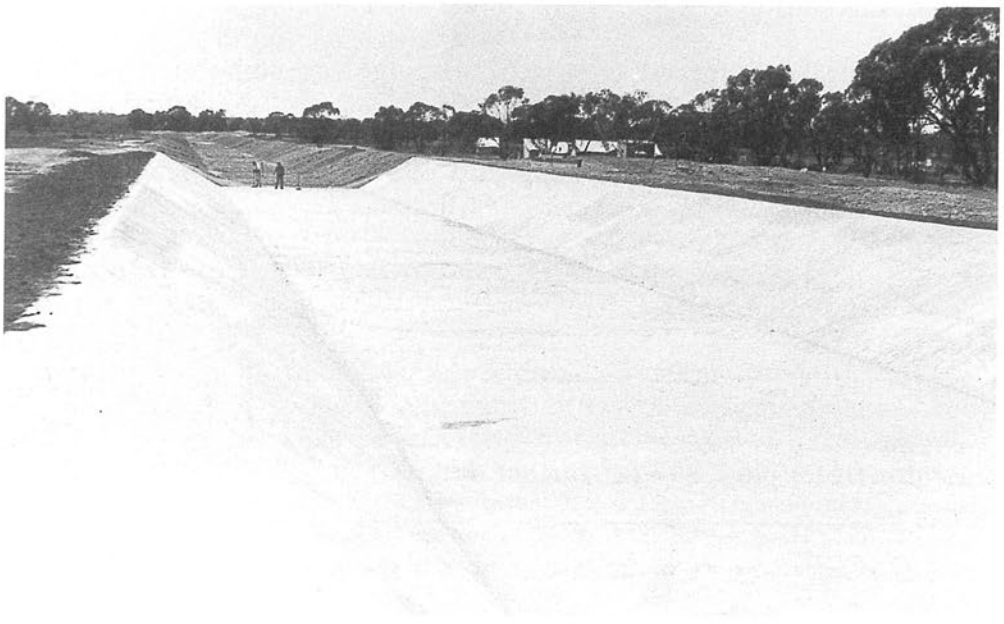
However, just as the Lake Bonney station was about to be dismantled, one of the Humphrey pumps at Cobdogla burst on 15.10.1928 (page 273), which required both Humphrey pumps to be dismantled. This left only one pumping plant, the Taylor Horsfield (refer below) to supply Cobdogla and Loveday! Even though this reliable old engine could pump 1,000,000 gph it could not supply the whole area so the Lake Bonney plant was recommissioned on 17.10.1928 and it continued to supply Nookamka with salt contaminated water until the Humphrey pumps were rebuilt. These came back into operation on 14.7.1930 and the Lake Bonney plant was not used again. This machinery was moved to the Loveday pumping station in 1931 where the engine drove a large electric generator. The remarkable Taylor Horsfield plant was used until 19.11.1930 and was kept in good order until 1944 being replaced with electric N° 3 plant in October 1943.

The old Nookamka N° 2 pumping station building on Lake Bonney is still standing. From 1936 to 1947, it was used by the Barmera District Council to house a diesel driven electric power plant. Soon after 1947, the building became the headquarters of the Lake Bonney Yacht Club and has been used for that purpose since then.

### COBDOGLA PUMPING STATION, TAYLOR HORSFIELD STEAM, N° 1 PLANT 1914.

The second pumping station to operate in the Cobdogla I.A. was installed as a temporary plant at Cobdogla in 1914 and completed in early 1915. It was sited on the northern bank of the intake canal to the then future Cobdogla pumping station, a short distance west of the planned Humphrey pumping plant site.

As indicated by its unusual siting (at the side of the canal and on the low level flood plain – 257C), the plant was placed there to allow the future Humphrey pumps (when the pumps eventually became available - the reasons for the delay are discussed on pages 251-252 and 273-275) to be sited in their correct position, on the end of the intake canal, and in line with the huge 3,000,000 gph supply channel (see below) then under construction.



NEW COBDOGLA 3,000,000 GPH MAIN CHANNEL 1915, constructed while awaiting the Humphrey pumping