
# Burrinjuck Dam Cableway South Tower Supply Upgrade

Statement of Heritage Impact

Report prepared for WaterNSW

August 2025

GML HERITAGE

# Acknowledgement of Country

We respect and acknowledge the First Peoples of the lands and waterways on which we live and work, their rich cultural heritage and their deep connection to Country, and we acknowledge their Elders past and present. We are committed to truth-telling and to engaging with First Peoples to support the protection of their culture and heritage. We strongly advocate social, cultural and political justice and support the Uluru Statement from the Heart.

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# Report register

The following report register documents the development of this report, in accordance with the GML Heritage Pty Ltd (GML) Quality Management System.

| Job No. | Issue No. | Notes/description | Issue date |
|---|---|---|---|
| 25-0220 | 1 | Draft Report | 23 July 2025 |
| 25-0220 | 2 | Final Report | 12 August 2025 |

**Quality management**

The report has been reviewed and approved for issue in accordance with the GML quality management policy and procedures.

It aligns with best-practice heritage conservation and management, *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance, 2013* and heritage and environmental legislation and guidelines relevant to the subject place.



**Cover image**

Cableways in operation at Burrinjuck Dam c1920s. (Source: Mitchell Library, State Library of NSW)

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# 1 Introduction

## 1.1 Background

GML Heritage Pty Ltd (GML) has been engaged by WaterNSW to provide heritage advice and prepare a statement of heritage impact (SoHI) for proposed upgrade works at Burrinjuck Dam (the project site).

The Burrinjuck Dam is included on the State Heritage Register (SHR) listing of NSW. Burrinjuck Dam is included on the SHR as 'Burrinjuck Dam' (SHR ID: 00958) and is also part of the larger SHR place, 'Burrinjuck Dam Site (Greater)' (SHR ID: 00959). It is included on WaterNSW's Section 170 Heritage and Conservation Register under the *Heritage Act 1977* (NSW).

The proposed works include the installation of a new power supply from the South Crest Chamber to the cableway south tower, utilising pre-existing cable ladders in the crest wall of the project site. The works will also involve the removal of existing overhead conductors over the dam and their connecting wooden poles at the north and south.

This SoHI report has been prepared as a standalone document to accompany a Section 60 application (s60) to Heritage NSW and any other approvals. This report identifies the project site's heritage context and relevant heritage items to be affected by the proposed works and assesses the potential impacts of the proposed works on the Burrinjuck Dam heritage values.

## 1.2 Identification of the project site

The site is in the southeast of New South Wales (NSW). It is approximately 55 kilometres from Yass by road (located to the northeast of the dam) and 125 kilometres by road from Canberra (located to the southeast of the dam) (Figure 1.1). Burrinjuck Dam is located on Burrinjuck Road within the Yass local government area (LGA), at the western end of Lake Burrinjuck on the Murrumbidgee River.

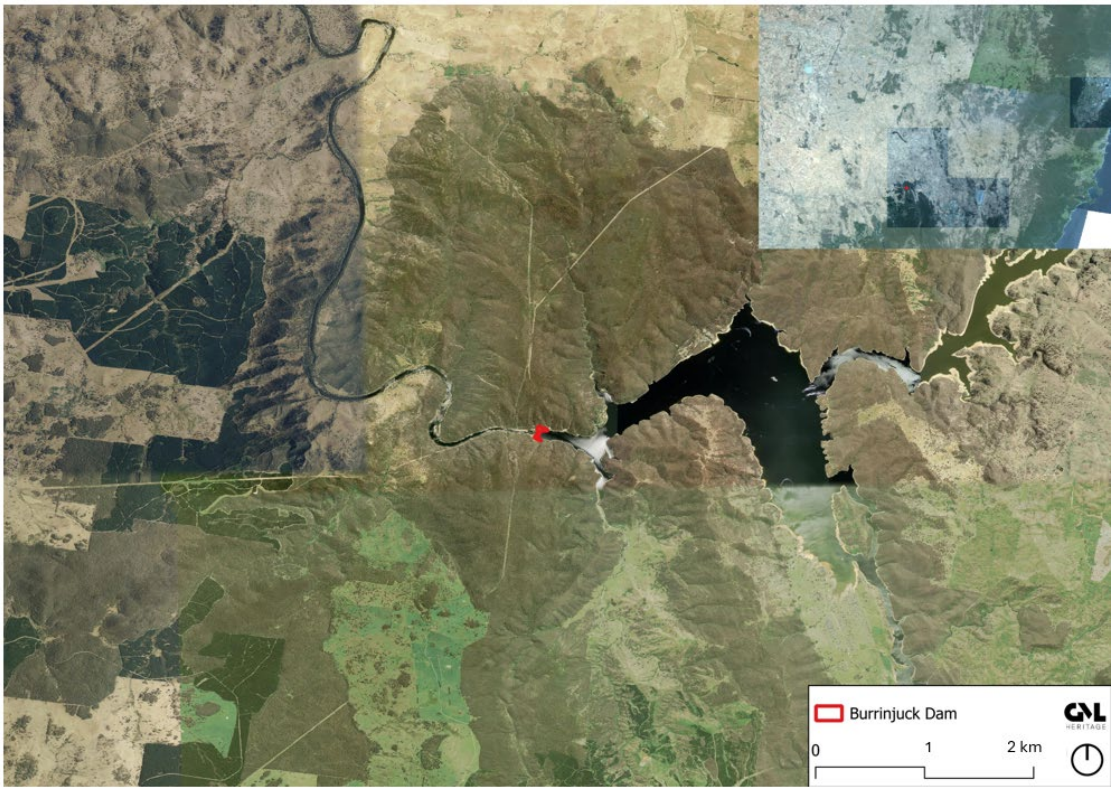



Figure 1.1 Location of the project site. (Source: GML Heritage, 2025)


Figure 1.2 Location of Burrinjuck Dam on the western end of Lake Burrinjuck. Identified area is the boundary of 'Burrinjuck Dam' SHR 00958. (Source: Nearmap with GML overlay)

The items related to the works are electrical equipment on the north and south sides of the dam servicing the north and south cableway towers, and connecting aerial conductor cables. The location of these is shown at Figure 1.3.

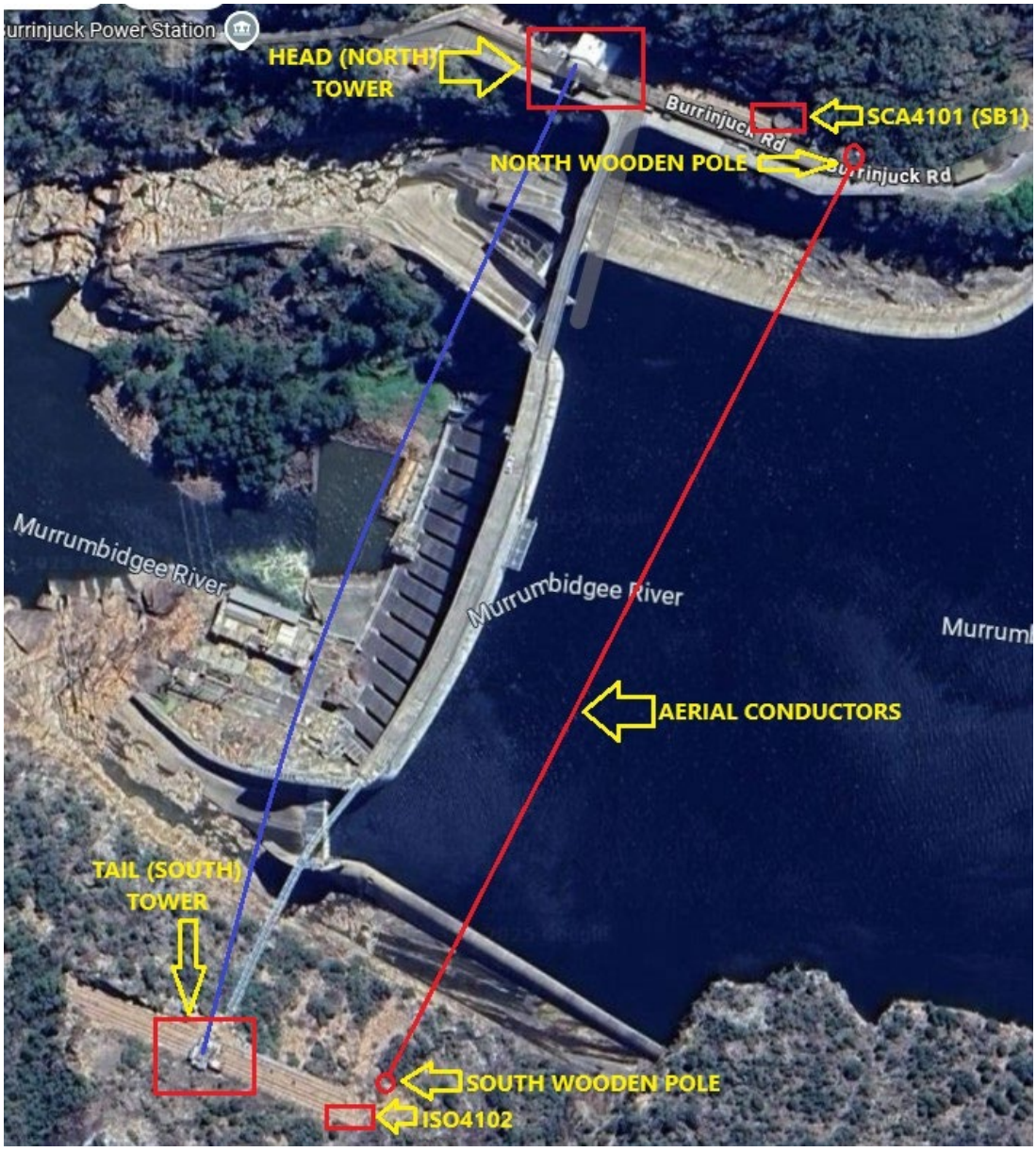



Figure 1.3 Location of key items. (Source: WaterNSW)

## 1.3 Heritage listings

The project site is part of several heritage listed places.

Table 1.1 Statutory heritage listings for Burrinjuck Dam Site.

| Item Name | Address | Significance | Listing | Item ID |
|---|---|---|---|---|
| Burrinjuck Dam | Burrinjuck Road | State | State Heritage Register | 00958 |
| Burrinjuck Dam Site (Greater) | Burrinjuck Road | State | State Heritage Register | 00959 |
| Burrinjuck Dam | Burrinjuck Road | State | Yass Valley Local Environmental Plan 2013 | I058 |
| Burrinjuck Dam Complex | Burrinjuck Road | State | s 170 WaterNSW Heritage and Conservation Register | 4550035 |
| Burrinjuck Dam Site (Greater) | Burrinjuck Road | State | s 170 WaterNSW Heritage and Conservation Register | 4550036 |

## 1.4 Methodology

This SoHI has been prepared in accordance with the statement of heritage impact guidelines published by the former NSW Department of Planning and Environment.[1] It is also consistent with the relevant principles and guidelines of the *Australia Charter for Places of Cultural Significance, 2013* (the Burra Charter). The impact assessment also refers to relevant policies of the 2012 conservation management plan (CMP).

## 1.5 Relevant heritage documentation

The following documentation was reviewed while preparing this SoHI:

- Urbis 2012, Burrinjuck Dam Conservation Management Plan (2012 CMP), prepared for State Water;
- WaterNSW, March 2025, 'Burrinjuck Dam Cableway South Tower Supply Upgrade-Electrical Installation Scope'; and
- Agency exemptions for WaterNSW—Heritage Council of New South Wales, 'Order under section 139(4) of the *Heritage Act 1977* to grant exceptions' in New South Wales, New South Wales Government Gazette, No. 521—Planning and Heritage, 4 November 2022, n2022-2173.

## 1.6 Limitations

- This SoHI is prepared based on a desktop inspection of the site, including documentary records and photos of the works area. A site inspection was not undertaken by GML's team for this report, though GML has inspected the site previously in 2022.
- The discussion of heritage significance is from the existing heritage listings for Burrinjuck Dam and the 2012 CMP. No additional significance assessment has been undertaken to inform this SoHI.
- No consultation with the Aboriginal community or other stakeholders has been undertaken in the preparation of this report.
- No additional archaeological survey or investigation was undertaken as part of preparing this report.

## 1.7 Endnotes

[1] Department of Planning and Environment, June 2023, 'Guidelines for preparing a statement of heritage impact', accessed 23 July 2025 <https://www.environment.nsw.gov.au/publications/guidelines-preparing-statement-heritage-impact>

# 2 Statutory context

## 2.1 Introduction

In NSW, items of heritage significance and archaeological remains are afforded statutory protection under the following Acts:

- the *Heritage Act 1977* (NSW) (Heritage Act);
- the *National Parks and Wildlife Act 1974* (NSW) (NPW Act); and
- the *Environmental Planning and Assessment Act 1979* (NSW) (EPA Act).

## 2.2 Heritage Act 1977

The Heritage Act is a statutory tool designed to conserve NSW's environmental heritage. It is used to regulate the impacts of development on the state's heritage assets. The Heritage Act defines a heritage item as 'a place, building, work, relic, moveable object or precinct'.

### 2.2.1 State Heritage Register

The SHR is established under the Heritage Act and is a list of identified heritage items of significance to the state of NSW. The SHR includes items and places (such as buildings, works, archaeological relics, movable objects or precincts) determined to be of state heritage significance.

Under the Heritage Act, approval must be sought for non-exempt works to state heritage items in the form of an s60 application.

Standard exemptions and site-specific exemptions are provided for under the Heritage Act, typically allowing for maintenance or minor works.[1] WaterNSW has obtained agency-specific exemptions under the NSW Heritage Act, but the proposed works do not meet these exemptions, which are focused on maintenance and repair and emergency works.[2] The standard exemptions 'do not permit the removal of significant fabric'.[3]

No site-specific exemptions apply to Burrinjuck Dam. The proposed works are not an exempt development under the standard exemptions. Therefore, approval must be sought for the works.

Under Section 169 of the Heritage Act, the Minister or Heritage Council may delegate certain powers, for example functions to grant approvals for works without major adverse heritage impact. WaterNSW does not have any delegations under the Heritage Act. Instead, it has obtained agency-specific exemptions for certain works.

Applications to the Heritage Council must be accompanied by a SoHI that provides details of the proposal's impacts on the heritage item.

The Heritage Act requires the minimum standards of maintenance and repair to apply to items included on the SHR to ensure that their heritage significance is maintained. These standards are set out in the Heritage Regulations 2012 and relate to weatherproofing, fire protection, security and essential maintenance.

An assessment of the proposal's impacts on Burrinjuck Dam, according to the standard questions found in the NSW statement of heritage impact guidelines, is provided in Section 7.2.

### 2.2.2 State agency heritage management

Section 170 of the Heritage Act requires NSW Government agencies to identify, conserve and manage heritage assets owned, occupied or managed by that agency. It requires the government agencies to establish, keep, review and amend a register of heritage items (Heritage and Conservation Register).

In accordance with the Heritage Act, WaterNSW keeps a Heritage and Conservation Register to record all heritage items in its ownership or under its control. Burrinjuck Dam is included on the Heritage and Conservation register.

Section 170A of the Heritage Act requires WaterNSW to manage its heritage assets according to the standards identified in the Act.

In accordance with Section 170A, WaterNSW must give the Heritage Council written notice if it proposed to remove, transfer ownership, cease to occupy or demolish any place, building or work listed on its Section 170 Heritage and Conservation Register.

WaterNSW must ensure that the Burrinjuck Dam is maintained with due diligence in accordance with State-owned Heritage Management Principles approved by the Minister. WaterNSW must also comply with heritage asset management guidelines issued by the Heritage Council to government agencies. These guidelines deal with the conservation of the items entered on the Heritage and Conservation register and the SHR. They relate (but are not limited to) such matters as maintenance, repair, alteration, transfer of ownership and demolition.

The State-owned Heritage Management Principles and the heritage asset management guidelines are published on the NSW Department of Planning and the Environment's website.[4]

An assessment of the proposed works' compliance with these principles and guidelines is included in Section 7.5.

## 2.3 National Parks and Wildlife Act 1974 (NSW)

All Aboriginal objects and places receive statutory protection under the NPW Act. Aboriginal objects are defined in the Act as:

> ... any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.

Under the Act, applicants must seek approval prior to disturbing sites with potential to contain Aboriginal objects or cultural material. Harming Aboriginal objects, and harming or desecrating Aboriginal places, is also a liability offence under the Act. Harm includes destroying, defacing, damaging or moving an Aboriginal object or declared Aboriginal place.

The proposed works are not expected to affect sites with potential to contain Aboriginal objects.

## 2.4 Environmental Planning and Assessment Act 1979

The EPA Act is administered by the NSW Department of Planning, Housing and Infrastructure and provides for environmental planning instruments to be made to guide the process of development and land use. The EPA Act also provides for the protection of local heritage items and conservation areas through listing on local environmental plans (LEPs) and state environmental planning policies (SEPPs), which provide local councils with the framework required to make planning decisions.

### 2.4.1 Yass Valley Local Environmental Plan 2013

Burrinjuck Dam is listed as a local heritage item on Schedule 5 of the Yass Valley LEP 2013.

Clause 5.10 of the Yass Valley LEP 2013 contains standard provisions regarding the conservation of heritage items and lists the following objectives for heritage conservation in Yass Valley:

- to conserve the environmental heritage of Yass Valley,
- to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,
- to conserve archaeological sites,
- to conserve Aboriginal objects and Aboriginal places of heritage significance.

Under Clause 5.10(4), development consent from Yass Valley Council is required for several activities, including demolishing, moving or altering the exterior of a heritage item, or 'altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item'.

Schedule 5 of the Yass Valley LEP does not specify any specific features inside Burrinjuck Dam.

Compliance of the proposed works with the provisions of the Yass Valley LEP 2013 is assessed in Section 7.4.

### 2.4.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

The *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TISEPP) aims to facilitate the effective delivery of infrastructure across the state. Among other things, it seeks to provide a consistent planning regime for infrastructure and the provision of services, identify the environmental assessment category into which different types of infrastructure and services development fall, and provide for consultation with relevant public authorities about certain development during the assessment process.[5] Certain developments are exempt from obtaining approvals under the EPA Act if they meet specific requirements. For heritage items, the works must involve no more than minimal impact on the heritage significance of the item.[6]

The SEPP does not affect other legislation associated with delivering public infrastructure and services. Relevant approvals, licences or permits under other legislation must still be obtained for infrastructure works on exempt or complying developments. This includes approvals under the Heritage Act.

Under Part 5.31, development consent is required for demolishing or removing a heritage item that has been listed in the TISEPP, altering a heritage item that is a building by making structure changes to its interior, or erecting a building on land on which a heritage item is located. Development consent is not required if the consent authority has advised that the proposed development is minor or for maintenance.

The SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to commencing certain types of development.

Burrinjuck Dam is not identified as a heritage item in the TISEPP. The proposed works' compliance with the controls of the TISEPP is discussed in Section 7.4.2.

# 2.5 Endnotes

[1] NSW Department of Planning and Environment, 2022, 'Standard Exemptions', accessed 15 December 2022 <https://www.environment.nsw.gov.au/topics/heritage/apply-for-heritage-approvals-and-permits/state-heritage-register-items/standard-exemptions>.

[2] Chairperson, Heritage Council of New South Wales, 'Order under section 139(4) of the Heritage Act 1977 to grant exceptions' in New South Wales, *New South Wales Government Gazette,* No. 521—Planning and Heritage, 4 November 2022, n2022-2173.

[3] NSW Department of Planning and Environment, 2022, 'Standard Exemptions', accessed 15 December 2022 <https://www.environment.nsw.gov.au/topics/heritage/apply-for-heritage-approvals-and-permits/state-heritage-register-items/standard-exemptions>.

[4] Heritage Council of NSW and Heritage Office, 2005, 'State Agency Heritage Guide Management of Heritage Assets by NSW Government Agencies', accessed 3 January 2022 <https://www.environment.nsw.gov.au/research-and-publications/publications-search/state-agency-heritage-guide>.

[5] *State Environmental Planning Policy (Transport and Infrastructure) 2021*, Part 2.1.

[6] *State Environmental Planning Policy (Transport and Infrastructure) 2021*, Part 2.20 (2)(e).

# 3 Historical overview

## 3.1 Introduction

The following section provides an overview of the historical development of Burrinjuck Dam.

The history in this section is drawn from the 'Burrinjuck Dam Complex' s170 record and the 'Burrinjuck Dam' SHR record, supplemented with information from the 2012 CMP. Refer to the 2012 CMP for a detailed history of the site.

## 3.2 History of Burrinjuck Dam

Burrinjuck Dam, originally known as 'Barren Jack', was constructed to support the Murrumbidgee Irrigation Area (MIA), a key initiative by the NSW Government to develop agriculture in the region. Prior to its construction, the dam site was located 50 kilometres from the nearest town and railway at Bowning. Although proposals for a dam in the area had been considered throughout the late nineteenth century, no substantial progress occurred until 1903, when the newly elected government under Minister for Public Works, C.A. Lee, ordered a formal investigation.

The dam was designed to be a massive structure and required 50,000 tonnes of cement. Its wall was constructed using cyclopean concrete, incorporating large granite blocks, or 'plums', with richer concrete used as supplies of granite diminished.

Construction officially began in early 1907, marking the beginning of one of the largest and most transformative infrastructure projects in NSW. The project not only provided the water infrastructure critical to developing the MIA but also gave rise to new towns such as Leeton and Griffith.

To access the isolated site and transport materials and workers, a narrow gauge railway was constructed, completed in 1908, and a temporary township, Barren Jack City, was established. Construction initially began under the Public Works Department using day labour, but by 1909, a contract was awarded to Lane and Peters, civil engineers who had completed similar large-scale projects. Although the central wall of the dam reached full height by 1913, geological problems in the abutments and spillway foundations delayed completion. Further delays were caused by World War I and material shortages. In 1919, the Water Conservation and Irrigation Commission took over and completed the work by day labour. Three cableway systems on a shared track were originally used during construction, due to the intense nature of the works. The cableway head tower and

matching tail tower still present on the site are the operational remnants of that more extensive system.

The dam was officially completed in October 1928. Following completion, the temporary railway was dismantled and the construction village removed, with some parts of the township submerged under the reservoir.

Burrinjuck Dam gained further historical significance by becoming the largest dam in the southern hemisphere and the fourth largest in the world at the time of completion. However, following major flooding in 1929, structural issues prompted remedial work starting in 1940. These works were delayed by World War II and completed in 1957. In the 1980s, a major upgrade was undertaken to secure the dam against extremely rare flood events. This involved raising the dam wall by 13.4 metres and securing it with post-tensioned steel cables, an innovation that drew considerable attention from the engineering community.

Further works continued into the 1990s and beyond, including the installation of steel linings in high-level outlets, comprehensive electrical upgrades, and the replacement of access and safety infrastructure.

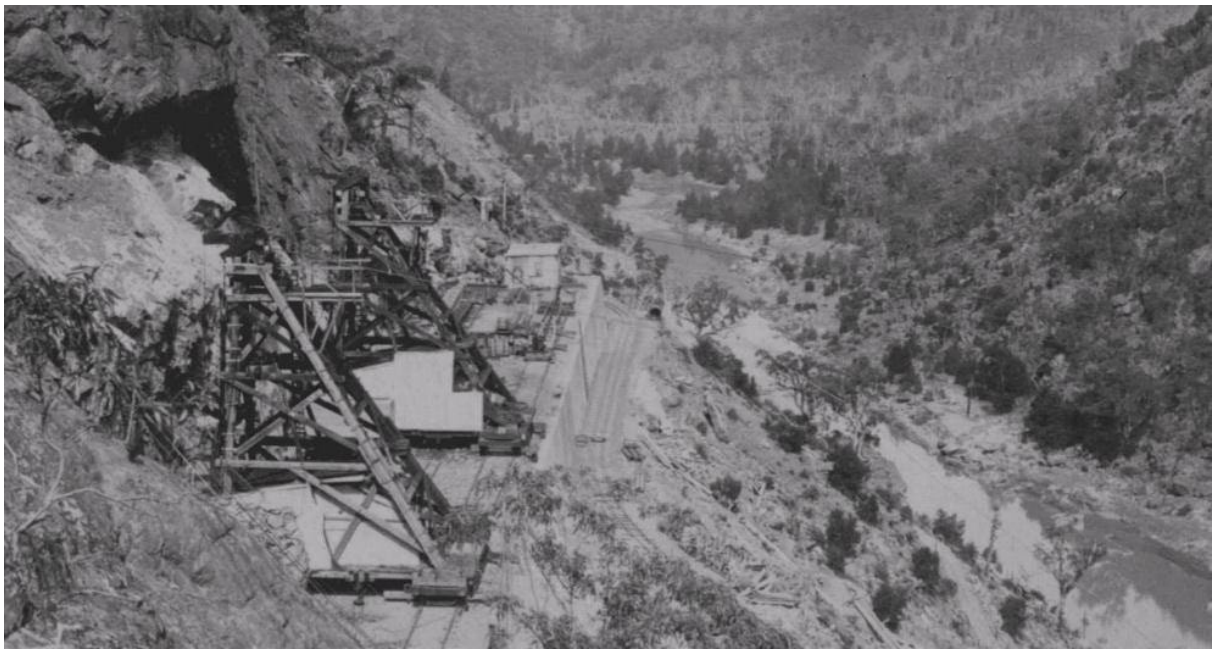


Figure 3.1 Two of the original cableway headstocks on the northern side of the dam, date unknown. (Source: 2012 CMP, p 116)

# 4 Site analysis

Burrinjuck Dam is located at the western end of Lake Burrinjuck on the Murrumbidgee River. The site analysis below draws on material in the 2012 CMP, supplemented by additional information.

## 4.1 The dam

The dam is a cyclopean concrete gravitation dam, approximately 93 metres high and 233 metres wide. It stores more than 1,028,000 megalitres of water and covers an area of 5,500 hectares.[1] The dam comprises the concrete dam wall with valve block and pump house. At the base of the dam is the lower gallery, which is 34 metres below the pump house and runs the length of the dam wall. A lift traverses the western face of the dam. At the top of the dam is the dam crest wall. This is a long wall travelling north to south, which has a vehicle and pedestrian road across the top. The dam crest is hollow inside.

The hydroelectric power generation system for the dam includes power stations 2 and 3, and the now disused power station 1. Power station 1 was constructed in 1928, power station 2 was constructed around 1938, and power station 3 was added as an extension at the east end of power station 2 in 2001.

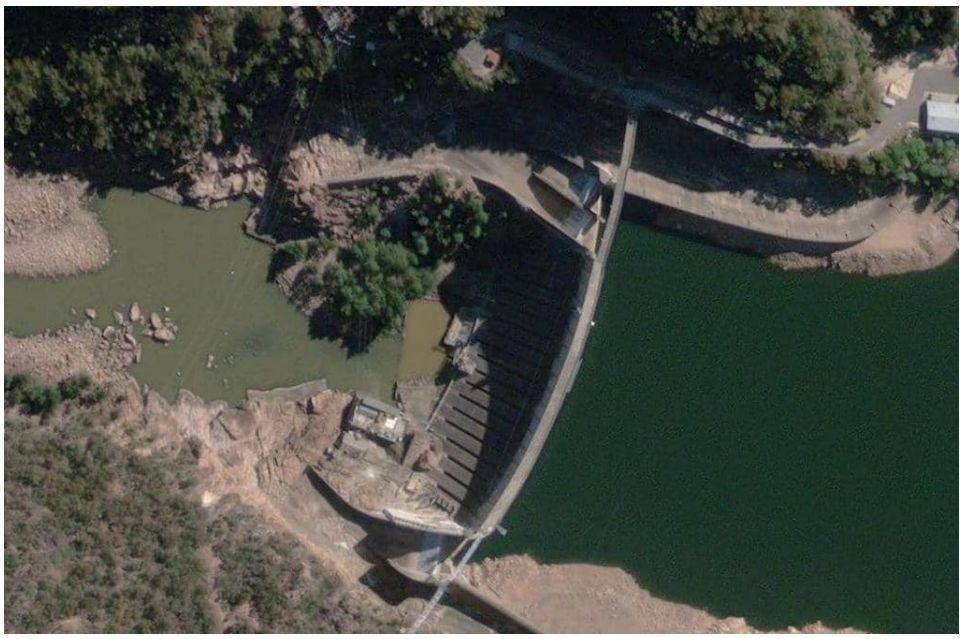


Figure 4.1 Aerial view of Burrinjuck Dam. (Source: Nearmap)

Figure 4.2 View of Burrinjuck Dam from the northwest, 2022. (Source: GML Heritage)

## 4.2 The cableway and towers

A large overhead cableway spans Lake Burrinjuck from the north to south just before the dam wall on the upstream side. The cableway is used in the maintenance of the dam, to pass loads between the north and south side.

The cableway consists of a head tower on the northern side, and a tail tower on the southern side. The head and tail towers are tall, steel-framed towers which run back and forth on a section of rails that spans either side of the dam wall, allowing access to the upstream and downstream side of the dam, and the wall crest. The head tower is on an elevated abutment above the access road. The tail tower is also on an elevated platform bench on the sloping, southern side of the valley walls. The cableway spans 365 metres between the head and tail towers. It is the last remaining industrial cableway in NSW.

Originally the towers were operated manually, but they are now operator-controlled from the head tower on the north side. The power supply to the head tower comes from the main switchboard, travelling to an isolator just outside the main switchroom. The power supply to the tail tower originates in the main switchboard on the northern site, and is then sent by several smaller aerial conductor cables strung across Lake Burrinjuck alongside the upstream side of the dam wall to the tail tower. These aerial conductor cables are fixed to timber poles at either end and do not move, unlike the cableway.

The fabric of the cableway and towers has changed over time, with original structural timber replaced with steel, and winching and hoisting equipment upgraded to a

hydroelectric system. However, the overall form and function of the cableway remains the same. The tail tower is accessed via a steel-framed walkway.

## 4.3 Setting and views

The Burrinjuck Dam is part of a large visual catchment which is created by the natural topography of the landscape, lake and dam itself. The dam wall, nearby historical village, Lake Burrinjuck, other buildings and structures, landscape elements and key views all contribute to this visual catchment.

In the context of this project, the visual catchment is focused immediately around the dam wall (refer to Figure 4.2).

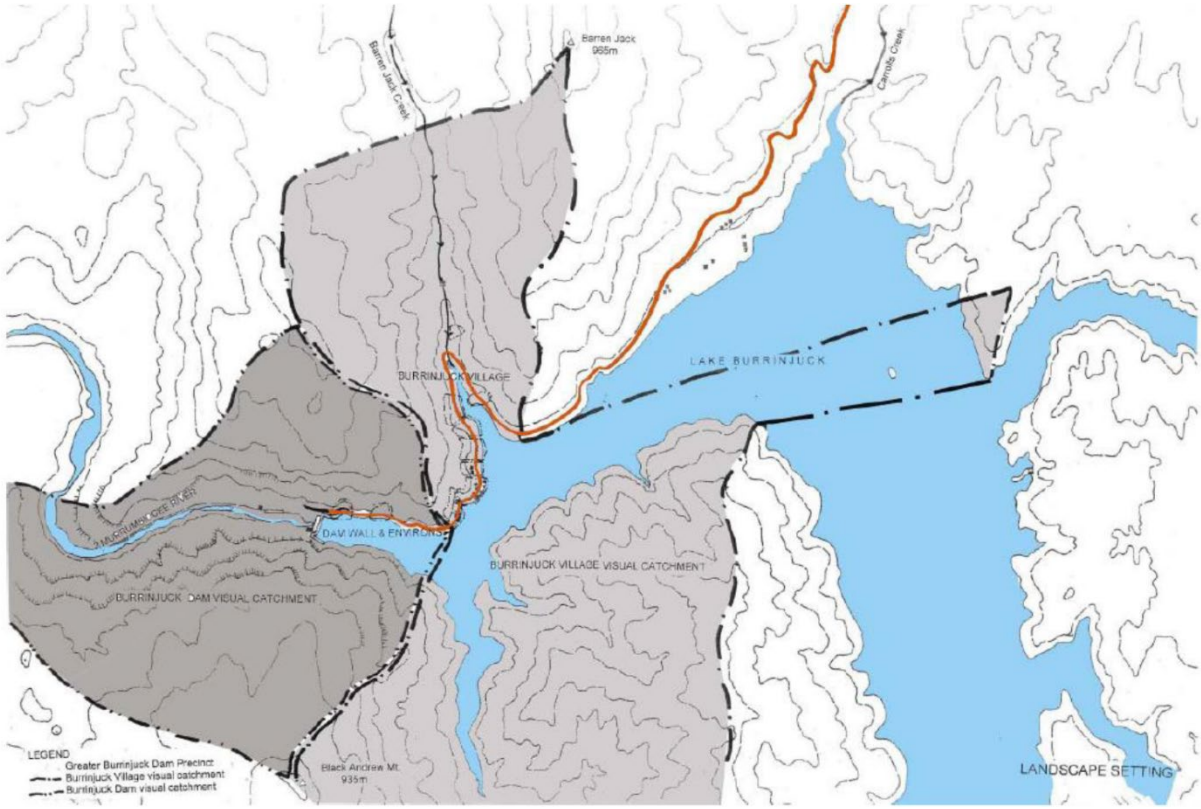



Figure 4.3 Burrinjuck Dam visual catchment. (Source: 2012 CMP, p 71)

## 4.4 Photographs of project site

Figure 4.4 View from top of the dam wall looking downstream to the west. Power station 1, constructed in 1928 and now unused, is visible in the distance, 2022. (Source: GML Heritage)

Figure 4.5 Lake Burrinjuck viewed from dam crest wall, looking east, 2022. (Source: GML Heritage)

Figure 4.6 Head tower, with cable to the left. (Source: WaterNSW, July 2025)

Figure 4.7 Northern head tower (viewed from southern side), with cable at left of image. (Source: WaterNSW, July 2025)

Figure 4.8 Tail tower. (Source: WaterNSW, July 2025)

Figure 4.9 Tail tower. (Source: WaterNSW, 2023)

Figure 4.10 Cable between head and tail tower, looking downstream. (Source: WaterNSW, 2025)

Figure 4.11 Northern aerial conductor cable fixing pole, with the 4 aerial conductor cables attached. (Source: WaterNSW, July 2025)

Figure 4.12 Southern aerial conductor cable fixing pole. (Source: WaterNSW, 2025)

Figure 4.13 Festoon cable and mount, southern tower. On right is tower distribution board DB2. (Source: WaterNSW, July 2025)

Figure 4.14 Walkway travelling from tail tower platform to dam crest wall. (Source: WaterNSW, July 2025)

Figure 4.15 Aerial conductor power supply cables between north and south side of dam. (Source: WaterNSW, 2025)

## 4.5 Endnotes

[1] Urbis 2012, Burrinjuck Dam Conservation Management Plan (2012 CMP), prepared for State Water, p 72.

# 5 Significance assessment

## 5.1 What is heritage significance?

Before making decisions to change a heritage item, an item within a heritage conservation area, or an item located in proximity to a heritage listed item, it is important to understand the values of the heritage item and the values of its context. This leads to decisions that will retain these values in the future. Statements of significance summarise the heritage values of the place—why it is important and why a statutory listing was made to protect these values.

Levels of significance are determined to be of local or state significance. These are defined as follows:

- Local heritage significance in relation to a place, building, work, relic, movable object or precinct means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.
- State heritage significance in relation to a place, building, work, relic, movable object or precinct means significance to the state in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

## 5.2 Statements of heritage significance

Burrinjuck is listed on the SHR under multiple listings as an item of state significance.

The statutory heritage listings of Burrinjuck Dam are identified in Table 1.1.

The following statement of significance is an extract from the Heritage NSW inventory sheet for 'Burrinjuck Dam', SHR No. 0958. Additional information from the 2012 CMP Statement of Significance for Burrinjuck Dam and the surrounding precinct is also provided. Key attributes or values relevant to the proposed works have been emphasised. The statements of significance for other heritage listings for Burrinjuck Dam reflect the content of the below information.

### 'Burrinjuck Dam SHR statement of significance

> This Dam is a fascinating example of how applied modern technology has been used to meet the demand of an expanding rural area. The dam was part of a larger system of weirs and controls providing water for the government-sponsored Murrumbidgee Irrigation Scheme which enabled agriculture to expand in the area. It is the first major water storage built specially for irrigation purposes in NSW. The dam is also part of the State's first hydro-electric scheme.

## Burrinjuck Dam CMP Statement of Significance

The Greater Burrinjuck Dam is of state heritage significance for its industrial, cultural and natural heritage values.

Burrinjuck Dam is of state historical, aesthetic, social, research and representative significance. Burrinjuck was the first major irrigation dam to be constructed in NSW and marked the development of one of the greatest social, economic and irrigation enterprises sponsored by the NSW government, namely the creation of the Murrumbidgee Irrigation Area. It also enabled extensive immigration and development of inland NSW. Burrinjuck Dam is of state aesthetic significance for its design and technical innovation, scale and landmark qualities. The dam is a fine example of a large concrete gravity dam and demonstrates technical innovation through early construction methods including building in 'paddocks' for the concrete and through subsequent upgrades to contemporary standards, including the hollowed elevated dam crest. The dam also features the only operating cableway in NSW. Burrinjuck Dam has a major impact on the downstream irrigated areas and is of social significance for its continued contribution to water and irrigation management in the Riverina/ Murrumbidgee valley. Burrinjuck remains one of the largest dams in the country, and although modified, still serves its original function. The dam itself and the associated body of archival records, scientific data and movable heritage items present a significant holistic historical record which may be of interest for research purposes and is of significance for its contribution to the understanding and interpretation of the dam.

Burrinjuck Dam is of associative significance at the local level for its association with the Public Works Department and prominent engineers including L.A.B Wade, E. M de Burgh, C.W Darley, H.G McKinney and J.J.C Bradfield.

The Greater Burrinjuck Village is of state historic, aesthetic and research significance as a remnant of the construction village which housed up to 2500 people at the peak of the construction works. The village provides examples of buildings from all phases of use. The village is of aesthetic significance for its design and layout which is a direct response to the immediate setting and landscape. The village is characterised by terracing using dry stone retaining walls (of local stone) and the use of demountable buildings. The village is also of state significance for its rarity; few remnants of these construction villages survive in NSW, particularly on the scale evidenced at Burrinjuck. The former construction village (largely under the dam storage) presents a significant archaeological resource (although disturbed). Remains of the village (1908-1927) are likely to be of state significance for their association with the construction of the Burrinjuck Dam and their ability to improve understanding of the earliest phases of occupation of the site.

The construction and remedial works presented a significant labour undertaking over an extended period and was supported by the development of the Burrinjuck village which housed the workers and their families. The dam and village are of local social significance to the descendants of the former Burrinjuck community who continue to have an association with the site. Lake Burrinjuck also presents a significant recreational resource to the local community and local tourism.

The cottages and administrative buildings associated with the dam development and subsequent expansions (1930s-1960) are of historic significance at the local level as representative buildings of the remedial works upgrade period. The cottages reflect department 'type' housing developed specifically for the precinct and demonstrating the social status of the occupants through the typologies used.

St Saviour's Church of England is of historical significance at the local level as the only known remnant building, surviving from the original construction village. The Church demonstrates a high degree of creative achievement in its ability to convey a Gothic language with minimal and rustic materials. Buildings of this type, quality and integrity are likely to be rare in NSW. Although highly intact, its aesthetic contribution is diminished by its condition. The church also contributes to the social significance of the village along with elements such as the stationmaster's cottage, school and cemetery, as they attest to the activities of the community and isolated circumstances.

Power station 1 is of historic significance as one of the earliest hydroelectric power station in NSW. The monolithic structure is of aesthetic significance locally as a fine and robust example of the free classical style with pseudo Egyptian (Art Deco) elements and for its impressive setting, downstream of the dam toe. The Power station retains its original turbines.

The Upper Lake Burrinjuck Area is nationally famous for the extraordinarily well displayed large scale folding of the fossiliferous Devonian limestones, and is noted as having international scientific significance as a type locality for many Devonian fossils though this requires further assessment. The area also has research significance for its natural heritage values, having been variously studied for its geological formations. A number of endangered species and rare geological features have been identified within the Precinct including the nationally endangered species *GREVILLEA IASPICULA* mcgillivary. The site supports the largest known population and equal second largest population.

The area is also likely to include places and items of Aboriginal cultural significance, though further assessment is required.

## 5.3 Grading of heritage significance

The following tables provide a summary of the grading of heritage significance for elements at Burrinjuck Dam relevant to the proposed works. The gradings are from the 2012 CMP.

Table 5.1 Definition for gradings of heritage significance. (Source: Burrinjuck Dam CMP, p 138)

| Grading | Justification | Status |
|---|---|---|
| Exceptional | Rare or outstanding elements that directly contribute to the place's overall heritage significance; they retain a high degree of integrity and intactness in fabric or use although degradation may be evident; any change should be minimal and retain significant values or fabric | Fulfils criteria for local or state listing |

| Grading | Justification | Status |
|---|---|---|
| High | Element demonstrates a key aspect of the place's overall heritage significance; they have a high degree of original fabric, or they retain their original use; where there may have been alterations, they do not detract from significance | Fulfils criteria for local or state listing |
| Moderate | Element contributes to the place's overall heritage significance; they may have been altered but they still have the ability to demonstrate a function or use particular to the site; change is allowed so long as it does not adversely affect the place's overall heritage significance | May fulfil criteria for local listing |
| Little | Element may not represent an important function or may be difficult to interpret or may have been substantially modified which detracts from its heritage significance; change is allowed so long as it does not adversely affect the place's overall heritage significance | Does not fulfil criteria for local or state listing |
| Neutral | Elements do not add or detract from the site's overall heritage significance; change allowed | Does not fulfil criteria for local or state listing |
| Intrusive | Elements are damaging to the place's overall heritage significance; can be considered for removal or alteration | Does not fulfil criteria for local or state listing |

Table 5.2 Grading of significance of elements at Burrinjuck Dam relevant to the proposed works. (CMP, p 149)

| Item | Element description | Location or building | Significance grading | Level |
|---|---|---|---|---|
| 1 | Burrinjuck Dam (overall structure) | Murrumbidgee River | Exceptional | State |
| 2 | Concrete dam wall (including valve house and pump house) | Dam wall and environs | High | State |
| 3 | Cableway head and tail towers and operating platform (excluding contemporary operating equipment) | Dam wall and environs | High | State |
| 4 | Contemporary switch and operating equipment | Dam wall and environs | Neutral | - |

## 5.3.1 Heritage significance of specific items

Commentary on the heritage significance of specific items affected by the proposed works is provided below.

Table 5.3 Significance of items related to the works.

| Item | Contributory significance | Commentary |
|---|---|---|
| Dam crest wall | High | The dam crest is identified as high significance in the 2012 CMP.<br>The dam crest wall has been raised several times over the history of the dam. The original dam construction finished in 1928. The wall was raised c1950s and then again in the 1990s, when the dam crest was raised by 13.4 metres.<br>As a whole, the dam crest wall is important in demonstrating the history and function of the dam. The physical fabric of the dam crest wall is important to the extent that it contributes to the existence of the dam.<br>The hollowed out dam crest demonstrates site-specific technical innovations and contributes to the technical significance of the dam. The hollowed out crest was installed in the 1990s to allow water to flood into the top of the dam and increase its stability during a flood. The upgrades to contemporary standards are part of the site's significance. |
| Steel walkway to southern tower bench | Neutral | The steel walkway to the southern tower bench has no individual significance. It is part of the operational functioning of the dam but is not of itself historically important fabric.<br>The first steel walkway was likely built c1990s (CMP, p 120), but the current walkway may be a later upgrade. |
| Northern and southern wooden pole for aerial conductor cables | Neutral | The northern and southern wooden poles have no individual significance. They are part of the broader operational functioning of the dam.<br>The poles currently facilitate the functioning of the cableway, which is highly significant. However, the poles themselves are incidental and supporting material to the cableway. The cableway was originally operated manually and later upgraded to electrical controls. It is assumed that the wooden poles were installed at some point following the electrification of the cableway.<br>The upgrades to contemporary standards are part of the site's significance. |
| Aerial conductor cables | Neutral | The aerial conductor cables have no individual significance. They are part of the broader operational functioning of the dam.<br>Like the wooden poles, the aerial conductors currently facilitate the functioning of the highly significant cableway. They are incidental and supporting material to the cableway, |

| Item | Contributory significance | Commentary |
|---|---|---|
| | | and are assumed to have been installed at some point following its electrification.<br>The upgrades to contemporary standards are part of the site's significance. |
| Festoon cable and mounts | Neutral | The festoon cable and mounts are not individually significant. They are part of the broader operational functioning of the dam.<br>The festoon cable and its mounts expand and contract with the movement of the cableway towers.<br>They are assumed to be part of the more recent operating equipment for the cableway, supporting the electrical operation of the towers. |
| Electrical panels (control switches, isolators, breakers, distribution boards) and electrical panel cables | Neutral | The electrical panels and panel cables are not individually significant.<br>A variety of electrical works were completed in the 1990s, including laying new cables between the switchboards and raised dam crests. Some of the cables and switchboards may date to this period, though some are more recent.<br>These are part of the contemporary operating equipment of the dam and do not add or subtract from its overall heritage significance. |

# 6 Proposed works

The proposed works involve upgrading the electrical power supply for the tail (south) cableway tower. These works will rationalise the power supply for the tail tower, which is currently sent over Lake Burrinjuck via aerial cables, and remove non-compliant and redundant electrical equipment.

## 6.1 Description of the proposed works

The proposed works include the following scope:

- Removing the northern and southern poles and removing the aerial conductor cables.
- Installing a new power supply to the tail tower from the southern crest chamber, within the dam crest, by:
  - Installing a new breaker in the southern crest chamber to supply new cables up to the crane isolator panel.
  - Tracking new cable up an existing cable ladder in the crest wall, across the chamber ceiling on a new cable ladder, through an existing opening in the crest chamber roof, up the steel walkway and along the bottom of a new handrail to the tail tower platform to a new isolator panel.
  - Scaffolding to access the ceiling of the crest chamber will be lowered through an existing access hatch.
- Constructing a replacement handrail between the end of the steel access walkway and the tail tower platform, with the new power cable to run along the handrail.
- Installing a new tower isolation point at the eastern end of the tail tower elevated platform.
  - The existing isolator panel, which is located above rocks in an unsafe location, will be removed.
  - The cable ladder, where the current isolator panel is attached, will be relocated to the right and reinstalled on flat ground. Two horizontal supports will be installed between the vertical beams.
  - New isolator panel will be installed on the new cable ladder.
- Removing the tail tower distribution board, catenary cable and steel conduit which will become redundant (and are non-compliant).
- Removing the supply cable from the main switchboard on the northern side to the northern wooden pole supporting the aerial conductor cables.
- Several other small specific electrical upgrades such as installing new fuses, circuit breakers and outlets in electrical panels.
- Temporary construction of site shed and compound on northern side of dam during construction.


Figure 6.1 Diagram of where new cables will travel to the crest chamber ceiling. (Source: WaterNSW)


Figure 6.2 Diagram showing the location of the new cable across handrail to tail tower platform. (Source: WaterNSW)


Figure 6.3 Diagram showing location of new isolator panel to be installed at eastern end of tail tower platform. (Source: WaterNSW)

### 6.1.1 Considerations of alternatives

**Do nothing**

Doing nothing would have no heritage impact, as it would not involve any changes to the historical or contemporary fabric of the dam. While this option avoids any heritage impacts, it is not supported as necessary upgrades to the dam to meet modern standards would not happen. The ongoing function and operation of the dam, including the cableways, is an important part of its significance, so appropriately designed, necessary functional upgrades support this significance in the long-term.

**Retaining the redundant aerial conductor cables and wooden poles**

Retaining the redundant aerial conductor cables and wooden poles after the upgrades are implemented was investigated but not feasible due to safety considerations. This approach would require ongoing maintenance to safely maintain redundant equipment with little heritage benefit due to the neutral significance of the fabric to be removed (see discussion of heritage significance of specific items at Section 5.3.1).

# 7 Heritage impact assessment

## 7.1 Introduction

This section addresses the impacts of the proposed works on the heritage values of Burrinjuck Dam. The proposed works are assessed against the statutory requirements that apply to Burrinjuck Dam, including from the Heritage Act, the NPW Act and the EPA Act, as well as the provisions of the 2012 CMP. Table 7.1 describes the terminology used when assessing the heritage impacts of the proposed works.

Table 7.1 Heritage impact rating definitions.

| Impact rating | Definition |
|---|---|
| Major adverse | Actions which will have a severe, long-term and possibly irreversible impact on the heritage item.<br>Actions in this category would include partial or complete demolition of a heritage item or addition of a new structure in its vicinity that destroys the visual setting of the item. These actions cannot be fully mitigated. |
| Moderate adverse | Actions which will have an adverse impact on a heritage item. Actions in this category would include removal of an important aspect of a heritage item's setting or temporary removal of significant elements or fabric. The impact of these actions could be reduced through appropriate mitigation measures. |
| Minor adverse | Actions which will have a minor adverse impact on a heritage item. This may be the result of the action affecting only a distant/small part of the setting of a heritage place.<br>The action may also be temporary and/or reversible. |
| Neutral | Actions which will have no heritage impact. |
| Minor positive | Actions which will bring a minor benefit to a heritage item, such as an improvement in the item's visual setting. |
| Moderate positive | Actions which will bring a moderate benefit to a heritage item, such as removal of intrusive elements or fabric, or a substantial improvement to the item's visual setting. |
| Major positive | Actions which will bring a major benefit to a heritage item, such as reconstruction of significant fabric, removal of substantial intrusive elements/fabric or reinstatement of an item's visual setting or curtilage. |

## 7.2 NSW statement of heritage impact guidelines

The proposed works are addressed in relation to the 'matters for consideration' taken from the NSW Department of Planning and Environment guidelines for statement of heritage impact.

### 7.2.1 Matters for consideration

#### Fabric and spatial arrangements

- The proposed works include several alterations to the existing fabric of the heritage place.
- The northern and southern wooden poles and the aerial conductor cables will be removed. New cable ladders will be installed in the southern crest chamber and on the tail tower elevated platform, an isolation panel on the western end of the tail tower platform will be relocated to a newly installed metal support, and there will be various upgrades to electrical panels and boards.
- The cableway towers, rail tracks and main cable for lifting loads will not be changed or physically affected. No new penetrations will be made in the concrete of the dam crest.
- The physical fabric to be altered by the proposed works has neutral heritage significance—that is, it does not add or subtract from the dam's significance. These items are later or contemporary equipment which has been installed to facilitate the ongoing operation of the dam, and are not attributes of its historical, representative or technical significance. As such, the proposed works will not impact on heritage fabric in a way which damages, diminishes or obscures its heritage significance.
- The proposed upgrade works are consistent with the history of the dam as an operating infrastructure and engineering asset that has been modified to meet contemporary standards over time. These phases and the precedents of modification and upgrades are part of the dam's heritage significance and demonstrate its ongoing technical innovation.
- No changes to the rest of the dam or its surrounding precinct are proposed.

#### Setting, views and vistas

- The proposed works will make some changes to the setting, views and vistas of the place. The curtilage of the dam includes the visual catchment of the dam wall and its environs, which contribute to its aesthetic significance.
- Views within the dam's visual catchment will be slightly altered by the proposed works. When the aerial conductor cables and wooden poles are removed, this will be

a visual change. The aerial conductor cables are visible but a relatively minor element of the existing view. As they have neutral significance, their visual presence does not demonstrate the heritage values of the dam as an achievement of engineering within a landscape setting (in contrast to the more visible and notable cableway cable, which is larger and can be seen to connect to the head and tail towers).

- The large visual catchment of the dam, and the large-scale expression of the significant views, mean that the removal of the wooden poles, and other work items such as installing new cables and electrical panels, will be small and low intensity changes to the significant setting and views of the dam.
- Consequently, the proposed works will have no notable impact on the expression or interpretation of the significant setting, views and vistas of the place.

## Landscape

- The proposed works will not impact the landscape setting of the place. There are no proposed changes to the vegetation, natural features or other aspects of the landscape.

## Use

- The proposed works are consistent with, and support the significant historical use of, the site as an operational dam, and the significance of the cableway as the only operating cableway in NSW.
- The dam, though modified, still serves its original function. Its upgrades over time to meet contemporary standards present a picture of the evolution of the dam and its technical innovations. As such, the proposed works which upgrade the power supply for the significant tail tower are consistent with the heritage significance.
- The proposed works will support the ongoing operation of the cableway and therefore positively contribute to the significant heritage values of the place as a whole as an operating dam with a continued contribution to water and irrigation management in the Riverina/Murrumbidgee valley.

## Demolition

- No demolition is proposed.
- The project involves removing or replacing some existing elements. These are discussed at **Fabric and spatial arrangements** above.

## Curtilage

- There are no proposed changes to the curtilage of the heritage place.
- Changes to the visual catchment are discussed at **Setting, views and vistas** above.

## Movable heritage

- Burrinjuck Dam has a number of significant movable heritage items (identified in the 2012 CMP), but none of them are affected by the proposed works, which impact fixed items.

## Aboriginal cultural heritage

- The 2012 CMP identifies there is potential for the broader Burrinjuck Dam place and its setting to include places and items of Aboriginal cultural significance, though the location of these has not been identified via further assessment.
- The proposed works primarily involve physical changes to existing dam infrastructure. These works will not impact on Aboriginal cultural heritage.
- If any unanticipated finds are discovered during the course of works (eg when installing new cable ladders or railings on the southern tail tower platform), all work should stop on site. WaterNSW should be notified, and WaterNSW's existing unanticipated finds procedure should be followed and the findings reported where required by the NPW Act.

## Historical archaeology

- The proposed works are not anticipated to impact any historical archaeological resource. The historical archaeological potential of the place is primarily associated with the former construction village for the dam, which now lies under Lake Burrinjuck.
- If any unanticipated finds are discovered during the course of works (eg when installing new cable ladders or railings on the southern tail tower platform), all work should stop on site. WaterNSW should be notified, and the unanticipated find should be inspected and reported in accordance with an unanticipated finds procedure and the Heritage Act 1977 (NSW)

## Natural heritage

- No items or features of natural heritage significance are proposed to be changed.

## Conservation areas

- No conservation area applies to the place. Burrinjuck Dam is a local heritage item under the Yass Valley Local Environment Plan 2013. Compliance with the LEP is discussed at Section 7.4.2.

## Cumulative impacts

- Burrinjuck Dam has undergone a number of changes over time which have combined to modify the place.
- The proposed works are not part of a broader scope of works; however, more generally they are typical of ongoing changes to the dam because of operational needs to make it function to contemporary standards. Other recent similar projects include mechanical upgrades to the spillway sector gate mechanisms, where 1950s era gate control equipment was updated.
- While ongoing upgrades to the dam have changed aspects of its physical fabric and curtilage, overall the significance of the dam as an example of historical, representative and technical achievement as a large engineering achievement has been maintained. The overall form, fabric and function of the dam is intact.
- Additionally, ongoing changes to the dam, including upgrades to contemporary standards, are consistent with and part of its significance, allowing the dam to continue its original function. The dam has undergone several major phases of construction in the 1920s, 1950s and 1980s which were all targeted at ensuring the dam's structural stability and ongoing operation. Smaller periods of works have also occurred, including in the 1990s and more recently.
- Where changes are sensitively designed, avoid impacting significant fabric, continue the practice of technical innovation, and are for the purpose of ensuring the ongoing operation and use of the dam, then the cumulative impacts of these changes are generally acceptable.
- The proposed works are relatively minor changes which are consistent with the heritage significance of the dam, and therefore make little to no contribution to cumulative impacts on the heritage values.

## Other items in the vicinity

- There are no other heritage items in the vicinity that will be affected by the proposed works.

## Commonwealth/National Heritage significance

- There are no Commonwealth or National Heritage places in the vicinity which will be affected by the proposed works.

## World Heritage significance

- There are no World Heritage places in the vicinity which will be affected by the proposed works.

## 7.3 Conservation management plan policies

Table 7.2 Relevant conservation policies from the 2012 CMP and analysis of compliance of the proposed works at Burrinjuck Dam with the policies.

| CMP policy | CMP compliance analysis |
|---|---|
| **Policy 3**<br>Any significant elements proposed for demolition or removal should have a photographic recording, which should be retained onsite. This should include photography and/ or measured drawings. Archival recording should be undertaken in accordance with the Heritage Council of NSW Guidelines for Photographic Recording of heritage items. | The proposed works are generally consistent with this policy.<br>The elements proposed for removal (contemporary equipment) are of neutral significance, and consequently full archival recording is not required by the CMP before their removal.<br>WaterNSW has photographs of the current site conditions as part of scoping the proposed works. These photographs should be retained as sufficient record of the current condition of the dam, before works occur. |
| **Policy 5**<br>Evidence of the continuous pattern of development of the landscape should be retained by retaining fabric from all periods of the site's development. | The proposed works are generally consistent with this policy.<br>Some redundant electrical equipment (eg panels, power supply cables) will be removed, which will have no impact on the heritage significance. |
| **Policy 6**<br>The continued use of the dam should be maintained as an operational asset. | The proposed works are consistent with this policy.<br>The electrical upgrades will facilitate the ongoing operation of the dam as an operational asset. In particular, they will facilitate the ongoing use of the highly significant cableway, the last operational cableway in NSW, by providing a contemporary power source to the tail tower. |
| **Policy 7**<br>Identified significant operational machinery and plant such as the Cableway should be retained and maintained in an operational condition as the best method to conserve the fabric and significance and maintain the skills to operate the plant. | The proposed works are consistent with this policy.<br>No changes are proposed to the significant cableway itself—the head or tail towers, the main cable or the cableway transformer sheds. Changes are only proposed to incidental elements that support the cableway's operation, to facilitate that ongoing operation. |
| **Policy 12**<br>Burrinjuck Dam and its built elements should be maintained and conserved as required to ensure ongoing operational use. | The proposed works are consistent with this policy. They will maintain the power supply for the cableway tail tower, ensuring the place's ongoing operational use. |

| CMP policy | CMP compliance analysis |
|---|---|
| **Policy 32**<br>Views to the dam and village from the southern side of the storage should be conserved. Similarly, views to the village from workshop 2 and from the approach to the horse shoe bend in the Burrinjuck Road should be maintained. The visual curtilage as indicated on the curtilage plan at figure 73 should be considered with regard to new development. | The proposed works are consistent with this policy. Views from the southern side of Lake Burrinjuck to the dam will be maintained. Alterations to the view will be minimal and will not involve changes to significant elements of the visual catchment. |
| **Policy 35**<br>Potential heritage impacts of all works to the Burrinjuck dam and greater precinct must be considered in an REF or similar assessment, prior to approval under the EP&A Act or Water Management Act (except where standard or site-specific exemptions apply). | The heritage impacts of the proposed works are considered in this SoHI, which will be submitted to Heritage NSW for approval under Section 60 of the Heritage Act. |

# 7.4 Heritage provisions of EPA planning instruments

## 7.4.1 Yass Valley Local Environmental Plan 2013

Relevant clauses from the Yass Valley LEP 2013 are listed in the table below, with an analysis of compliance of the proposed works at Burrinjuck Dam with the clauses.

Table 7.3 Yass Valley LEP Clause 5.10 compliance table and analysis of the proposed works at Burrinjuck Dam.

| Part 5 Clause 10—Heritage Conservation | Compliance analysis |
|---|---|
| **Clause 5.10 (1) Objectives**<br>(a) To conserve the environmental heritage of Yass Valley,<br>(b) To conserve the heritage significance of heritage items and conservations areas, including associated fabric, settings, and views,<br>(c) To conserve archaeological sites,<br>(d) To conserve Aboriginal objects and Aboriginal places of heritage significance. | The proposal is consistent with the objectives of the Yass Valley LEP to conserve the heritage significance of heritage items, including associated fabric, settings and views.<br>The proposal has benefits to the heritage significance of the dam as a place that continues to operate in its original function, supporting its operation through contemporary upgrades. Such upgrades and innovation are consistent with the heritage values of the dam as a place that has been subject to change over time. |

| Part 5 Clause 10—Heritage Conservation | Compliance analysis |
|---|---|
| | The heritage significance of the place will be conserved, as only fabric of neutral significance will be altered. |
| **Clause 5.10 (2) Requirements for Consent**<br>Development consent is required for any of the following:<br>(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):<br>(i) a heritage item,<br>(ii) an Aboriginal object,<br>(iii) a building, work, relic or tree within a heritage conservation area,<br>(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,<br>(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,<br>(d) disturbing or excavating an Aboriginal place of heritage significance,<br>(e) erecting a building on land:<br>(i) on which a heritage item is located or that is within a heritage conservation area, or<br>(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,<br>(f) subdividing land:<br>(i) on which a heritage item is located or that is within a heritage conservation area, or<br>(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance. | WaterNSW is seeking approval for the proposed works as an item on the SHR from the approval body (Heritage NSW) directly, rather than as an integrated development application through or referral from Yass Valley Council. |

## 7.4.2 State Environmental Planning Policy (Transport and Infrastructure) 2021—Heritage Provisions

Part 5.31 of the TISEPP contains heritage provisions for development and provides the following objectives and requirements:

(1) **Objectives** The objectives of this section are as follows—

(a) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,

(b) to conserve archaeological sites,

(c) to conserve Aboriginal objects and Aboriginal places of heritage significance.

(2) **Requirement for consent** Development consent is required for any of the following—

(a) demolishing or moving a heritage item,

(b) altering a heritage item that is a building by making structural changes to its interior,

(c) erecting a building on land on which a heritage item is located.

Burrinjuck Dam is not listed as a heritage item in the TISEPP 2021. Accordingly, the above provisions do not apply to the site.

## 7.5 State agency heritage management requirements

WaterNSW is required to manage Burrinjuck Dam in accordance with the State-owned Heritage Management Principles and comply with the State-owned Heritage Asset Management Guidelines.

In general, these guidelines require WaterNSW to lead by example in adopting appropriate heritage management strategies, processes and practices. WaterNSW should set a best-practice example for managing heritage assets and conserving places to retain their heritage significance to the greatest extent feasible. Activities should minimise impacts on heritage values, be based on and guided by an understanding of heritage significance, and manage change to avoid reducing heritage significance. Changes should be recorded and reversible, and the Burra Charter principles of 'as much as necessary, as little as possible' should be followed. When meeting modern standards and requirements, state agencies should minimise heritage impacts to the greatest extent prudent or feasible.

The proposed works are generally consistent with the heritage management requirements for state-owned agencies. Only alterations to items of neutral significance are proposed, and the changes are consistent with and support the ongoing operation of the dam, which is identified as part of its heritage significance.

## 7.6 Summary statement of heritage impact

Based on the analysis of heritage impacts noted in previous sections, the proposed works at Burrinjuck Dam will be **neutral** and will not have an adverse impact on the heritage values of the place.

The proposed works are consistent with Burrinjuck Dam's identified heritage significance as an infrastructure and engineering site that has continued to be upgraded to meet contemporary standards over time. The dam's ongoing operation for its original use is an important heritage value and will continue with the implementation of the proposed works.

The items proposed to be changed and removed are contemporary operating elements of 'neutral' heritage significance. They contribute to the operation of the highly significant cableway by supplying power to the southern tail cableway tower, but in and of themselves are incidental elements of the cableway rather than significant heritage attributes.

Despite changes to the power supply cabling, switches and electrical panels, and the potential removal of the aerial conductors and wooden poles, the overall form, function and significant fabric of the cableway, and its operation, will be maintained. No new penetrations are proposed to the dam crest wall, meaning this significant fabric will be retained intact.

The significant views and vistas within the Burrinjuck Dam visual catchment will not be adversely impacted. The views and vistas are expressed through the combination of the dam as a large engineering achievement within a striking landscape setting. While the proposed works may alter the view slightly, by the potential removal of the aerial conductor cables and wooden poles, these features are not key attributes of the view, or its overall form, and the visual setting to the dam will remain largely unchanged.

The proposed works will not impact other aspects of the dam, including its structure or design, or the larger dam precinct, or the remnants of the former construction village.

Overall, the dam has a history of replacing and upgrading infrastructure and equipment as operations, access, maintenance and safety requirements changed. While cumulatively having the potential to diminish the integrity of the dam's supporting componentry, the overall composition, form and operation of the dam has always been maintained.

# 8 Conclusion

The proposed upgrades to the southern tail tower electrical supply involve minimal change to items of neutral significance. The works are justified in the context of maintaining the dam's operational capability, meeting current standards, and ensuring its continued original and historic operation.

As demonstrated in Section 7, the proposed works would result in a **neutral** heritage impact to Burrinjuck Dam.

To help minimise or mitigate the heritage impacts of the project, the following actions are advised for implementation before, during and after the works.

## 8.1 Recommendations

1. The proposed works should be submitted for approval under Section 60 of the Heritage Act.
2. Photographs of the current condition of the works area, and design documents for the works, should be retained by WaterNSW in its organisational records for access by current and future site managers. A copy should be retained onsite or accessible via the Burrinjuck Dam site office.
3. The significant fabric of Burrinjuck Dam generally should be protected from damage during the works. Works must avoid damaging historically significant fabric, apart from the materials to be replaced as part of the project. In particular, caution should be taken around the head and tail towers, the cableway platforms and their rail tracks, the dam crest wall and chamber, and the main cable of the cableway. If accidental damage occurs, an appropriately qualified heritage expert should be consulted to advise on immediate and long-term repairs.
4. Works should be undertaken under the oversight of the relevant staff member (such as a site supervisor or engineer), and site induction for staff and contractors should include a heritage induction, covering the heritage significance of the Burrinjuck Dam, the findings of this report, and these recommendations.
5. In the event that any future works uncover or disturb unexpected Aboriginal or historical archaeological features or deposits at the site, all works in the area should cease and Heritage NSW must be notified immediately, in accordance with Section 146 of the Heritage Act and the NSW National Parks and Wildlife Act.
6. The next iteration of the CMP for Burrinjuck Dam should be updated to reflect the changes made to the site. GML notes that the 2012 CMP is recommended for review within 10 years (CMP Policy 76).

# Appendix A—Burrinjuck Dam cableway south tower supply upgrade: Electrical installation scope

| | | | |
|---|---|---|---|
| Location | **Burrinjuck Dam** | Project Code | MB320047.13 |
| Project Name | **Cableway South Tower Supply Upgrade** | | |
| WaterNSW Contact | [redacted] | | |

## 1 Document Revisions

| Revision Number | Date | Description / Note | By |
|---|---|---|---|
| 0 | 07/03/2025 | Issued for Tender | AG |
| | | | |

## 2 Reference Documents

| Document Number | Description / Note | Rev |
|---|---|---|
| CD2021/109[v2] | WaterNSW Electrical Works Design and Installation Standard | 0 |
| CD2023/47 | Preferred Equipment List – Electrical, Controls and Instrumentation | V2.0 |

## 3 Project Background

Burrinjuck Dam is locate north west of Canberra, with the coordinates of 35°00'08.86" S and 148°35'01.35" E.

It is also a 45-60 minute (55km) drive from Yass.

The cableway at Burrinjuck Dam provides a means to be able to move loads from the north/south banks of the dam, as well as from upstream/downstream (east/west). A plan view of the infrastructure is shown in Figure 1.

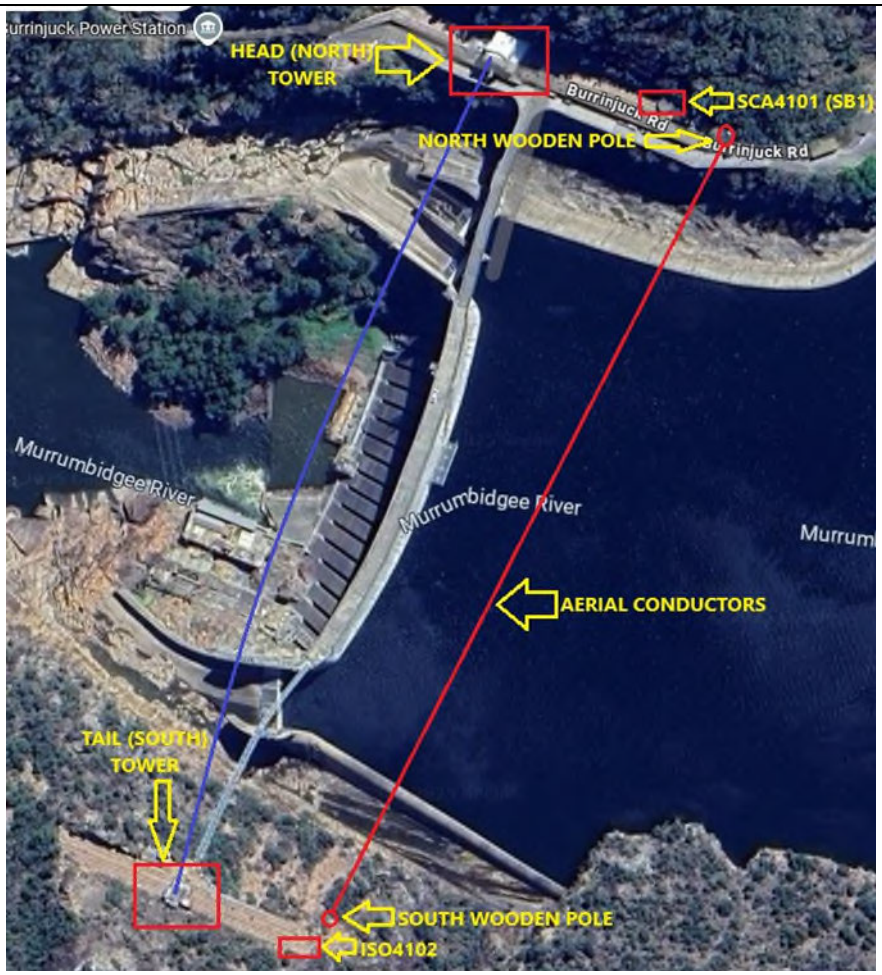



*Figure 1: Cableway Plan View*

This is done by having a main (head/north) tower that provides the east/west drive along railway tracks and the ability to shift the load-lifting mechanism in the north/south direction as well as up and down.

*Figure 2: Head/North Tower (white structure)*

Partnered on the south side is the tail tower which moves in the east/west direction in sync with the head tower.

*Figure 3: Tail/Tail (South) Tower*

The head tower power supply originates in the main switchboard (SCA4101/SB1) utilising a 400A circuit breaker to feed cables that are enclosed in conduit underground before appearing into an isolator just outside the main switchroom, which is mounted on a pole.

The tail tower power supply originates in the main switchboard (SCA4101/SB1) utilising a 63A circuit breaker. The outgoing feed cables that are enclosed in conduit underground before appearing in a junction box (Figure 4), then up to the top of a wooden pole (Figure 5), before transitioning to bare aerial conductors across the lake (Figure 6). From here they are fixed to another wooden pole, changing to sheathed overhead conductors before terminating into a new isolator (Figure 7).

*Figure 4: Junction Box for supply cables*

*Figure 5: Pole and Aerial Conductors*

*Figure 6: Aerial Conductors, Pole and Overhead Cable to Isolator*

*Figure 7: Tail (South) Tower Isolator*

## 4 Standards and Specifications

All work must be in accordance with the relevant Australian Standards and Legislation.

All electrical work must be in accordance with:

- CD2021/109[v2] WNSW Electrical Works Design and Installation Standard Rev 0.
- CD2023/47 WNSW-ELE-SP-001 Preferred Electrical, Controls & Instrumentation Equipment List Specification Rev 2.0

## 5 Free Issue Equipment

The following will be free issue:

- Electrical Drawings – to be used for installation and to provide red-line markups.

## 6 Contractor Supply

The remaining will be contractor supply:

- Cable
- Conduit
- Flexible metal conduit
- Cable ladder (if required)
- Isolator Panel (Stainless steel)
- Circuit breaker/fault limiting fuses
- Moulded-case circuit breaker (c/w external handle)
- Scaffold
- Crane Hire
- Labels
- Cable numbers (stainless tags)
- Bootlace ferrules
- Cable Lugs
- Ties
- 20A three phase socket outlet
- SDI cable
- Cable Glands
- Wire numbers
- Support beams for new ELP4102
- All other items required

# 7 Scope of Works – Electrical

## 7.1 Proposed Electrical Asset Layout

Install a new supply from the South Crest Chamber. Refer to Figure 8 for a proposed layout.


Figure 8: Proposed Electrical Layout – Upgraded Power Supply using new cables from SCA7401/SB4

By utilising a spare bay in SCA7401/SB4 in the southern crest chamber, a new breaker can be installed to supply new cables up to the crane isolator panel (ISO4102 (ELP4102)).
The proposed path is utilising the existing cable ladder in the crest wall, up through an existing opening through the roof, up the inclined stairway, then along the bottom of the new handrail.
Once the cable gets outside of the building, it is to be enclosed in 2 x 50mm metal conduits and flexible steel conduit. This is a distance of approximately 210m.

### 7.1.1 SCA7401/SCA7404/SB4

Located in the Southern Crest Chamber is SCA7401/SB4 (Refer Figure 9). It is fed from SCA3101/SB2, which is where the isolation point is located, as SB4 doesn't have a local isolator. The top section has an 18-pole light and power section, consisting of Terasaki Safe-T breakers (Refer Figure 10).

Figure 9: SCA7401/SCA7404/SB4


Figure 10: Light and Power Section

The bottom section contains a 100A circuit breaker (Refer Figure 11) that feeds two moulded-case breakers below (Refer Figure 12). One 30A is used to supply the hydraulic unit for the emergency closure gates (used by the Hydro operator) and the other is a 30A spare.


Figure 11: Feeder Circuit Isolator


Figure 12: Hydraulic Unit Supply and Spare

It is proposed to remove the 30A Spare Circuit Breaker (Refer Figure 13), upgrade the line side wiring and install a new 63A moulded-case circuit breaker (complete with external handle and override function), complete with an electronically-adjustable trip unit. Preference given to either Schneider or NHP. An outage between WaterNSW and the hydro operator (Foresight) will need to be negotiated for this work to occur.

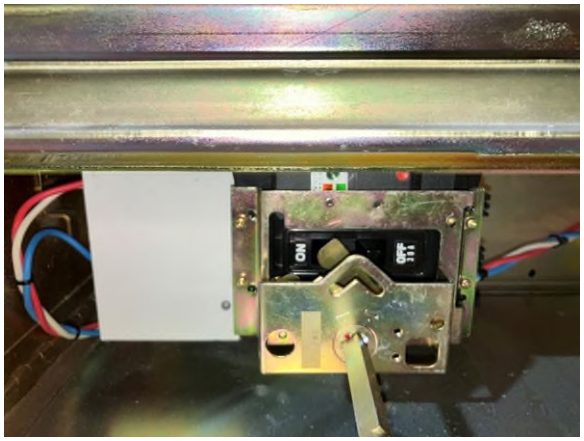



Figure 13: 30A breaker and line side wiring to be replaced.

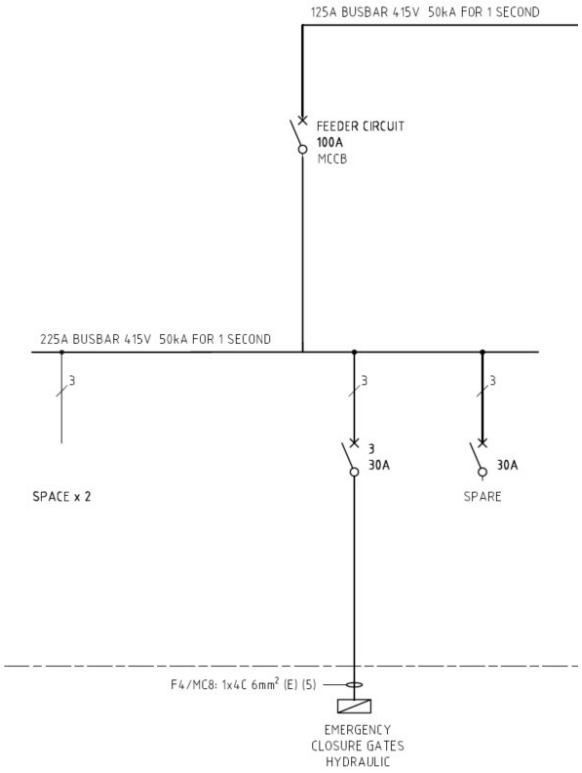



Figure 14: Existing Circuit Breaker Layout

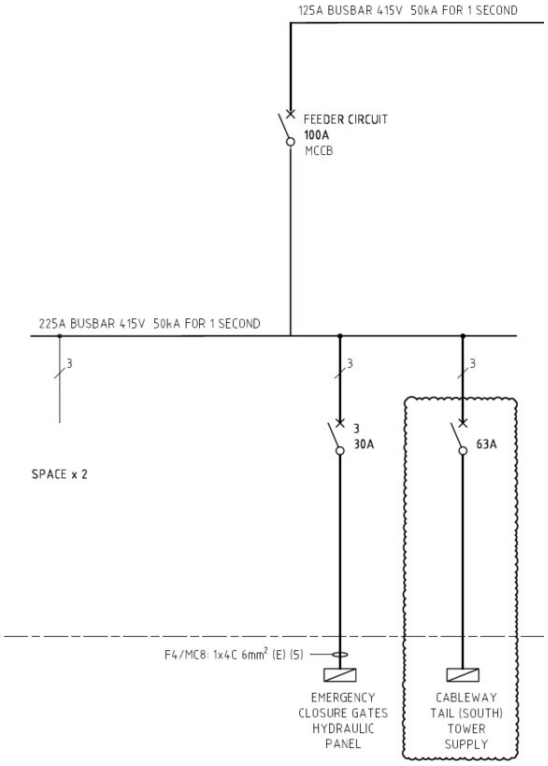



Figure 15: Proposed Circuit Breaker Layout

### 7.1.2 Cable sizing and installation

Powercad modelling recommended a 1204C+E for voltage drop purposes. However, to make the installation more manageable, two smaller circuits will be run in parallel. To ensure voltage drop isn't exceeded, there is the option of using either 50mm2 SDI (3 actives and one neutral) or 50mm2 4C+E, running in two 50mm galvanised conduits.

NB: If the 50 4C+E cable is used, the earth cable is not required as a local earth stake is already in use at ISO4102 (ELP4102) to create an MEN, as this board is treating the south tower as an "outbuilding."

Part of the electrical estimate will include an option for each type of cable. Figure 16 shows the free space difference in 50mm conduit (also allowing for the internal 40mm diameter of 50mm Flexible Steel Conduit).

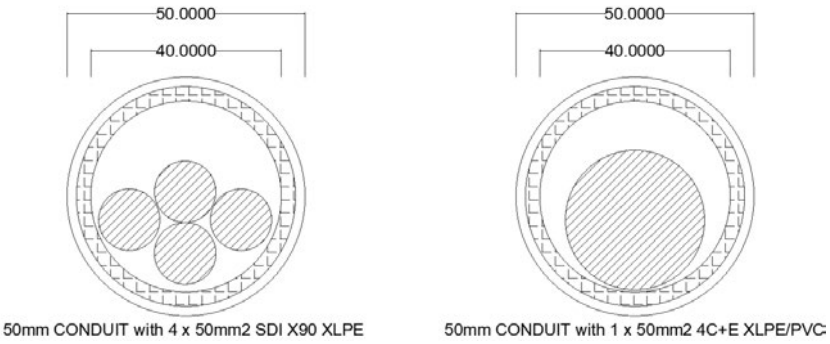



Figure 16: Free space comparison between SDI and 4C+E cables

### 7.1.3 Cable Route

The new cable(s) will originate from SB4 in the South Crest Chamber, taking the following path:

1. Existing Cable Ladder up the wall to the ceiling.
2. Across the ceiling on new cable ladder to an existing penetration to the top of the crest wall.
3. Through the penetration into conduit following the first gantry/inclined walkway.
4. Underneath the middle landing of the walkway.
5. Continuing up the second gantry/inclined walkway.
6. Along the new handrail to the removal section.
7. Just above ground level in the removal section.
8. Along the new handrail to ISO4102 (ELP4102).

### 7.1.4 Cable Route – Southern Crest Chamber

After leaving SB4, the cable will go up the existing cable ladder before across the ceiling to the existing penetration. A new cable ladder is to be installed on the ceiling to support the cables. Refer to Figure 17.


Figure 17: New cable route in the Southern Crest Chamber

In order to get the scaffolding into the crest chamber, it is proposed to lift one of the concrete access hatches using a crane to be able to lower the scaffold down to build. The floor to ceiling height is approximately 9-10 metres. Figure 18 shows three access hatches above the area in question.

Capital Cranes are usually engaged to lift the hatches for WNSW.


Figure 18: Three access hatches above the Southern Crest Chamber

### 7.1.5 Cable Route – Crest Wall to 1st Walkway

Once coming up the hole in the crest roof, the cables will then be under the start of the first inclined walkway. Refer Figure 19. They will then need to come out onto the right-hand side to run parallel to the walkway (refer Figure 20).

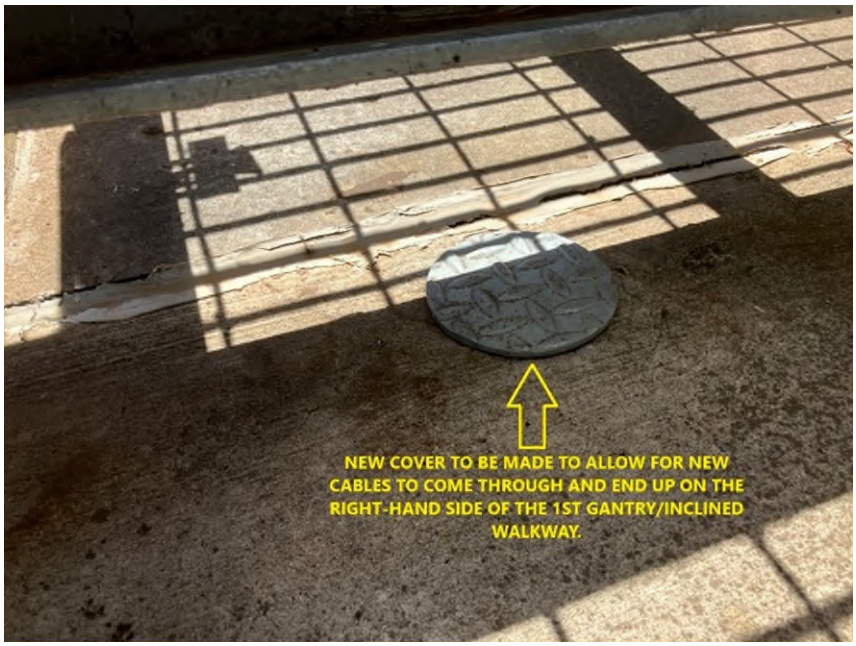



Figure 19: Cover on floor penetration from top of southern crest wall into crest chamber


Figure 20: Conduits running parallel to walkway up to the middle landing

### 7.1.6 Cable Route – Middle Landing

At the middle of a structure is a landing which has a set of stairs for emergency egress. There are two options for the new cables and conduits at this point:

1. Overhead
2. Under the Landing

Due to a lack of structure, the preference would be to go under the landing (using flexible steel conduit), before coming up the other side and continuing along the second inclined walkway (refer to Figure 21).

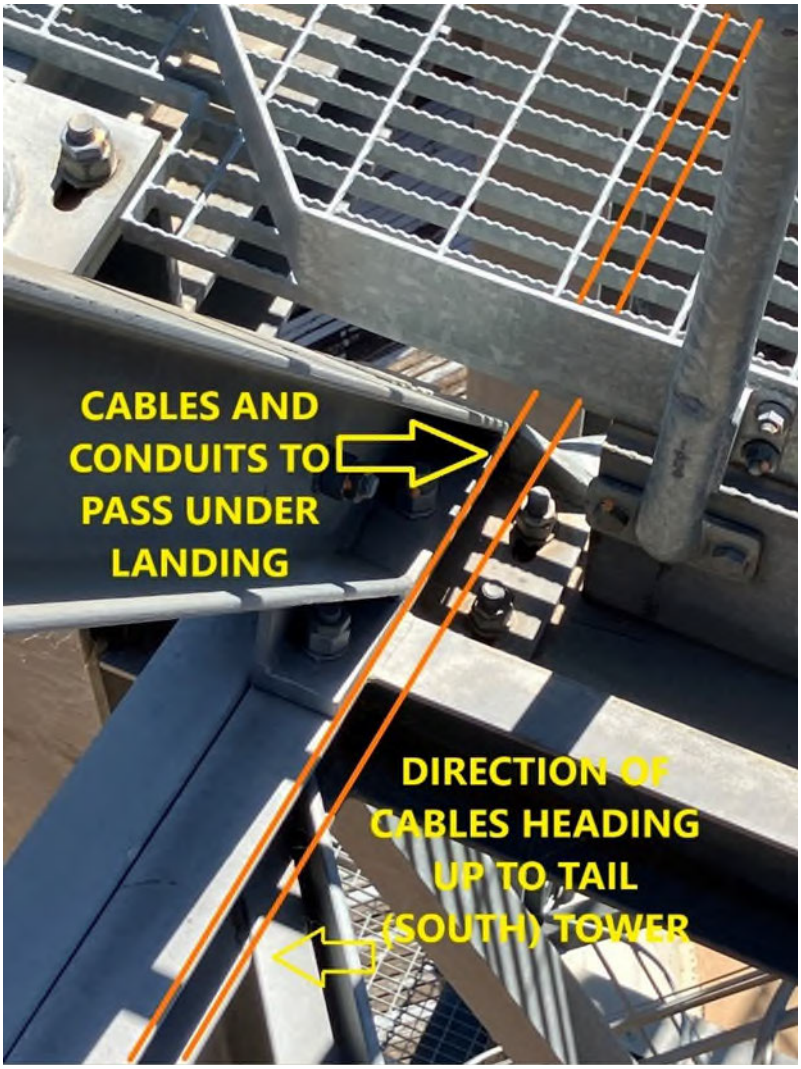



Figure 21: Conduits under landing heading up to Tail (South) Tower

### 7.1.7 Cable Route – Middle Landing to Tail (South) Tower Bench

After coming under the landing, the cable can continue up the second inclined walkway, and then go under the walkway at the end (refer Figures 22 and 23).


Figure 22: Conduits up 2nd walkway


Figure 23: Conduits going under walkway

### 7.1.8 Cable Route – Tail (South) Tower Bench to ISO4102 (ELP4102)

Once the cables pass under the walkway, they are then required to follow the new handrail all the way around to the tower isolation point (ISO4102 (ELP4102)). A slight complication is the removable handrail (which is required for heavier loads that the cableway wouldn't be able to lift over a permanent fixture). With on-site discussions on 19th February 2025, the conduits can be fixed just above ground level. Refer Figure 24. Allow for a mechanical cover to site over the top of the conduits for more protection. Refer Figure 25.


Figure 24: Conduit installation across removable handrail section

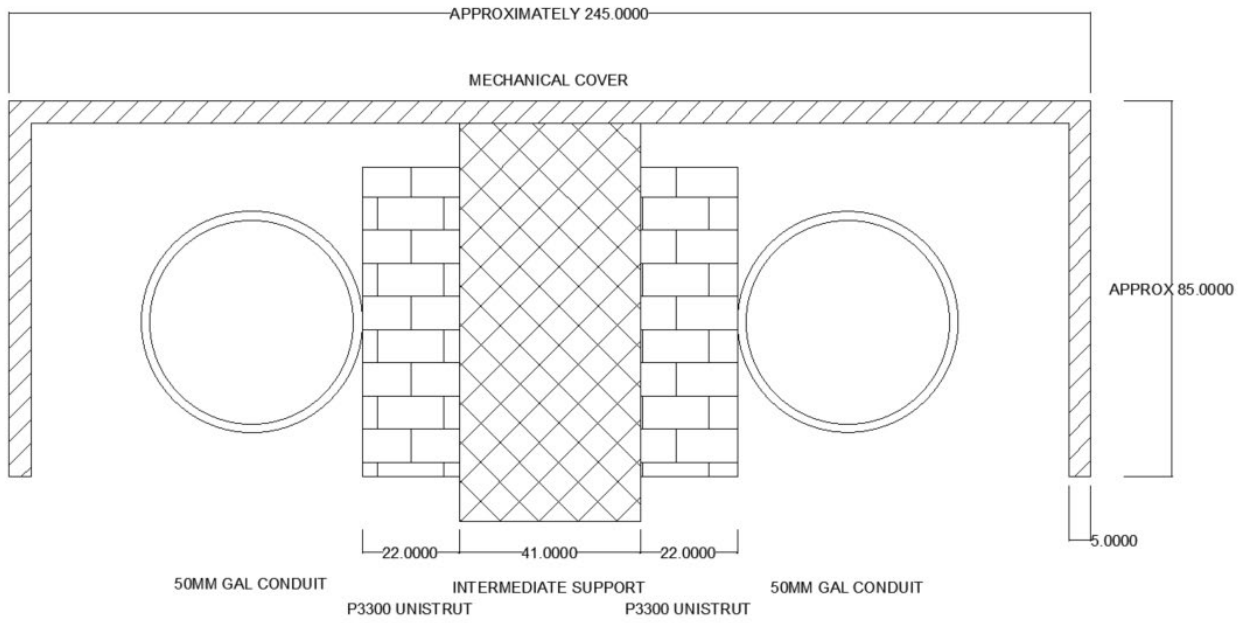



Figure 25: Conduit installation across removable handrail section with mechanical cover

Figures 26-28 show the route to the current tower isolation point.


Figure 26

Figure 27


THE LAST SECTION UP THE ROCK TO THE SUPPORT POLE COULD EITHER BE CONDUIT OR CABLE LADDER

Figure 28

### 7.1.9 Tower Isolation Point (ISO4102 (ELP4102))

This isolation point (ISO4102 (ELP4102)) is where the existing aerial conductors from the south wooden pole terminate.

At present, it is located in a place that is unsafe to access, due to having to climb up onto the rocks and needs to be relocated and replaced. By installing two horizontal beams between the existing steel poles, and relocating the cable ladder, a new panel can be installed. Refer to Figure 29. The black-sheathed overhead cables will need to be removed back to the southern wooden pole.


Figure 29: Works to occur at ISO4102 (ELP4102).

The existing panel has two isolators (circuit breakers), one is the main isolator to turn off the whole south tower (including the single phase outlet on the side and a distribution board halfway down the festoon cable support structure), while the other solely turns off the south tower while keeping the power outlets energised. Refer to Figures 30-33.


Figures 30 and 31: Main Switch and Crane Isolator

Figures 32 and 33: Breakers for Distribution Board Halfway along and Local Single Phase Outlet on Side

The new panel will just have a main isolator/circuit breaker and no single-phase outlet. The existing earth stake is loose. This may need to be repositioned or put further into the ground. Change the existing earth cable to 120mm2.

### 7.1.10 Festoon Cable – ISO4102 (ELP4102) to Tower SCA4102 Incoming Junction Box

When the new panel is installed, the festoon cable currently going down the cable ladder into the existing ISO4102 (ELP4102) will not be long enough to reach. To overcome this problem, some changes will need to be done to the position of the cable clamps to gain some extra length. Refer to Figures 34 and 35.

Figure 34: Festoon Cable on the way to maximum extension

Figure 35: Festoon Cable at maximum compression (Tower has reached end stop limits)

### 7.1.11 Tail Tower DB2

This panel is to be removed as it is no longer required, as well as the catenary cable and steel conduit that originates from ISO4102 (ELP4102). It contains porcelain fuses and isn't compliant with AS3000 or the WaterNSW standards. Refer to Figures 36-38.


Figures 36 and 37: Tail Tower Distribution Board DB2 – to be removed


Figure 38: Redundant equipment to be removed.

### 7.1.12 Tail (South) Tower SCA4102 and DBL4102

With the removal of the Tail Tower DB2, and the single phase outlet from ISO4102 (ELP4102), there is now the need for power to be sourced from SCA4102 inside the south tower.

This means that when the main switch is turned off and isolated, then DBL4102 will still have power. The tower will not be able to move and all other equipment (excluding light and power) will be de-energised. Refer to Figures 39 and 40.

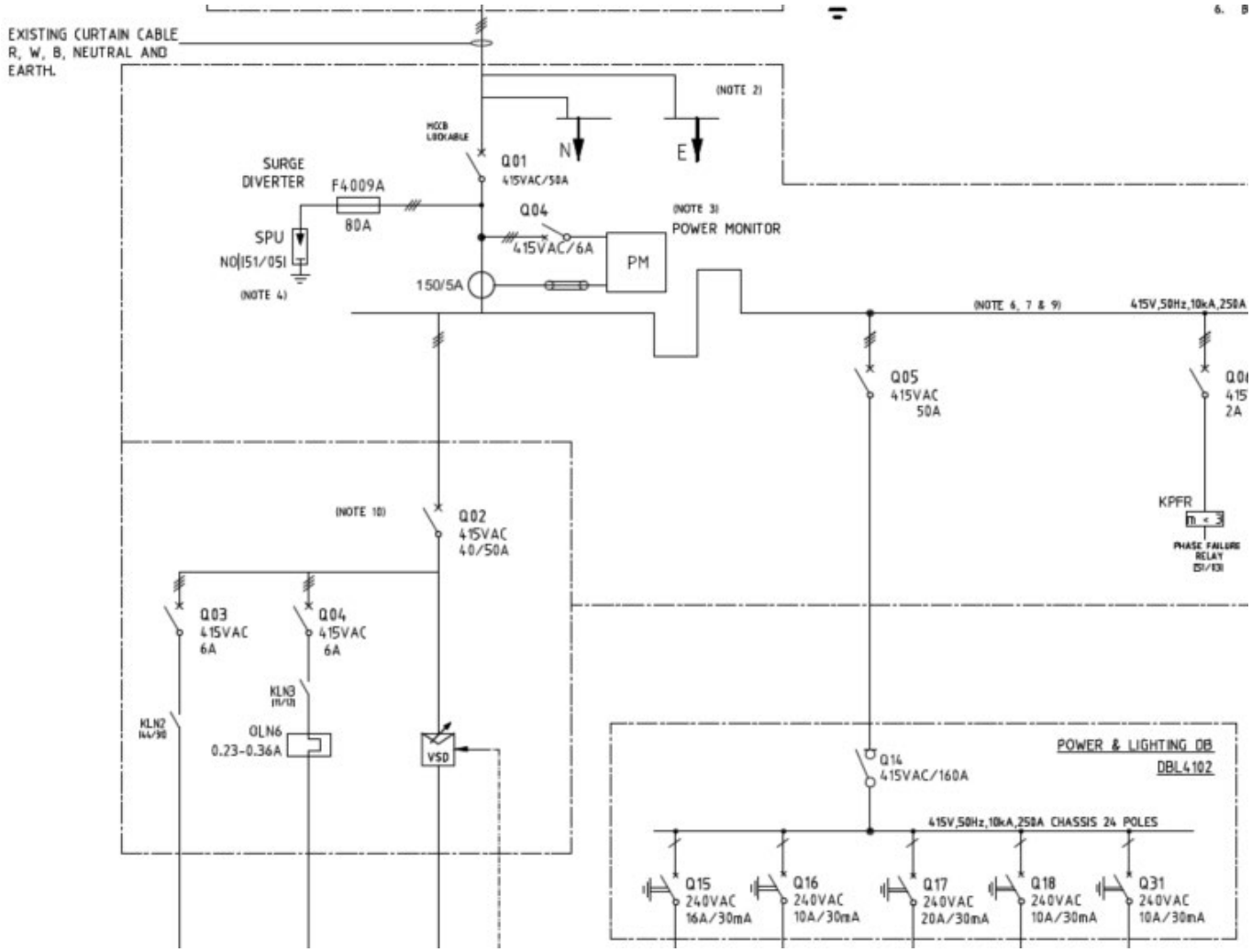



Figure 39: Existing SLD for SCA4102

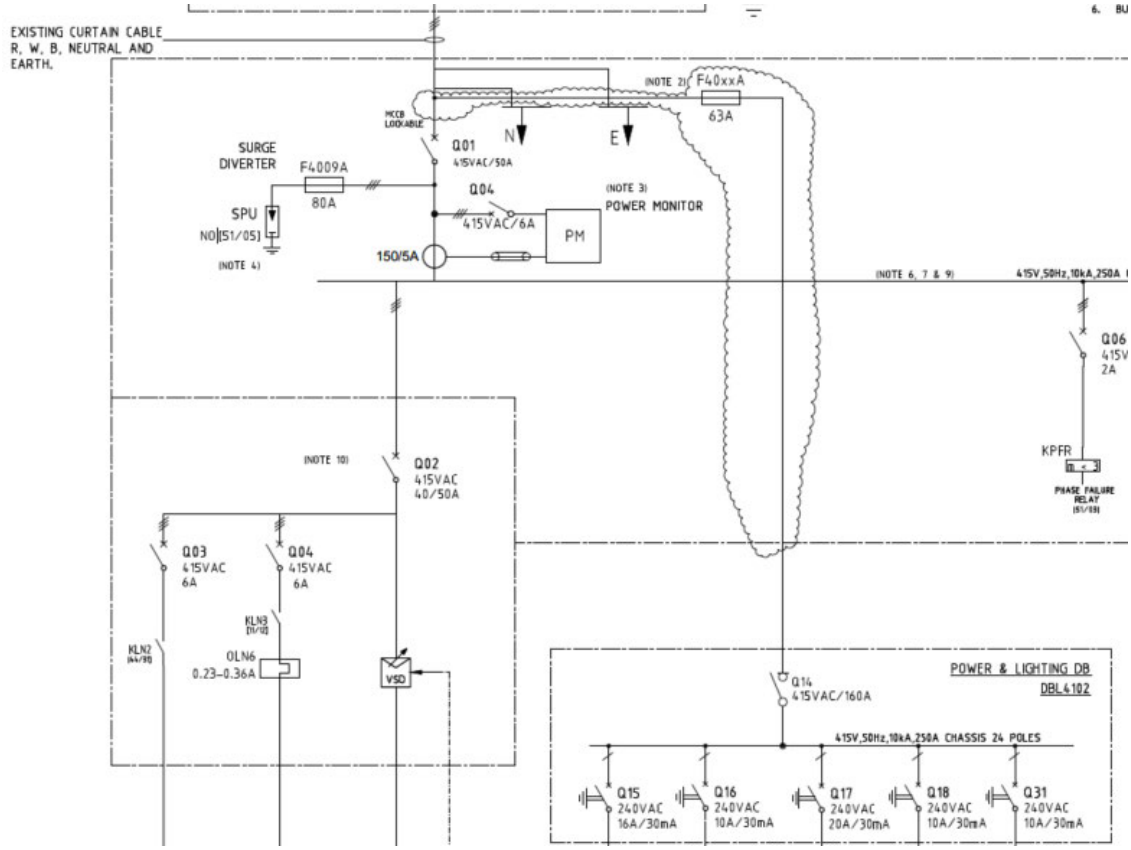



Figure 40: Proposed SLD for SCA4102

A new circuit breaker and/or fault limiting fuses and SDI cable will be required to re-supply DBL4102 from the line side. Refer Figure 41.

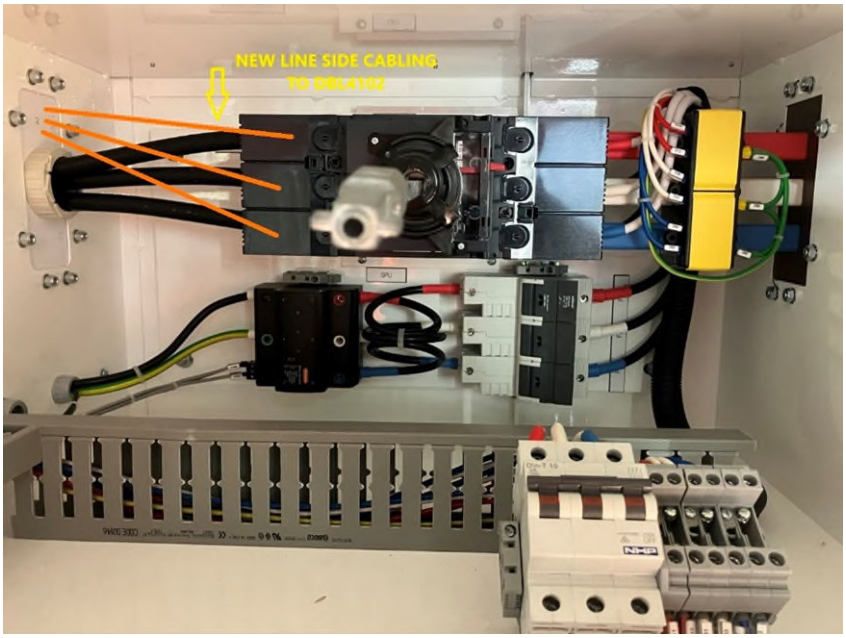
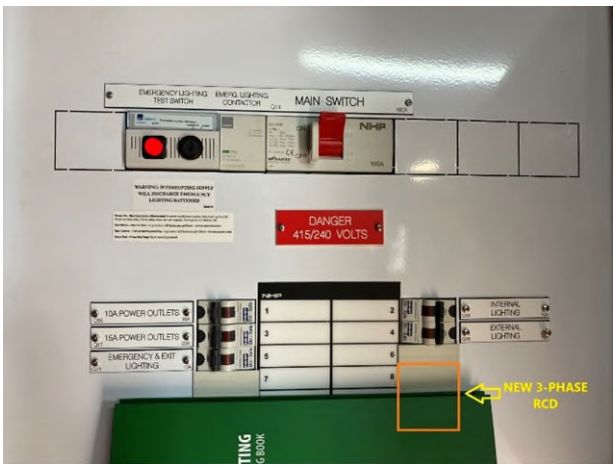



Figure 41. Line side cables to feed DBL4102

The current supply cable from Q05 may not be long enough; if not, a new cable with the same specifications as the existing (but longer) will need to be supplied.

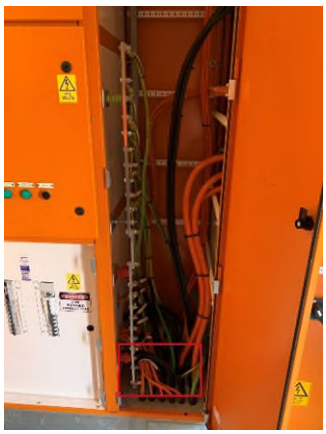
In DBL4102, a 20A 3 phase RCD is to be supplied (same brand as existing) and a 20A three-phase socket outlet (4 pin). Refer Figures 42 and 43.


Figures 42 and 43. DBL4102 External and Internal

### 7.1.13 Removal of supply cables from SCA2102 /SB1 to North Wooden Pole

As per the WNSW Installation Standard, any cabling that becomes redundant, needs to be removed. This means the cabling that originates from SCA2102/SB1 (Main Switchboard) to the top of the northern wooden pole will need to go. Refer to Figures 44-45.



Figures 44-45: Redundant supply to be removed from SB1 to top of Northern Wooden Pole

## 7.2 Aerial Conductor Removal

With the cableway being supplied from SB4, the existing overhead conductors will become redundant.

The following will need to occur:

1. Remove the four aerial conductors spanning the lake. Refers Figures 46-48

Figures 46-48: Aerial Conductors

2. Remove the northern and southern wooden poles.

## 8 Testing, As Builts and Quality Assurance

1. The Contractor is to provide Inspection and Test Plans (ITPs) and quality documentation (to include but not be limited to testing as per AS3000 and AS3008 for cable installation and point to point testing)
2. Provide handover package for submission to WaterNSW consisting of the following:
    a. Completed ITPs
    b. "Work as Executed" drawing markups
    c. OEM manuals and test sheets for any supplied equipment

## 9 Inductions/Permits

All personnel working on site will be required to complete WaterNSW Access Rules Training and a site specific induction.