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Environment and Heritage

33kv Substation
Dendrobium Colliery

Archival Recording

South 32 Illawarra Coal

June 2018

Document control

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Project Manager:	Chris McEvoy
Authors:	Sam Richards
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Excellence in your environment.
ABN: 19 137 111 721

Head Office

Level 1, 460 Church Street
Parramatta NSW 2150
All mail correspondence to:
PO Box 2443
North Parramatta NSW 1750
Phone: **02 9630 5658**
Email: **info@niche-eh.com**

Locations

Sydney
Central Coast
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Cover photograph: Dendrobium Colliery 33kv Substation (Source: Niche 2018)

Executive Summary

Niche Environment and Heritage Pty Ltd (Niche) have been commissioned by South32 Illawarra Coal to prepare an archival recording for the proposed upgrade works to the existing power supply at the Dendrobium Colliery. The Dendrobium Colliery site is listed on the Wollongong Local Environmental Plan (LEP) 2009 as "Nebo Colliery" (Item #7104) as an item of local significance. Previous heritage assessments have defined the existing electrical switchyard site, which is proposed to be replaced, as an item of moderate to low heritage significance. Niche (2016:4) advised that should the existing switchyard site be demolished, further heritage assessment would be required to ascertain the precise extent of heritage impacts.

The Dendrobium (formerly Nebo) switchyard was constructed circa 1962. The switchyard is supplied from the BlueScope Steel Limited (BSL) 33kV network. Dendrobium are required to change from the BSL supply to the Endeavour Energy 11kV network. As a result, a new kiosk transformer is proposed to be installed adjacent the existing switchyard. To install the kiosk transformer there is a requirement to remove part of the existing switchyard structures.

Once the new kiosk transformer has been commissioned, the existing switchyard supplied from the BSL network will be decommissioned. At this time the balance of the existing switchyard will be redundant and due to its poor state of repair it will be removed.

A photographic archival record was conducted on 27 March 2018. The NSW Heritage Branch guidelines *Photographic recording of heritage items using film or digital capture* (NSW Heritage Office, 2006) and The NSW Heritage Office document *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office, 1998) were followed in the preparation of the photographic archival record.

A paper and digital copy of the Archival Recording (with a set of photographic prints) is to be submitted to Wollongong City Council. Additional paper and electronic copies will be provided to The Department of Planning and Environment and South 32 Illawarra Coal.

Table of Contents

List of Figures

List of Plates

List of Tables

1. Introduction

1.1 Project background

Niche Environment and Heritage Pty Ltd (Niche) have been commissioned by South32 Illawarra Coal to prepare an archival recording for the proposed decommission, removal and upgrade works to the existing power supply at the Dendrobium Colliery. The Dendrobium Colliery site is listed on the Wollongong Local Environmental Plan (LEP) 2009 as "Nebo Colliery" (Item #7104) as an item of local significance. Previous heritage assessments have defined the existing electrical switchyard site, which is proposed to be replaced, as an item of moderate to low heritage significance. Niche (2016:4) advised that should the existing switchyard site be demolished, further heritage assessment would be required to ascertain the precise extent of heritage impacts.

1.2 Location

The proposed works area (hereafter referred to as the 'subject site' or 'site') is located approximately 8 km to the west of the Wollongong CBD and is located within the boundaries of Wollongong City Council. The works area is located adjacent to the entrance gate and a car park for the current Dendrobium Mine (Figure 1).

1.3 Proposed development

The Dendrobium (formerly Nebo) switchyard was constructed circa 1962. The switchyard is supplied from the BlueScope Steel Limited (BSL) 33kV network. Dendrobium are required to change from the BSL supply to the Endeavour Energy 11kV network. As a result, a new kiosk transformer is to be installed adjacent the existing switchyard. To install the kiosk transformer there is a requirement to remove part of the existing switchyard structures (refer to Annex 1 for the design drawings).

Once the new kiosk transformer has been commissioned the existing switchyard supplied from the BSL network will be decommissioned. At this time the balance of the existing switchyard will be redundant and due to its poor state of repair it will be removed.

1.4 Aims

This report aims to adequately record the existing 33kv substation for future reference (Wollongong LEP 2009 Item #7104). It presents the results of historical research, assessment of significance and photographic archival recording. The report aims to follow the guidelines for preparing an archival record of heritage items contained within the NSW Heritage Branch guidelines *Photographic recording of heritage items using film or digital capture* (NSW Heritage Office, 2006) and The NSW Heritage Office document *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office, 1998).

1.5 Report Outline

This archival recording report includes:

- Background information including historical context (Section 2)
- Inventory of Archival documents (Section 3)
- Physical description (Section 4)
- Assessment of significance (Section 5)
- Photographic Archival Recording (Annex 1), including:
  - Catalogue sheets including details of camera, lenses, sensors, photographer, dates, image file numbers, image description and orientation

- Labelled proof sheets of all photographs taken
- Photographic Plan (Site map) showing the position and direction of photographs
- Copies of all digital photographs on DVD.

A paper and digital copy of the Archival Recording (with a set of photographic prints) is to be submitted to Wollongong City Council. Additional paper and electronic copies will be provided to The Department of Planning and Environment and South 32 Illawarra Coal.

1.6 Statutory Context

A summary of heritage listed items within, or in proximity to, the subject site, is outlined in Table 1. The location of these items with respect to the subject site is illustrated in Figure 2.

Table 1: Summary of heritage listed items in or near the project area

Name of item	Heritage Register	Item Number	Significance	Subject site within curtilage?
Nebo Colliery*	Wollongong LEP 2009	7104	Local	Yes
Site of Pioneer Kerosene Works*	Wollongong LEP 2009	6411	Local	No (located on the boundary of the Nebo Colliery)
Kembla Heights Mining Village—Harry Graham Drive and Soldiers Road Heritage Conservation Area	Wollongong LEP 2009		Local	No (but other parts of the Nebo Colliery site are included within the curtilage)
Mine manager's residence	Wollongong LEP 2009	5947	Local	No (located to the north of the curtilage for the Nebo Colliery)
Former St Clements Roman Catholic Church	Wollongong LEP 2009	5944	Local	No (located east along Cordeaux Road)
Mt Kembla Colliery—including site of mine workings, portal, mine air shaft and pit pony stables*	Wollongong LEP 2009	5946	Local	No (located to the north of the subject site)

* Denotes archaeological items or a heritage item that contains an archaeological component.

1.7 Authorship and acknowledgements

This report was written by Sam Richards (Heritage Consultant, Niche). The report was reviewed by Chris McEvoy (Principal, Niche) and Clare Anderson (Senior Heritage Consultant, Niche).

Location map

Dendrobium Power supply SoHI

FIGURE 1

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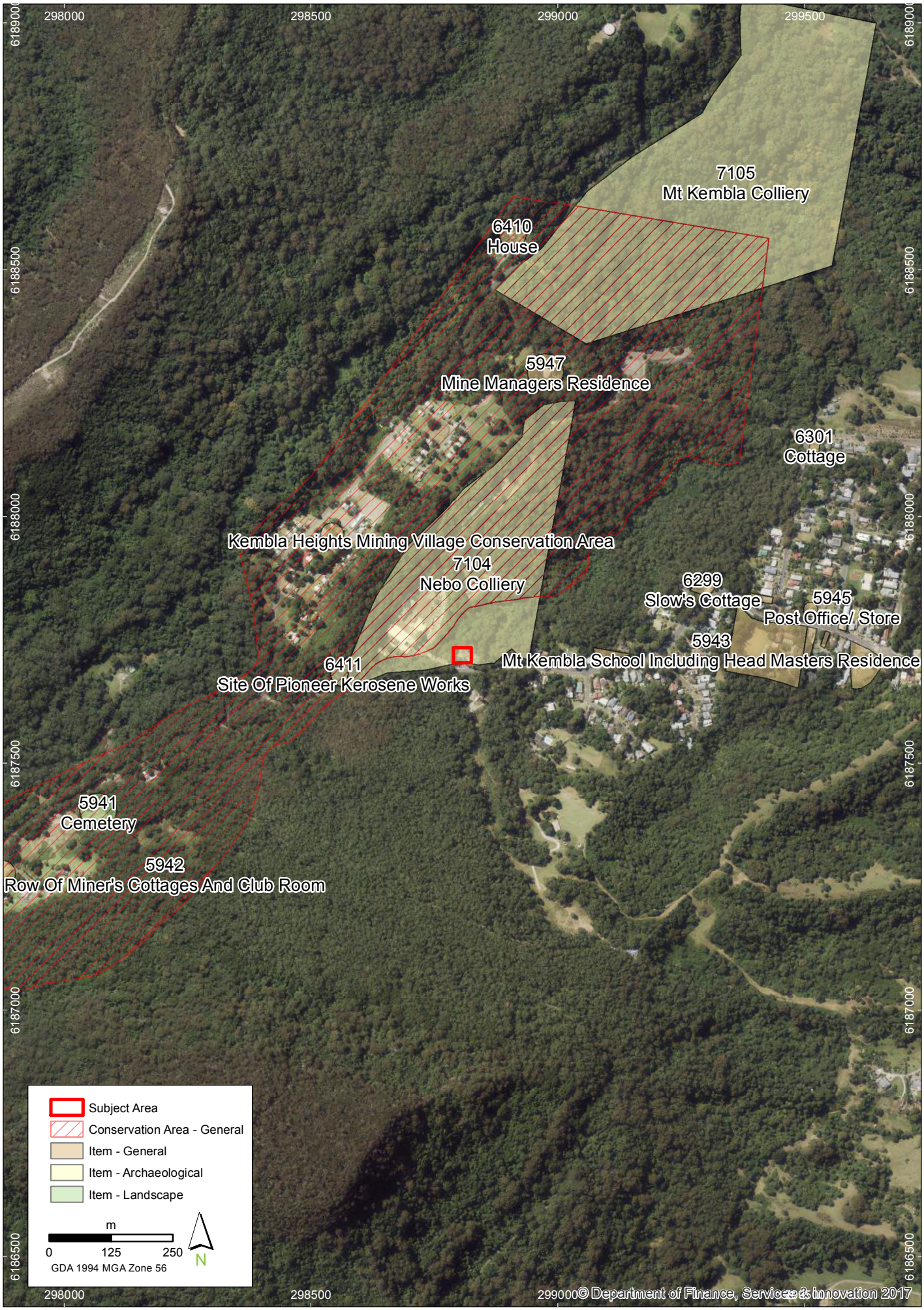

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Heritage Items

Dendrobium Power supply SoHI

FIGURE 2

Imagery: (c) LPI 2013

2. Historical Context

2.1 Preamble

The following subsections present a broad history on the subject site and surrounds to provide a context for this assessment.

2.2 Mining in the Illawarra

The first discovery of coal in the Illawarra was made by a group of shipwrecked sailors who came across it by chance in the vicinity of modern Austinmer. Governor Hunter sent George Bass to investigate the area, accompanied by one of the survivors. They were able to confirm the discovery of coal seams at Coalcliff and Austinmer (OHM Consultants 2005:19).

Development of the coal field in the Illawarra was delayed by the establishment of the Australian Agricultural Company (AAC), which was based in Newcastle and was granted a thirty year monopoly on mining in the Colony by the British Government in 1828. Mining was eventually started in 1849, with the first mine opened at Mount Keira. Other mines opened along the coastline between Helensburgh and Mount Kembla. Between 1847 and 1900 twelve mines were opened along the escarpment. The Mount Kembla mine was opened in 1883, which was the first mine opened on the Bulli seam south of Mount Keira (OHM Consultants 2005:21).

During the first half of the twentieth century more than a dozen mines were opened along the escarpment, with the pace slowing down due the exhaustion of coal reserves, changes in mining practices and the cost of keeping very old mines in service (OHM Consultants 2005:22) . New greenfield mines have been established since the 1970s to mine the Bulli seam.

2.3 Pioneer Kerosene Works

In 1865 a shale oil (kerosene) mine was established on American Creek drawing from the shale bed known as the American Creek seam. This was the first undertaking of its kind in Australia. A kerosene shale plant was established in 1872 which remained in use only until 1878 when the plant was forced to shut down because they could not compete with the price of kerosene from elsewhere.

There is disagreement regarding the location of the site, due to the fact the area has returned to bushland. The only standing structure (as of 1991) within the gazetted curtilage of the plant is an iron retort which is located by the side of Cordeaux Road at Mt Kembla Heights to the east of the colliery entrance but according to Navin Officer (2000) it is not *in situ*. Navin Officer notes that the exact location of the shale oil mine is unknown, but states that the likely location of the mine is in the immediate area of the Nebo Colliery surface facilities (Navin Officer 2000:47). It is likely the mapped curtilage for the LEP archaeological item relates to the location of the moved iron retort, rather than the actual location of the shale mine site. Brian Rogers states that the site of the former Kerosene Works is located on the flat to the east of the present pit top (Rogers 2005:18). This prior assessment, before the Dendrobium Mine came into full operation, states that the site will be overfilled with spoil during the excavation of the initial tunnels for the new mine.

2.4 Nebo Colliery

The Nebo Colliery was constructed as a greenfield mine development on land that had been previously purchased by BHP/AIS for the Mount Kembla Colliery. The mine was established by BHP/AIS to work part of

the Wongawilli seam. As noted by Navin Officer, the complex is unique in that it is the only ensemble of mine structures in the region that was constructed solely after World War II.

The mine opened in 1947 and was the first fully mechanised mine. The mine employed track mounted mechanical coal loaders and coal cutters constructed by Jeffery Manufacturing (USA), but these were replaced by caterpillar Anderson Boyes cutters (UK) and Joy Manufacturing loaders in 1948. There were also 10-tonne capacity mine cars and battery and diesel powered locomotives.

Once the coal was mined it was refined using a Bradford Breaker (which has since been removed). The coal was then loaded to a conveyor belt and moved to rail loading storage bins which were located adjacent to a private rail line which linked to the original Mt Kembla colliery rail line (which has also been removed).

The ensemble of buildings included a headquarters for administrative and professional staff. The buildings designed for the handling of equipment, maintenance and storage were larger than previous and constructed with steel frames. The construction of a bathhouse on site was part of an architectural suite of buildings designed to be taken as a whole. It was the different ethos for colliery construction that improved miner's working conditions (Irving 2001:85).

Nebo ceased operations as an independent colliery in 1993, as the underground workings were linked to Wongawilli Mine and the Kemira leases to create the Elouera mine. The surface portals remained working for the Elouera mine ventilation system. The surface structures were retained in relatively intact conditions.

In 2001 the remaining surface facilities at the Nebo Colliery were appropriated into the new Dendrobium Mine and modified where required for this purpose. These include the two brick buildings used as the administration building and the mine workshop, and the bathhouse and the lamp cabin. Shafts 1, 2, and 3 were filled in, and the restoration of the surface facilities took place in 2006 after Dendrobium mine took over the operation.

2.5 Transformer and switchgear compound

The current 33kV substation was not part of the original construction of the Nebo colliery in the 1940s. Rogers (2001) identified that it was constructed prior to 1974. A map drawn in 1968 of the colliery shows structures in the approximate location of the current substation (Figure 3). They are shown as small square structures with indistinct writing adjacent to them. There is an unknown building to the north, which could not be identified.

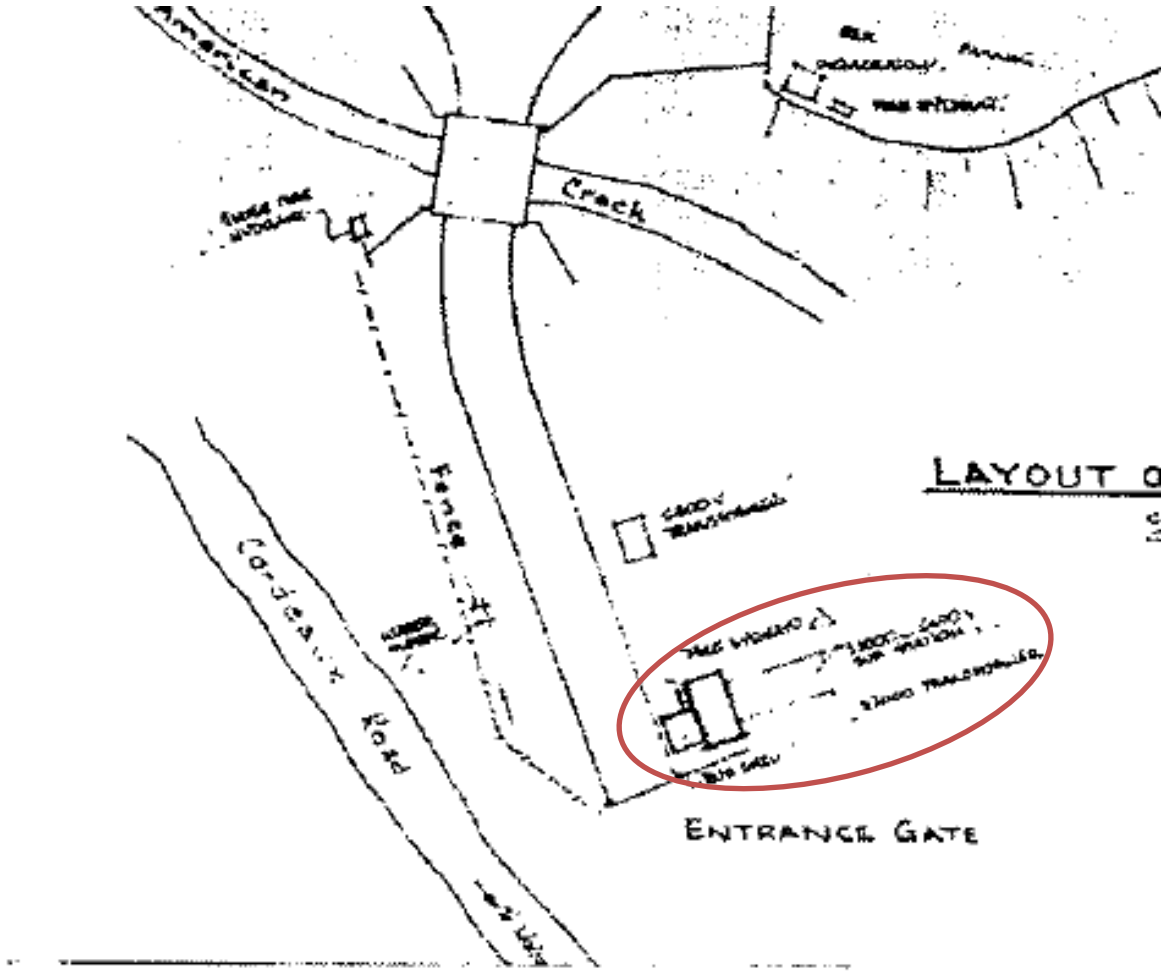


Figure 3: Crop of plan of Nebo Colliery drawn in 1968, the substation is outlined in red (copied from Navin Officer 2000)

3. Inventory of Archival documents

3.1 Archival documents

The following assessments and reports can be found on the 33kV substation for reference.

Table 2. Archival documents.

Author	Date	Source	Title	Description
Brian Rogers	2001	Olsen Environmental Consulting	Nebo Colliery: Catalogue of Items of European Cultural Heritage, Indicating Level Of Significance And Likely Impact Of Dendrobium Project On Each Item.	Commissioned by BHP Billiton Illawarra Coal for the Dendrobium Mine EIS. Evaluates significance of physical fabric of items that make up Nebo Colliery for future management assessments.
Niche	2016	Niche Environment and Heritage	Dendrobium Mine Surface Electrical Supply - Section 75W Modification (MOD 8) to Dendrobium Mine Development Consent 60-03-2001. DRAFT-NOT ISSUED.	Provided recommendations for the substation
Niche	2017	Niche Environment and Heritage	Dendrobium Mine Surface Electrical Supply: Alternate Transformer Sites Heritage Constraints Assessment. Prepared for South32 Illawarra Coal.	Provided recommendations and impact assessments for transformer sites

4. Physical description

4.1 Site location and setting

The 33 kV Substation is situated near the vehicle entrance of the current Dendrobium Colliery (and Former Nebo Colliery). The entrance is located 250 m west on Cordeaux Road from the T-junction of Cordeaux Road and Araluen Avenue, and on Cordeaux Road 420 m east from the intersection of Harry Graham Drive. The substation is located 25 m to the north of the entrance to the site from Cordeaux Road. The site is 25 m in length east to west, and up to 25 m in extent north to south. The item is situated within a fenced compound consisting of two steel tower blocks on a cement and gravel base. Thick eucalypt forest is located to the north and northwest of the item, with the south and west sections surrounded by sealed road and a car park to the east. There is a brick bridge located 50 m to the west of the subject site which was noted on the 1948 aerial photo of the site (Rogers 2001:12). Due to the high vegetation cover between the current substation structure and the bridge, it is not visible from the bridge. It is also not possible to see the bridge from the current substation structure (Plate 2 and Plate 3).

The site today is used as an electrical substation which supplies the current Dendrobium mine operation with electricity from a private electrical supplier. One of the larger steel towers of the substation has been replaced and upgraded to allow for the distribution of electricity for operations with the other smaller steel tower block decommissioned and no longer in use.

4.2 33kV Substation and condition

The subject site is located 25 m north of Cordeaux Road from the entrance gate of Dendrobium Mine (Plate 1). The subject site is located within the Nebo Colliery Heritage curtilage (Figure 2). The compound in which the substation is situated is surrounded by sealed bitumen from an existing car park, with a bitumen road to the south and bushland to the north. The substation compound is situated on flat ground on the top of a ridgeline adjacent to a deeply inclined creek-line to the north. The entrance to the colliery gently slopes to the north on a bitumen road that abruptly branches off to a carpark to the east and the surface operation to the west over the America Creek Bridge (Plate 2 and Plate 3). A hedge is located at the southern fence line of the substation with a small kerb at the edge of the road. At the northern end of the substation over the fence the landscape steeply drops down to American Creek within thick bushland.

The subject site is surrounded by a steel fence with an opening at its eastern end. The compound is surrounded by a black steel fence with two large steel frames that make up the Substation. These large steel frames are situated on concrete slabs with the rest of the floor space within the compound covered in gravel (Plate 4). The steel tower to the northern end of the compound is approximately 4 m long by 4 m wide and is not currently in use with no clear modern additions or changes (Plate 5). This tower is surrounded by a grey steel fence with barbed wire on the top. The top of the tower has three overhead power cables running to the north from three orange-brown ceramic transmission insulators along a dis-used transmission line. Another three overhead power cables run south from three orange-brown ceramic transmission insulators to the three orange-brown ceramic transmission insulators on the adjacent steel complex. A further six orange-brown ceramic transmission insulators are situated in the middle on the top tower and are connected to each overhead power cable (Plate 6). This tower is in poor condition with structural rust.

The other steel transmission frame, situated in the southern section of the compound, is surrounded by a grey fence line with razor wire on the top (Plate 7). This rectangular tower measures approximately 3 m wide by 15 m long with a smaller, lower square section to the north east measuring 4 m by 4 m (Plate 8).

Four modern additions have been made to this section of the substation. There are three main transformers that connect to the old orange-brown ceramic transmission insulators on the steel frame of the tower (Plate 9) and one 240V auxiliary transformer and distribution board (Plate 10). There are different types of transmission insulators on this section of the substation varying in length and spacing (Plate 11) with some modern additions evident with grey ceramic insulators which have been added to the transformers (Plate 12). This tower is in poor condition.

Plate 1: Entrance to Dendrobium mine from Cordeaux road at the western end of the substation. South east aspect. (Source: Niche 2018).

Plate 2: Eastern end of the substation view down access road to mine surface operations. East aspect. (Source: Niche 2018)

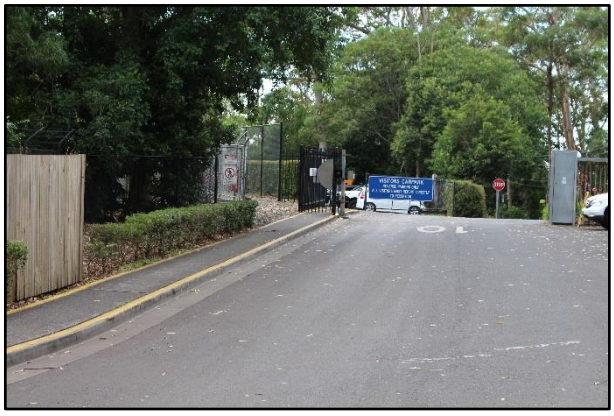


Plate 3: View toward eastern carpark from western access road to surface mining operations, western aspect. (Source: Niche 2018).

Plate 4: View of Substation from eastern entrance, west aspect. (Source: Niche 2018).

Plate 5: 3 m by 4 m steel tower to the north end of the compound, west aspect. (Source: Niche 2018).

Plate 6: Overhead power cables and orange brown ceramic transmission insulators, south east aspect. (Source: Niche 2018).

Plate 7: 4 m by 15 m steel tower to the south of the compound, south aspect. (Source: Niche 2018).

Plate 8: 3 m by 15 m steel tower with a smaller 4 m by 4m north eastern tower, south east aspect. (Source: Niche 2018).

Plate 9: Example of modern transformer addition, south aspect. (Source: Niche 2018).

Plate 10: Modern addition of 240v auxiliary transformer and distribution board, south aspect (Source: Niche 2018).

Plate 11: Example of orange brown ceramic transmission insulators, south east aspect (Source: Niche 2018)

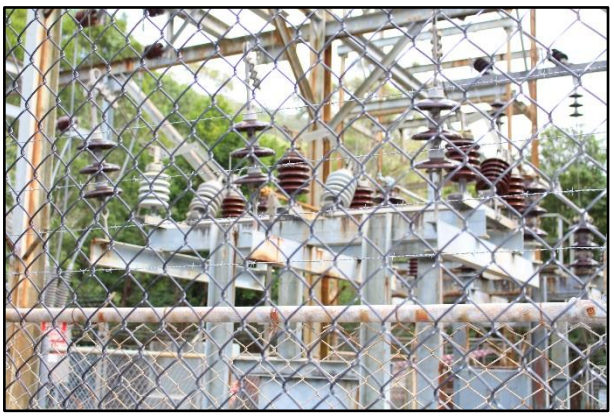


Plate 12: Example of modified grey ceramic insulators, south east aspect (Source: Niche 2018)

5. Assessment of Significance

5.1 Significance framework

The *NSW Heritage Manual*, prepared by the former NSW Heritage Office and Department of Urban Affairs and Planning provides the framework for the following assessment and statement of significance. These guidelines incorporate the five aspects of cultural heritage value identified in the *Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999* (Burra Charter) into a framework currently accepted by the NSW Heritage Council.

5.2 Significance Assessment Criteria

The significance assessment provided in Table 3 has been adapted from the Strategic Management Plan for Historic Coal Mining Sites of the Illawarra entry for the Nebo Colliery (OHM Consultants 2005). The heritage significance of the Nebo Colliery site is assessed here. The relative value of the switchyard to the heritage significance of the item is discussed in Section 5.4 below.

Table 3. Significance criteria for Nebo Colliery (the heritage item)

Criterion	Significance
(a) An item is important in the course, or pattern, or NSW's cultural or natural history (or the cultural or natural history of the local area)	Nebo Colliery has association with the development of mining in the Illawarra in the post-World War II era. It was opened as a greenfields site and constructed to take into account the wellbeing of the mine workers following legislative changes. It was one of the first mechanised mines in the area. Later significance can be garnered from the association with the new Dendrobium mine, which took over the site in 2001. **The heritage item has State heritage significance under this criterion.**
(b) An item has strong or special associations with the life or works of a person, or group of persons, of importance in the cultural or natural history of NSW (or the cultural and natural history of the local area)	Associated with the Broken Hill Proprietary Company Limited /Australian Iron and Steel companies, which were among some of the major industrial companies and employers in the Illawarra area. **The heritage item has local heritage significance under this criterion.**
(c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievements in NSW (or the local area)	The mine contains two Post-War International Style buildings (the Administration Building and the Bath House). These buildings are of aesthetic and technical architectural significance for their style of design and functional utility to the post-war operation of the mine. **The heritage item has local heritage significance under this criterion.**
(d) An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.	Significant for its association with Mt Kembla village and the surrounding area for its relationship between mines, mining companies and their workers. Coal mining is an industry which is traditionally associated with the labour movement and workplace safety initiatives. **The heritage item has local heritage significance under this criterion.**

Criterion	Significance
(e) An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)	Phases of reworking of the site over time have left likely archaeological relics throughout the Nebo Colliery precinct, which have some research potential for the understanding of the site and mining practices throughout the late 20th century. **The heritage item has local heritage significance under this criterion.**
(f) An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area); and	Nebo Colliery represents a post-war mining complex which is not unique or unusual in NSW. While the Administration Building and Bathhouse are of architectural interest, they are not rare examples of their architectural type. **The heritage item does not meet the local heritage significance threshold under this criterion.**
(g) An item is important in demonstrating the principal characteristics of a class of NSW's: • Cultural or natural places; or • Cultural or natural environments; • (or a class of the local area's) • Cultural or natural places; or • Cultural or natural environments.	The Nebo Colliery site is not considered a representative example of Illawarra or NSW coal mining sites due to the different phasing of fabric and the change in use of the site over time. **This heritage item does not meet the local heritage significance threshold under this criterion**.

5.3 Statement of Significance

The following Statement of Significance has been adapted from the State Heritage Inventory sheet for the Nebo Colliery (OEH 2017).

> *This site is significant as it was the first mine to be opened as a fully mechanised mine in 1947. It was a green field mine development and its surface facilities were of the most modern design being fully mechanised upon opening. It is also significant for its association with Mt Kembla village and the surrounding area, for its relationship between mines, mining companies and their workers and for the joint ownership of the mine and the associated steel works. It is also significant for its association with the new Dendrobium Mine for which its facilities were chosen to support.*

5.4 Significance Assessment of the existing 33kV substation

The existing electrical switchyard and substation was constructed in the 1960s and was responsible for powering mining operations at the site from that time up until the present day. The northern tower has been decommissioned for a significant period of time with no visible structural or engineering alterations present. However the tower is in poor condition with most of the steel gantry supports showing significant rust.

The southern substation array is also in a poor condition but to a lesser degree. It was originally constructed in the 1960s, however it has been upgraded and updated with new transformer equipment and insulators added over time to extend its operational lifespan.

Neither substation array was constructed as part of the original opening of the Nebo Colliery in the 1940s. Their architectural design is considered a ubiquitous example of 1960s electrical infrastructure. Elements of

the Nebo Colliery with high heritage significance are predominantly associated with the 1940s Administration Building and Bathhouse, which were built in an iconic Post-War International architectural style.

As the substation was not part of the original phase of development of the Nebo Colliery, it is either in poor physical condition or has been modified over time, the substation has been determined to be of low heritage value to the overall heritage significance of the Nebo Colliery item.

References

Australia ICOMOS (2004). The Illustrated Burra Charter: Good Practice for Heritage Places, Deakin University, Burwood, Victoria.

Department of Urban Affairs and Planning (1996) NSW Heritage Manual.

Development Approval DA 60-03-2001. Dendrobium Underground Coal Mine and associated surface facilities and infrastructure

Heritage Branch of the Department of Planning (2009). Standard Exemptions for Works Requiring Heritage Council Approval.

Heritage Office and Department of Urban Affairs & Planning (2002). Statements of Heritage Impact. Available online at http://www.environment.nsw.gov.au/heritage/publications/#S-U

Navin Officer Heritage Consultants [NOHC], (2000). Dendrobium Coal Project: Cultural Heritage Assessment. Prepared for Olsen Environmental Consulting Pty Ltd on behalf of BHP Coal Illawarra.

Niche (2016). Dendrobium Mine Surface Electrical Supply - Section 75W Modification (MOD 8) to Dendrobium Mine Development Consent 60-03-2001. DRAFT-NOT ISSUED.

Niche (2017). Dendrobium Mine Surface Electrical Supply: Alternate Transformer Sites Heritage Constraints Assessment. Prepared for South32 Illawarra Coal.

Office of Environment and Heritage, (2017). State Heritage Inventory entry for “Nebo Colliery”. Available online at http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5062596

OHM Consultants (2006). Strategic Management Plan for Historic Coal Mining Sites of the Illawarra.

Olsen Environmental Consulting (2001). Environmental Impact Statement for the Dendrobium Underground Coal Mine.

Rogers, B (2001). Nebo Colliery: Catalogue Of Items Of European Cultural Heritage, Indicating Level Of Significance And Likely Impact Of Dendrobium Project On Each Item. Prepared for Olsen Environmental Consulting and BHP Collieries Division.

Annex 1 Archival Photographic Recording

Dendrobium Colliery 33kV Substation – Kembla Heights NSW

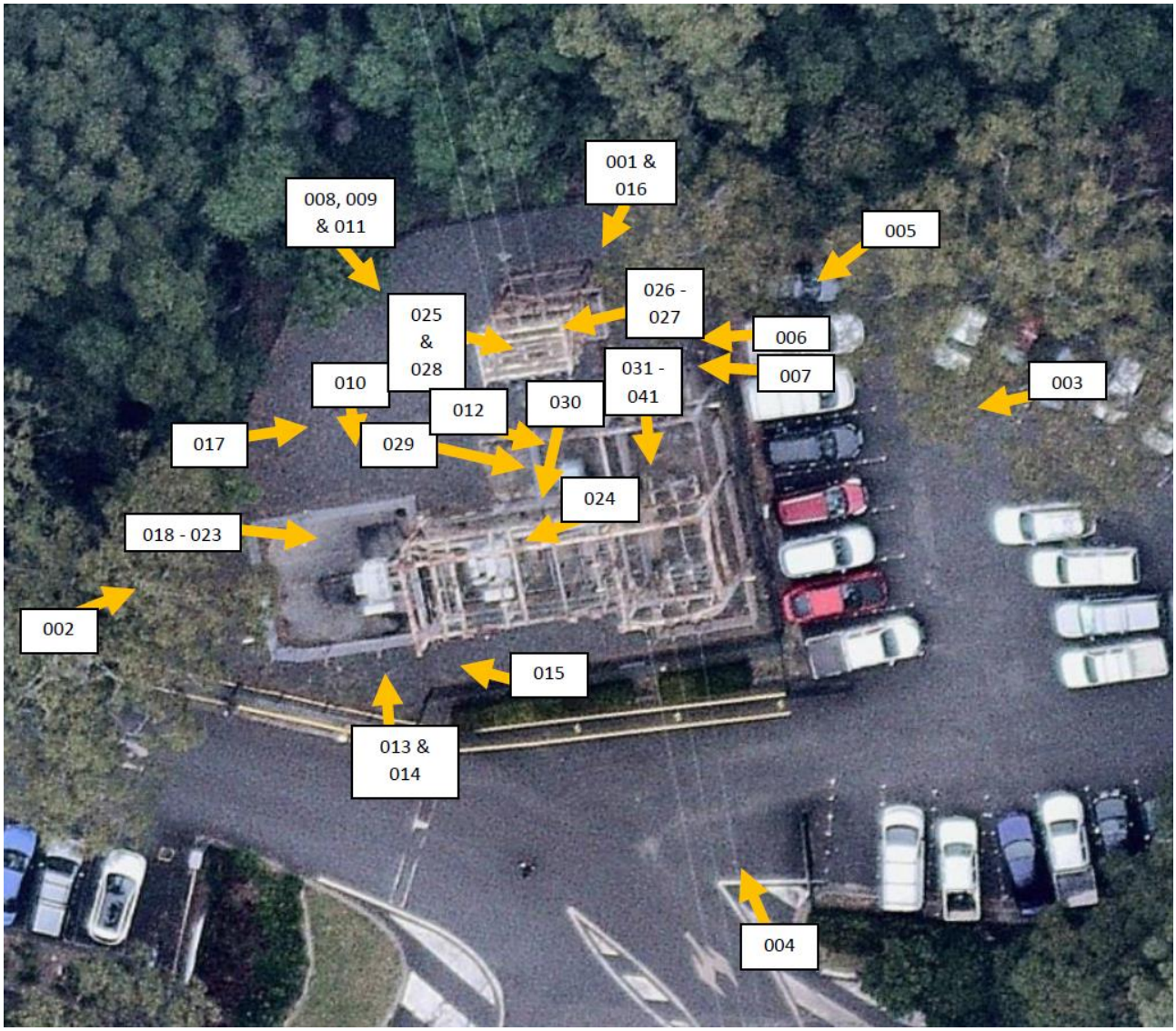
Archival Photography Digital Image Catalogue Sheet

Project Name	33kV Substation, Dendrobium Colliery		
Camera	Canon EOS 700D	**Lenses**	18 – 55 mm
Proof #	D -2	**Photographer**	Sam Richards

Image file no.	Date	Description	Camera Direction
001	30/4/2018	View of top of northern tower	north west
002	30/4/2018	View of the 33kV Substation	north
003	30/4/2018	View of the 33kV Substation	west
004	30/4/2018	View of the 33kV Substation	north
005	30/4/2018	View of the 33kV Substation	north west
006	30/4/2018	View of the northern tower	west
007	30/4/2018	View of the 33kV Substation	west south west
008	30/4/2018	View of the 33kV Substation	south east
009	30/4/2018	View of the 33kV Substation	south east
010	30/4/2018	View of the western transformer	south
011	30/4/2018	View of the 33kV Substation	south east
012	30/4/2018	View of the eastern side of 33kV Substation	south east
013	30/4/2018	View of modern electrical addition to the substation	south
014	30/4/2018	View of modern electrical addition to the substation	north
015	30/4/2018	View of modern addition to 33kV Substation	west
016	30/4/2018	View of northern tower of 33kV Substation	south west
017	30/4/2018	View of northern tower of 33kV Substation	north east
018	30/4/2018	View of modern transformer	east south east
019	30/4/2018	View of modern transformer	east south east
020	30/4/2018	View of historic insulators connected to modern transformer	east

Image file no.	Date	Description	Camera Direction
021	30/4/2018	View of historic insulators connected to modern insulators	east
022	30/4/2018	View of historic insulators connected to modern transformer	South east
023	30/4/2018	View of modern addition to 33kV Substation	East
024	30/4/2018	View of modern circuit breaker	North east
025	30/4/2018	View inside of northern tower	east
026	30/4/2018	View inside of northern tower	north
027	30/4/2018	View inside of northern tower	West
028	30/4/2018	View inside of northern tower	east
029	30/4/2018	View of modern circuit breaker control cubicle looking north east	north east
030	30/4/2018	View of various historical insulators	north east
031	30/4/2018	View of electrical box	south
032	30/4/2018	View of various historical insulators	north
033	30/4/2018	View of historical insulator	north
034	30/4/2018	View of various historical insulators	south
035	30/4/2018	View of modern electrical distribution box	south
036	30/4/2018	View of historical insulators	south
037	30/4/2018	View of historical insulators	south
038	30/4/2018	View of various historical insulators	south east
039	30/4/2018	View of historical insulators	south east
040	30/4/2018	View of modern insulators mixed with historical insulators	north
041	30/4/2018	View of historical insulators on eastern section 33kV Substation	north

Photographic Plan Sheet



001 View of top of northern tower facing north west.

002 View of the 33kV Substation facing north

003 View of the 33kV Substation facing west

004 View of the 33kV Substation facing north

005 View of the 33kV Substation facing north west

006 View of the northern tower facing west

007 View of the 33kV Substation facing west south west

008 View of the 33kV Substation looking south east

009 View of the 33kV Substation looking south east

010	View of the western transformer looking south
	
011	View of the 33kV Substation looking south east

012 View of the eastern side of 33kV Substation looking south east

013 View of modern electrical addition to the substation looking south

014 View of modern electrical addition to the substation looking west

015 View of modern addition to 33kV Substation looking west

016 View of northern tower of 33kV Substation looking south west

017 View of northern tower of 33kV Substation looking north east

018 View of modern 33/6.6kV 1.5MVA power transformer (D-SS03-TX01) looking east south east

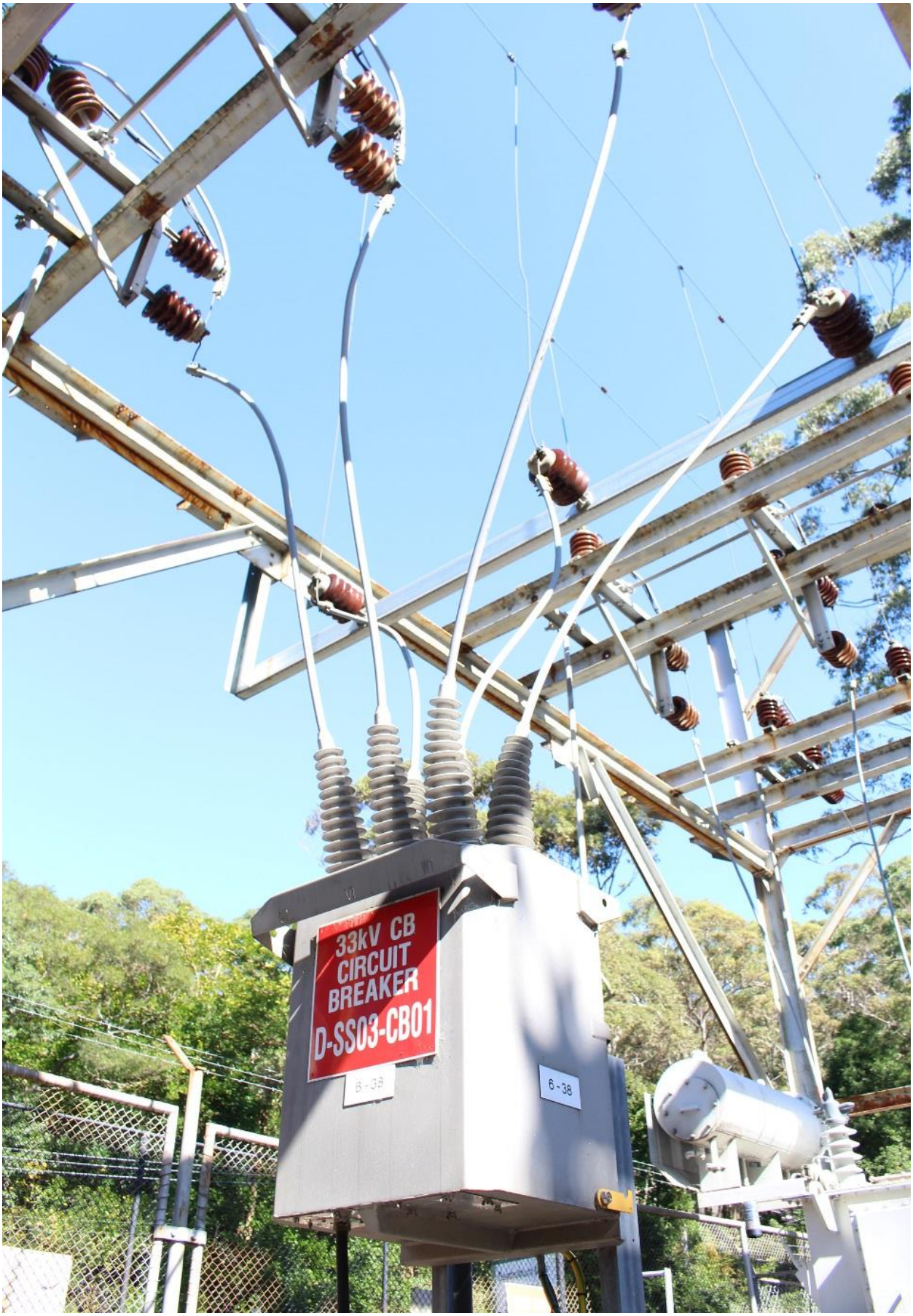
019 View of modern 33/6.6kV 1.5MVA power transformer (D-SS03-TX02) looking east south east

020 View of historic insulators connected to modern transformer looking east

021 View of historic insulators connected to modern insulators looking east

022 View of historic insulators connected to modern transformer looking south east

023 View of modern addition to 33kV Substation looking east



024 View of modern circuit breaker (6-38) looking north east

025 View inside of northern tower looking east

026 View inside of northern tower looking north

027 View inside of northern tower looking west

028 View inside of northern tower looking east

029 View of modern circuit breaker control cubicle (0-SS03-CB01) looking north east

030 View of various historical insulators looking north east

031 View of electrical box looking south

032 View of various historical insulators looking north

033 View of historical insulator looking north

034 View of various historical insulators looking south

035 View of modern electrical distribution box looking south

036 View of historical insulators looking south looking south

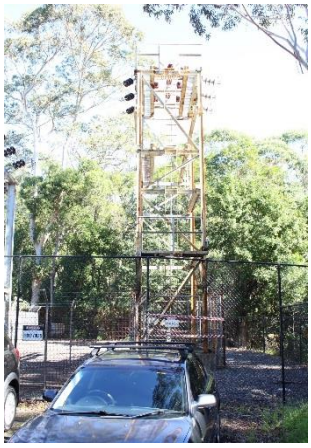
037	View of historical insulators
	
038	View of various historical insulators looking south east

039 View of historical insulators looking south east

040 View of modern insulators mixed with historical insulators looking south east

041 View of historical insulators on eastern section 33kV Substation looking north

Thumbnail Image Sheets

		
001	002	003
		
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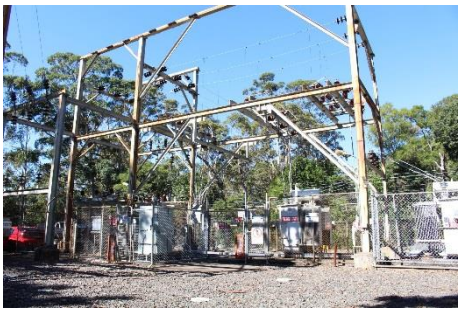
007	008	009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		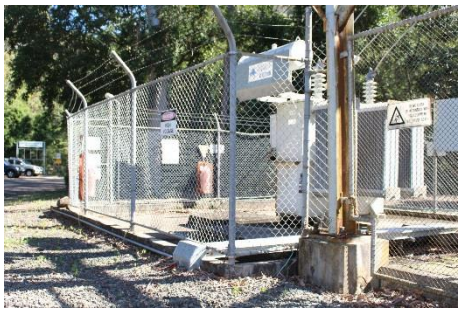
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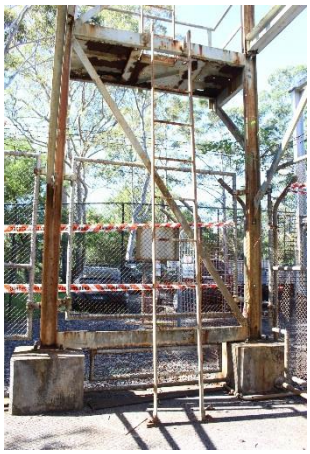		
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		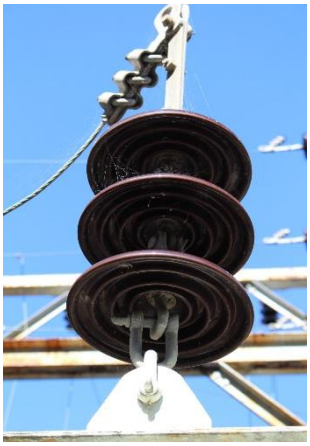
034	035	036
		
037	038	039

		
040	041	

Niche Environment and Heritage

A specialist environmental and heritage consultancy.

Head Office

Niche Environment and Heritage
PO Box 2443 North Parramatta NSW 1750
Email: info@niche-eh.com

All mail correspondence should be through our Head Office