Appendix C

STATEMENT OF HERITAGE IMPACT (EJE HERITAGE)

STATEMENT OF HERITAGE IMPACT - 003

RevA

CARRINGTON HYDRAULIC ENGINE HOUSE

STAGE 3 – ENGINE ROOM REMEDIATION & ACCESSIBLE ENTRY RAMP

THE PORT OF NEWCASTLE
106 BOURKE ST
CARRINGTON, NSW

Prepared by EJE Heritage
APRIL 2022
11009-SOHI-003-RevA

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1. INTRODUCTION

EJE Heritage has been requested to provide a Heritage Assessment and subsequent Heritage Impact Statement for the proposed Stage 3 development of Carrington Hydraulic Engine House (CHEH), Carrington NSW, which involves introduction of a new suspended floor slab within the building's main Engine Room to encapsulate an existing asbestos hazard, and provide a new accessible ramp entry up to this level ready for future adaptive re-use.

The Statement of Heritage Impact will support the Port of Newcastle's application pursuant to section 57(1) of the *Heritage Act (NSW) 1977* regarding the building works, to carry out the above development on the land on which the Carrington Hydraulic Engine House is situated.

The initial section of the report places the site within an historical context, and examines the physical condition and context of the current building. With the history and physical condition and context of the building understood, a heritage assessment of the site can be completed using the NSW Heritage Branch guidelines encompassing the Australia ICOMOS *Burra Charter 2013* heritage values: historical significance; aesthetic significance; scientific significance; and social significance.

The Statement of Heritage Impact that follows examines the proposed works, identifying any impacts which the proposal might have on the significance of the heritage items, and any measures which should be taken to mitigate any negative impacts, if these are in fact identified.

The Historical Context section of this report was prepared by Dominic Warland incorporating previous work by David Campbell. This Statement of Heritage Impact was prepared by EJE Heritage. The project team consisted of:

- Barney Collins – (Director), Conservation Architect. NSW ARB Reg No 4438. B.Sc (Arch), B.Arch (Hons II), M.Sc (Arch)(Cons)
- Dominic Warland – (Associate), Architect. NSW ARB Reg No 10138. M.Arch, B.Des Arch.

Unless otherwise acknowledged, photographic images are by EJE Heritage.

SITE, OWNERSHIP AND STAKEHOLDERS

The CHEH site (being Lot 30 DP 1190075) is owned by NSW Treasury through a holding company named Port of Newcastle Lessor Pty Ltd (Port Lessor). Port Lessor has granted a 98-year lease of its land around the shipping port, including the Engine House to the Port of Newcastle (PON). PON is responsible for its day-to-day operations and management as is considered the Proponent of the development at the Carrington Engine House building.

The historical crane bases (7-10) sit within Lot 5 DP 1104199 which is 'wet' land forming part of the harbour channel. This land is owned by Transport for New South Wales (TfNSW), who have granted PON usage rights as the lessee of the adjoining port 'dry' land. PON may also sub-grant these usage rights.

Additional Stakeholders include:

- Heritage NSW, as the agency responsible for listings, declarations and approvals under the *Heritage Act 1977.*
- The NSW Minister for Planning and Public Spaces, as Consent Authority for the site under the *Three Port SEPP 2013.*

It is noted that the local government, the *Council of the City of Newcastle*, does not appear to have any planning authority over the site of the Item, although their councillors, heritage and planning departments would no doubt have a professional interest in the development of the significant historical building within their LGA.

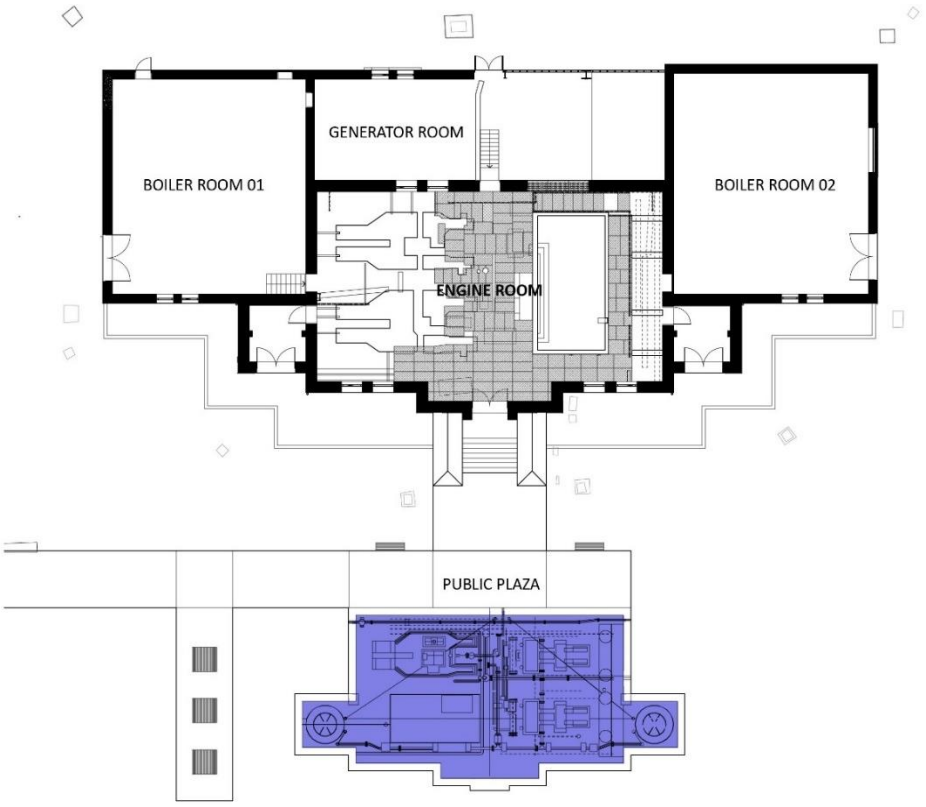

Figure 1. Existing Floor Plan – Carrington Hydraulic Engine House 2021.

EJE Heritage

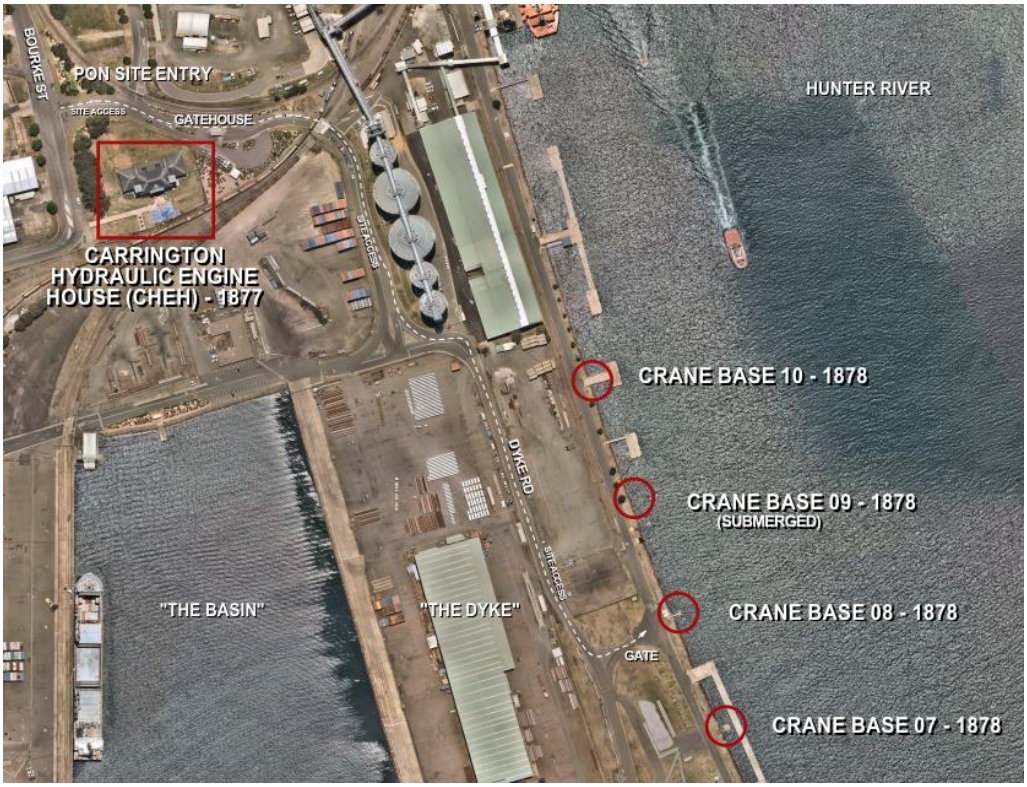

Figure 2. The CHEH site, in context with crane bases located along The Dyke.

***Nearmap* (by License) Edited.**

1.1 METHODOLOGY

This report has been undertaken in accordance with the NSW Heritage Office publications, *Assessing Heritage Significance and Statements of Heritage Impact*, together with the Australia ICOMOS, *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 2013*.[1]

1.2 CONSTRAINTS AND LIMITATIONS

EJE is not qualified to offer structural opinions. This report is not intended to convey any opinion as to the structural adequacy or integrity of the structure, nor should it in any way be construed as so doing. Similarly, the author's observations are limited to the fabric only: he does not comment on the capacity, adequacy, or statutory compliance of any building services.

1.3 HERITAGE LISTINGS

The site and building are listed as a Heritage Item of State Significance as follows:

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		01987	25 Aug 17	2017-92	4513

This listing includes the remnant fabric of the hydraulic crane bases located some distance further to the east of the Engine House building within the Port of Newcastle. The proposed works do not impact upon these items and hence they are not discussed in this report.

The Carrington Hydraulic Engine House is also listed within the following Heritage registers:

- *Section 170 Heritage and Conservation Register: Item 2170005 - Port of Newcastle*
- *State Environmental Planning Policy (Three Ports) 2013*

The subject site is in proximity to further Heritage Items of Local significance, as hereunder:

Suburb	Item	Address	Description	Significance	Item No.
Carrington	Former Morrison Bearby Warehouse (façade only)	92 Hill Street	Lot 11, DP 1023961	Local	NA

Suburb	Item	Address	Description	Significance	Item No.
Carrington	The Seven Seas Hotel	33 Cowper Street North	Lot 1, DP 102046	Local	I58

[1] Burwood: Australia ICOMOS, 2013.

1.4 EXEMPTIONS FROM THE HERITAGE ACT

The following exemptions are applicable, as per the Item's State Heritage Register listing:

1.4.1 Standard Exemptions

Section of Act 57(2)
Description Exemption to allow work

Title Standard Exemptions

Comments *SCHEDULE OF STANDARD EXEMPTIONS*
HERITAGE ACT 1977

Notice of Order Under Section 57 (2) of the Heritage Act 1977

I, the Minister for Planning, pursuant to subsection 57(2) of the Heritage Act 1977, on the recommendation of the Heritage Council of New South Wales, do by this Order:

1. revoke the Schedule of Exemptions to subsection 57(1) of the Heritage Act made under subsection 57(2) and published in the Government Gazette on 22 February 2008; and

2. grant standard exemptions from subsection 57(1) of the Heritage Act 1977, described in the Schedule attached.

FRANK SARTOR
Minister for Planning
Sydney, 11 July 2008

Action Date Sep 5 2008

1.4.2 Site Specific

Section of Act 57(2)
Description Exemption to allow work

Title Heritage Act - Site Specific Exemptions

Comments *ORDER UNDER SECTION 57(2)*

TO GRANT SITE SPECIFIC EXEMPTION FROM APPROVAL
Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10, Carrington
106 Bourke Street, Carrington and 140 Bourke Street, Carrington

SHR No. 01987

I, the Minister for Heritage, on the recommendation of the Heritage Council of New South Wales, in pursuance of section 57(2) of the Heritage Act 1977, do by this my order, grant an exemption from section 57(1) of that Act in respect of the engaging in or carrying out of any activities described in Schedule "C" by the owner described in Schedule "B" on the item described in Schedule "A".

The Hon Gabrielle Upton MP
Minister for Heritage
Sydney, Day of 2017

SCHEDULE "A"

The item known as Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10, Carrington, situated on the land described in Schedule "B".

SCHEDULE "B"

All those pieces or parcels of land known as Lot 30 of Deposited Plan 1190075 and Lot 5 of Deposited Plan 1104199, Parish of Newcastle, County of Northumberland shown on the plan catalogued HC 2901 in the office of the Heritage Council of New South Wales.

SCHEDULE "C"

All works and activities in accordance with a current and valid development consent from Newcastle City Council, the Department of Planning and Environment or the Land and Environment Court of NSW in force at the date of gazettal for listing the Carrington Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 on the State Heritage Register (including DA 07/1496).

Such minor development as is specifically identified as Exempt or Complying Development in State Environmental Planning Policy (Three Ports) 2013, and any successor planning instrument, that does not materially affect the heritage significance of the Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10.

All works and activities pertaining to existing access catwalks, navigational aids, maritime support structures and mooring infrastructure associated with Crane Bases Nos. 7, 8, 9 and 10.

The undertaking within the heritage curtilage of Crane Bases Nos. 7, 8, 9 and 10 of all works associated with the development and operation of port infrastructure, including the Channel Berth and Newcastle Cruise Terminal that do not impact on original fabric associated with the Crane Bases.

The removal or alteration of non-original fabric with regard to Crane Bases Nos. 7, 8, 9 and 10 as may be necessary to facilitate the development and operation of port infrastructure, including the Channel Berth and Newcastle Cruise Terminal.

Action Date Aug 29 2017

1.4.3 Application to the Subject Works

It is noted that the above listed exemptions from the Heritage Act are not applicable for the works proposed at the subject of this application.

1.5 SITE IDENTIFICATION

The site is identified as part of 106 Bourke St Carrington, NSW.

The subject site is located within Newcastle Local Government Area. The real property description is: Lot 30 DP 1190075. The site is zoned Special Activities SP 1 under the State Environmental Planning Policy (Three Ports) 2013, and is hence not encumbered by the planning controls of the Local Government Area.

Figure 3. Aerial view of Newcastle, the site is indicated with then red arrow at the top of "The Basin"

Spatial Information Exchange

Figure 4. The site is bordered in red.

Spatial Information Exchange

Figure 5. The site is bordered in red. The Engine House faces slightly east of south, towards the basin and harbour.

***Nearmap,* (By Licence) 2021.**

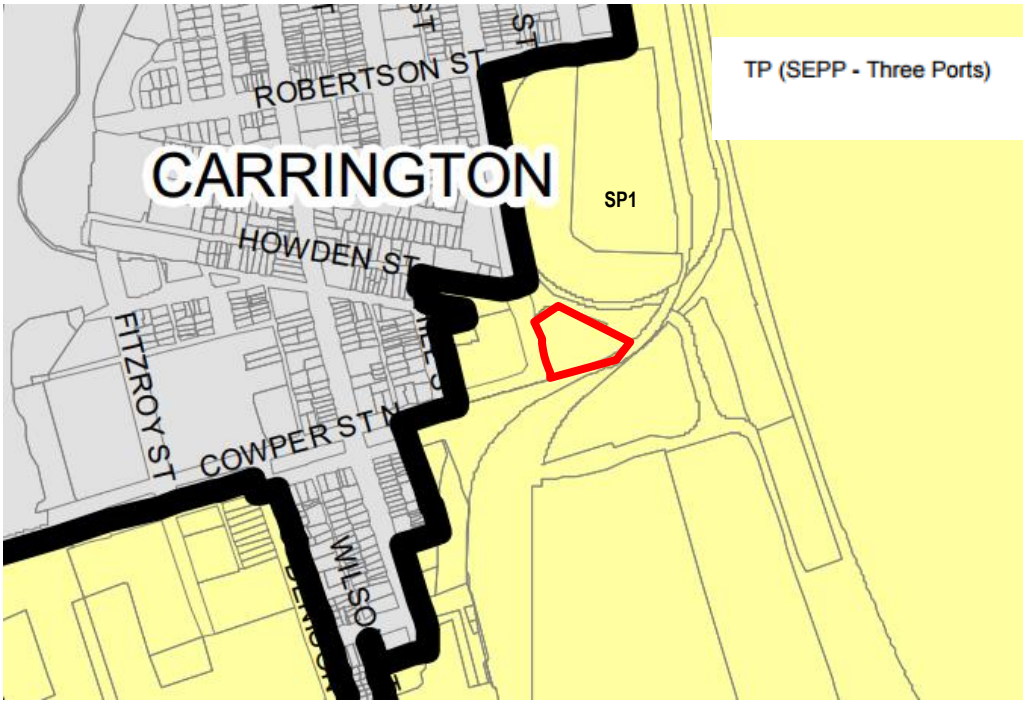

Figure 6. Detail of SEPP (Three Ports) Land Zoning Map LZN_003, the site is bordered in red.

Newcastle Local Environment Plan 2012

2. HISTORICAL CONTEXT

2.1 PRE-COLONIAL INHABITATION

Prior to European exploration and settlement, *Muloobinba* (Newcastle), place of 'edible sea fern', and the *Coquon* (Hunter River) region hosted the traditional nations of the Awabakal and Worimi Aboriginal people. The river estuary at this time was considerably wider than the present-day harbour, consisting of shifting sands and moving channels, with the area of today's Carrington consisting of low tidal mudflats.[2] Coastal Banksia, otherwise known as *Honeysuckle*, flourished along the banks of the river, an area rich in food sources for the traditional occupants.

The site of the proposed work around today's Carrington Hydraulic Engine House is based on land reclaimed from the Harbour by European inhabitants from the 1860's onwards. Prior to European settlement, seafood such as fish, oysters and pippies would have been a prominent source of bush tucker sourced in the area, with evidence of shell middens, a campsite, and ceremonial ground discovered at *Meekarlba* (today's Honeysuckle Precinct). While not always confrontational in nature, European colonial occupation in the 19th century drastically affected the Aboriginal people; times of conflict, dispossession of hunting grounds, and the introduction of diseases such as small pox drastically reduced Aboriginal populations in the area. The first European census of aboriginal people in the area of Newcastle occurred in 1827, and counted only 140 individuals in receipt of government provisions.[3]

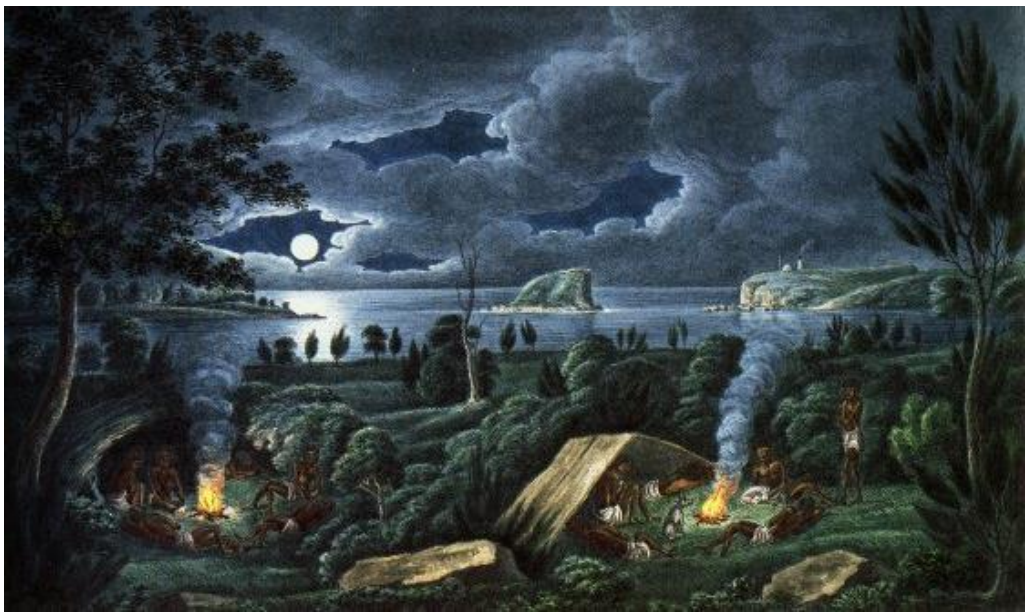

Figure 7. Lycett, Joseph (ca.1775 – 1828).

Aborigines resting by a Camp Fire near the Mouth of the Hunter River, Newcastle, NSW.

National Library of Australia

2.2 BULLOCK ISLAND

The Awabakal people who settled near the Hunter River referred to Bullock Island as "Onebygamba" *(Onibygambah)*, meaning large mound. It was an appropriate moniker for the wide expanse of ground rising (albeit only marginally) above the water's surface between two arms of the Hunter River, where Throsby Creek entered the secondary flow. The area later achieved its colonial name of Bullock Island because of the cattle which would go there to graze when the low tide allowed them access. Bullock Island was swampy and isolated and as such was ignored by colonial settlers for many years while residential and industrial development occurred on firmer ground elsewhere, with Europeans first settling in the area in the 1860's.

[2] The Institute of Engineers, Australia*, Newcastle Harbour, A National Engineering Landmark*, 1989.
[3] NSW Government – Hunter Development Corporation, *History of Ferries in Newcastle,* n.d.

2.3 THE MORIARTY PLAN

E.O. Moriarty had broad engineering experience in breakwater construction, railway works, surveying, construction and shipbuilding. He had worked as a cadet engineer on the Isle of Portland breakwater in Ireland before emigrating to New South Wales with his family in 1843. After working as a consulting engineer and surveyor in Sydney for several years, he became an assistant in the Surveyor-General's Department. In 1853 he became Engineer-Surveyor of the Steam Navigation Board (which he later Chaired), followed by his appointment to Newcastle in 1855 as Engineer for Hunter River improvements.[4] After leaving Newcastle in 1858 he became Engineer in Chief, Harbours and Rivers for the Public Works Department.[5]

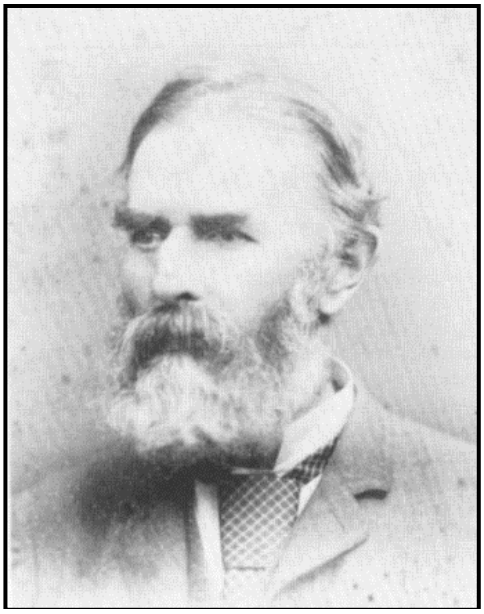

Figure 8. Edward Orpen Moriarty.

Shaping the Hunter

Proposing that public coal handling facilities should be centralised at Bullock Island, Moriarty produced a report on the navigation problems of the harbour, identifying "two natural drawbacks of the harbour": a rock ledge and unusual current at the entrance, and the extensive banks of sand within. He predicted the removal of the rock ledge, or the carving of a channel through it, "at some future time",[6] but laid down an ambitious three stage plan in 1858 to reduce the levels of silt and sand within the estuary and form a deep water harbour. These steps were summarised by maritime historian Terry Callen:

> *The first stage was the "continuation of the river" plan and involved the building of a large stone dyke curving from Port Waratah to opposite the Australian Agricultural Company's wharf (Crown Street). The second stage was to build a similar stone wall from near Crown Street curving slightly until it met Macquarie Pier. The third stage was a small stone guidewall or breakwater on the northern side of the harbour at Pirate Point. All three features were planned to work together in concentrating the outgoing current into one stream which would scour out the harbour and the bar.*[7]

For many years the government raised funds for Newcastle harbour improvements by levying of tonnage dues. This scheme operated from 1858 until the 1873 when the Repeal of Tonnage Dues Act was passed, following pressure from local politicians who resented the expenditure of locally raised funds in other areas.[8]

[4]Armstrong, *Shaping the Hunter, p.15.*
[5]*ibid.,.*
[6]Coltheart, *Between Wind and Water,* p.41.
[7] Callen, *Bar Safe,* p.26.
[8] N. Cushing, "Creating the Coalopolis: Perceptions of Newcastle 1770-1935", PhD Thesis, University of Newcastle, 1995, p.188.

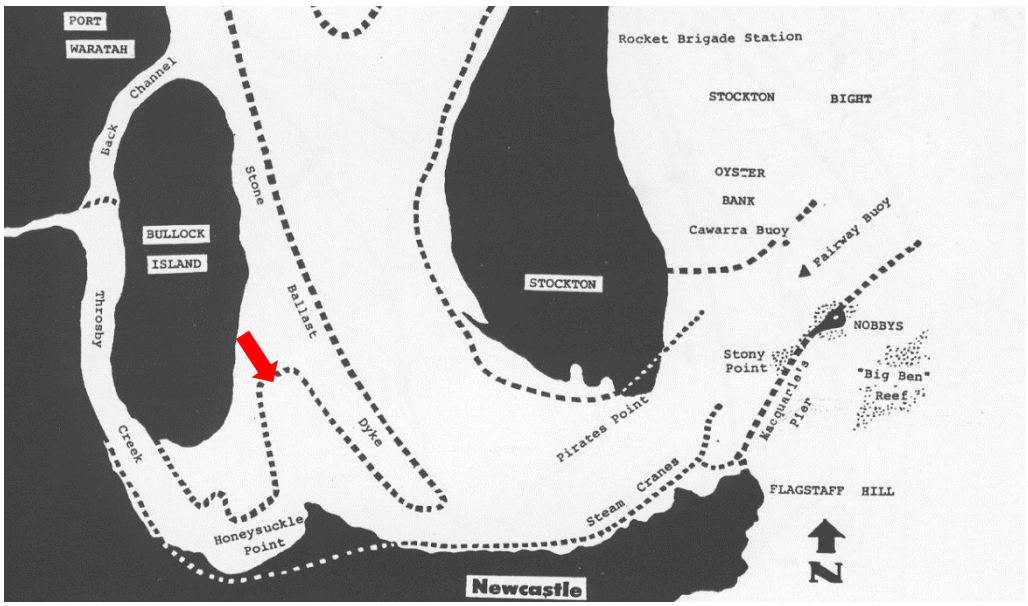

Figure 9. Plan of Newcastle Harbour with manmade foreshores shown in broken lines.

The approximate location of today's Hydraulic Engine House indicated by the red arrow.

T. Callen, Bar Dangerous.

2.4 STAGE 1: THE DYKE

First known as the Ballast Dyke, then later, "The Dyke" construction of reclaimed rock wall at Bullock Island served a dual purpose in Moriarty's plan. While its eastern face would improve the flow of the river, it would also support a line of wharves for coal loading purposes. Reclamation work behind The Dyke would create an area of land which could be devoted to loading activities.

A sand bank of about 650 hectares ran north-south on the east of the Bullock Island, and Moriarty proposed depositing a layer of ballast along the margin of the bank to prevent it flooding at high tide and to divert the flow of the river to scour a channel to the east of the Dyke. In 1862, two ballast jetties were built and ships began depositing ballast heaps on the line of the embankment, while sand dredged from the harbour was pumped behind the newly created wall.

The diverse nature of the ground on the man-made island was highlighted by a local newspaper:

> *Here we have geological specimens from every part of the world. The whole expanse of ground has been built up of ballast from the ships that come to our harbour. In one place we tread upon a layer of London flint, next a collection of stones from the shores of the sunny Mediterranean. These are succeeded by a rocky mound from Scandinavian coasts and these in turn give place to blue stone from Melbourne, green trap from New Zealand, limestone from Singapore and even the sun burnt bricks and glazed uncouth carvings from a dismantled village in far off China.*[9]

By 1874 the stone bank was complete, enabling contracts to be let for the construction of wharves. Reclamation work continued on Bullock Island and by 1890, a series of mudflats had been transformed into 121 acres of usable land.

Enlargement of the basin behind The Dyke in 1892 involved pumping sand through a pipe laid under the main railway line to swampy land north of the hydraulic engine house. Rock at the entrance to the new basin was removed by drilling and blasting, using a specially built rockbreaker, *Posiedon*.[10]

[9] *Newcastle Morning Herald and Miners Advocate,* 7 November 1877.
[10] Coltheart, *Between Wind and Water,* p.92.

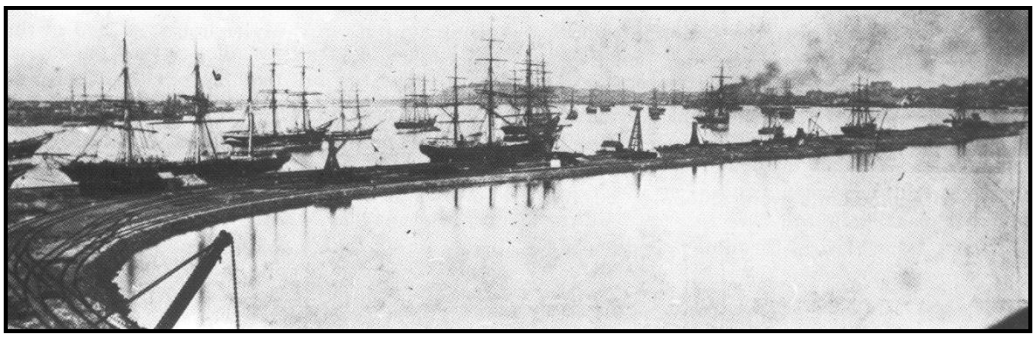

Figure 10. The Dyke during construction phase, looking towards Nobbys.

T. Callen, *Bar Dangerous*

2.5 COAL LOADING MOVES TO THE DYKE

Contracts were let in 1874 for the construction of wharves on the eastern side of Bullock Island, in preparation for the transfer of coal loading activities from the southern side of the harbour. Moriarty and associate Cecil West Darley had by this time agreed that the most appropriate way to load coal at these wharfs was with the use of hydraulic cranes erected on masonry bases, to be powered by a central engine house.[11]

2.6 HYDRAULIC CRANES & THE ENGINE HOUSE

Tenders were called for *"the erection of the engine house, boiler house, smoke stack and hydraulic towers"* in April 1876, and the New South Wales Parliamentary Papers of 1877 refer to the expenditure of £20,000 for *'Newcastle wharf, cranes, hydraulic engine house & c.'*[12] Archaeologist, Damaris Bairstow, has documented the development of these wharves between 1875 and 1877:

> *Along the Dyke, wharves were built in 30 metre sections, 60 metres apart starting about 230 metres from the southern end. Seventeen were built in 1875, the same year as the branch railway crossed Throsby's Creek on the east side of the island. By 1876, including all sidings, some eleven kilometres of single track had been laid, all in steel, designed to last six times as long as the iron rails normally used. In 1876-7, concrete foundations for the first four hydraulic cranes were laid at Berths 4,5,6 and 7, ninety metres apart. [These bases supported the cranes which later became known as Nos.7, 8, 9 and 10] In the course of the latter year, the first ten wharves were connected to form a continuous timber-built wharf 838 metres long.*[13]

The engine house building was erected and fitted out by private contractor William H. Jennings, employed by Harbours and Rivers section of the Public Works Department. Design of the building is not formally attributed, but has at times been attributed to the prolific Government Architect, James Barnet, his assistant Edmund Spencer and or Government Engineers Edward Moriarty & John Whitton,[14] or perhaps even as a template design from the UK.[15]

The building features the same yellow bricks from local brickmaker, Jospeh Bowtell of The Glebe (now Merewether), which had been used in the Customs House at Newcastle. Interestingly, Customs House had also been designed by Barnett and Spencer around the same time as the Engine House, and was constructed by the same contractor, and perhaps even the same workmen.[16]

[11] *Cockbain, 1998, p.173; Gibson, 2009, 2 in;* SHR Listing.
[12]Department of Commerce,2005: 3.6-3.7
[13]D. Bairstow, "The Bullock Island Hydraulic Power House", unpublished manuscript in possession of the author. Identification of cranes in relation to surviving bases was carried out by B. Collins and R. Melville following close study of documentary and physical evidence.
[14]SHR Listing: http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5055925
[15] Refer SHR Listing for a more detailed discussion on the origins of the CHEH building's design.
[16] *Bridges and McDonald, 1988, 89; Hunter Design, 1992, p.10 in;* SHR Listing.

Built on "huge blocks of shining white sandstone" (now grey in colour), the building drew favourable comment:

> *On heavy foundations, then thought essential for any major building on reclaimed land, this Classic Revival edifice is of yellow, compressed brick, with Sydney sandstone quoins, architrave, frieze and pediment. The roof was boarded and slated. The overall length was 43.9 metres, the depth 26.9 metres. The engine room measured 21.3 by 12.3 metres.*[17]
>
> (and)
>
> *A magnificent structure of solid handsome masonry, being built of white glistening sandstone blocks, beautifully dressed, from Sydney quarries, relieved by yellow brick masonry neatly pointed, and well and truly laid.*[18]

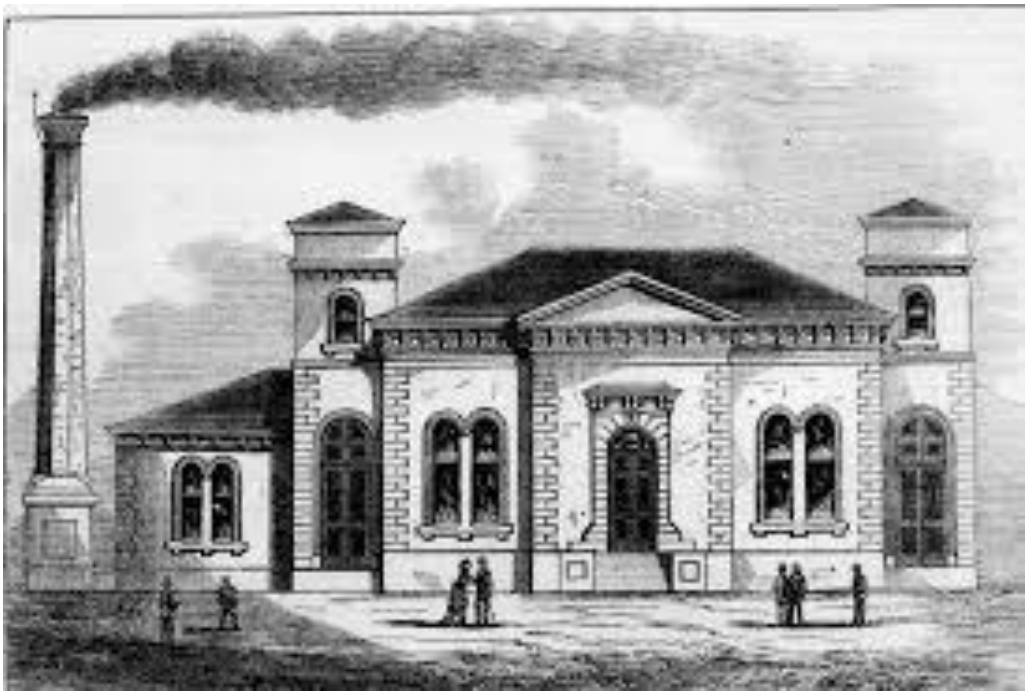

Figure 11. Early drawing of the Hydraulic Engine House.

Engineers Australia

Within the two flanking 20m towers, the Armstrong "hydraulic accumulators" consisted of a large cast iron cylinder within which a 120-ton slag-filled ram compressed water reservoirs, accumulating 800psi water pressure. Water was supplied to the site via gravity fed pipeline from Wickham, contained in tanks in the engine room, and pumped by steam engine into the accumulators. The 100 horsepower engines with 18-inch cylinders also provided the base load of lifting power to the cranes developing 90psi. The engines were mounted on large mass concrete foundations surrounded by open cast iron floor grates above a deep service cavity.[19]

Contracts for the hydraulic pumps and associated hydraulic loading cranes had been awarded to the Armstrong Hydraulic Machinery Co., Elswick, England,[20] and a Hydraulic Engineer from the UK travelled out to supervise their erection, under Moriarty. Pressurised water from the Engine House was directed to the cranes along 10-inch pipes linked with bolted junctions, reticulating through the crane itself in 6-inch pipes. Water was then recirculated back to the engine house for re-use.

[17]Suters Architects, "Macquarie Pier and Nobbys Head Conservation Management Plan", p.11.

[18] Newcastle Morning Herald, 7 November 1877, p2.

[19] SHR Listing.

[20]For a detailed description of this equipment see P. Cockbain, "The Engineering Heritage Associated with Coal Shipment from Newcastle 1877 to 1967, paper presented to National Engineering Heritage Conference, 1997.

The crane bases were constructed on mass concrete building foundations 10 feet 6 inches deep, resting on the shoreline inside iron caissons (supplied by Davy and Co. of Sydney) sunk 40 feet into the river bed. A similar construction method of cofferdams and mass concrete was also used for the footings of the accumulator towers at the Engine House.[21] The red face bricks of the crane bases were also supplied by Bowtell, and the sandstone blocks, varying from 1-9 tonnes in size, were transported to the site by sea from Pyrmont.[22] In February 1878, Moriarty witnessed a test lift and on 19th March, 1878 the first shipment of coal loaded by hydraulic cranes left Newcastle Harbour aboard the *Downiemount*, which had brought the cranes from Britain on her previous voyage.

Physical operation of the cranes was controlled by an operator opening and closing cocks from the high-pressure pipelines to actuate hydraulic rams with two levers, one for hoisting and the other for slewing.[23] The cranes were described in the *Town and Country Journal* in March 1879 as "the chief glory of Newcastle":

> *These beautiful pieces of mechanism … represent the last achievements of mechanical science in hydraulic machinery. They could be manipulated by a child. The wagons of coal are brought into position by a rope worked by an hydraulic windlass. The man in charge has simply to press his foot on the treadle, while he draws in the rope, and the irresistible water pressure does the rest. The wagon being in position, the hooks of the chains are fastened in it, and the man standing on the platform of the hydraulic crane moves a lever, and the giant lifts the top of the truck as easily as a mother would lift her child, without a sound swings it over the ship's hatchway, where the lumpers knock out the pins which fasten the bottom of the truck, and then the coal disappears into the hold of the vessel. The whole process takes only a minute and a half.*[24]

Figure 12. Fixed Hydraulic Cranes at Carrington.

Newcastle University Cultural Collections

[21] Maitland Mercury, 22 January 1876, p.10, 6 June 1876, p.7 In: SHR Listing.
[22] Ibid, 11 September 1877, p7. In: SHR Listing.
[23] Bairstow, 1986, in; SHR Listing.
[24] cited in D. Bairstow, archaeological report on various industrial sites in Newcastle, unpublished manuscript in possession of author.

The hydraulic cranes installed at the Carrington Hydraulic Engine House were the first employed in the entire country. They predated any similar machines in Sydney (at the Pump House in Ultimo) by more than a decade. The Sydney machines drove a great diversity of warehouse and commercial equipment across the CBD, while those at Carrington were constructed exclusively to drive the largest coal loading facility in the State. That this new and expensive technology was first employed in Newcastle demonstrates the acknowledged importance of Newcastle harbour in the NSW economy at that time. J C Docherty records that the northern coal fields, of which Newcastle was the port, accounted for about 70 per cent of all coal production in New South Wales between 1880 and 1930.[25]

To keep up with the demand for coal, the Carrington Hydraulic Engine House was soon upgraded and expanded. Its original four cranes were added to with four more commencing service from 1880, four additional smaller units in 1888 and three cranes were transferred from Queens Wharf on the south of the harbour in 1889. Driving all the cranes night and day for over a decade had obviously taxed the original engines and plans were put in place to install a new, more powerful engine which would not only power the hydraulic cranes but generate electricity.

To accommodate the larger equipment and third steam pumping engine required, in 1891, a second boiler room and smokestack were constructed on the east side of the pump house by contractor E.J. King. These structures were almost symmetrical with the equivalent on the western side, although the boiler room was made slightly deeper in plan (perhaps to accommodate the newer Babcock and Wilcox boilers) and the new chimney taller. In the same year, King also constructed an addition known as the Auxiliary Engine House on the northern side of the building (later known as the dynamo room). This room housed Westinghouse engines and dynamos to power new electric lighting for the building and the wharfs. The existing gas lights were decommissioned when the electric lights went on 2nd of September 1891 and by February 1892 all the new machinery was operating.

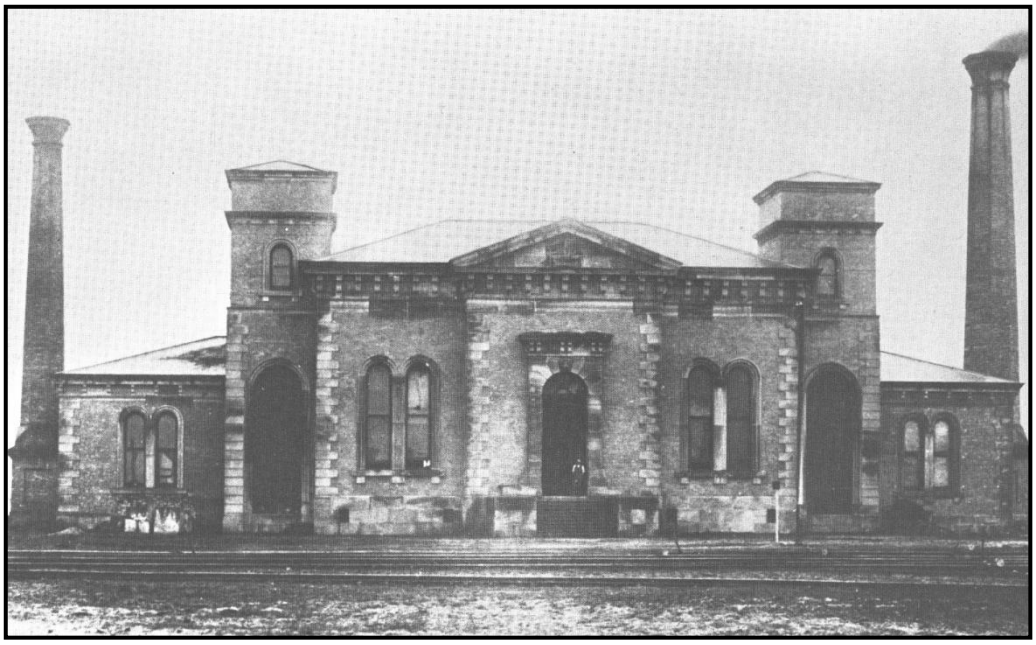

Figure 13. Hydraulic Engine House showing the added boiler room (on the right).

The two asymmetrically sized chimneys have since been demolished.

Newcastle Region Public Library.

[25] J.C, Docherty; Newcastle: The Making of an Australian City, 1983 p8

2.7 ONE OF OUR LIONS

In the Christmas day edition of the Newcastle Morning Herald in 1891, there was recorded high praise for the additions to the building, the new equipment and the Engineer who enabled it all to come together.

> *We give it as our opinion that our experienced and energetic Engineer for Harbours and Rivers will not permit avoidable delay to retard this important addition to the loading and discharging capabilities of the port. Another important improvement in an economic direction has been recently effected by the above-named official at THE HYDRAULIC ENGINE HOUSE, the' exterior of which, since the completion of the new wing during this year, presents a more uniform and imposing appearance.*
>
> *The interior, especially when lit up at night by means of the arc and incandescent lights, with the ponderous and well-kept machinery in rapid motion, is a most pleasing sight. A stranger visiting the port and leaving without having paid a visit to the hydraulic and electric engine house will have missed seeing what the citizens of Newcastle may be justly pardoned for terming "one of our lions," From this building, the machinery in which is going almost incessantly from midnight on the Sunday, to the same hour on the Saturday following the year round (may it still continue its almost ceaseless revolutions) is worked the 13 hydraulic cranes extending for over three quarters of a mile north and south along the dyke, each one of which is capable, should necessity require, of loading a vessel from 2000 to 8000 tons burden, well within twenty four hours.*[26]

Figure 14. The Lions Head keystone, CHEH South Façade (2020).

Terras Landscape Architects

The progressive influence of electricity made its mark at the coal loading facilities in more than just the lighting. Between 1903 and 1907, new Armstrong hydraulic cranes were mounted along the eastern side of The Basin, with these cranes featuring electric motors which enabled them to be moved short distances along rails.[27]

[26] Harbour Improvements, *Newcastle Morning Herald* 25th December 1891 p2
[27] *The Newcastle Morning Herald*, 9 December 1903, p6.

Figure 15. Mobile Hydraulic Cranes at the Basin.

Newcastle University Cultural Collections

Between May 1916 an April 1917 six new *Cowans, Sheldon and Co*. moveable electric cranes were brought into service at the Port which quickly overtook the bulk of the coal loading duties. These were designed by Percy Allan, Public Works Department district engineer and assisted by Orlando Brain, NSWGR Chief Electrical Engineer. The Auxiliary Engine Room was reappropriated as a condenser (battery) room at this time, and a freestanding substation building was erected just north of the Engine House, foreshadowing the complete replacement of hydraulic power at the cranes. The moveable electric cranes were powered by a temporary power plant at the Eastern end of railway land until power was provided by submarine cable from the Zaara Street Substation, completed in 1920.

The moveable and fixed Hydraulic cranes were progressively decommissioned from the 1930's though with some still utilised up until the 1960's. Maintenance on remnant units was increasingly neglected and many were left derelict when they ceased to function. Crane Base 9 was demolished to below the low water mark in the 1950's. A report sent from the Waterfront Group of Unions to the Minister for Transport in 1957 stated that one of the travelling cranes had been out of action for more than two years, two for six months and others for lesser periods.[28]

After World War II, Japan turned their request to Australia to supply the coal needed to power the reconstruction of their country and their industry. This contributed greatly to the increase in demand for coal coming through the Port of Newcastle. The cranes that remained in operation at the port were no longer able to keep up and started to attract derision.

> *'...the port has been brought into such chaos as to make it almost unworkable... All in all it is lamentable and tragic picture. There is not a port in Australia or elsewhere in the world, which could possibly present such an example of ineptitude and neglect.'*[29]

It is a tragedy that "the chief glory of Newcastle" could become "such an example of ineptitude and neglect" in only 75 years.

[28]Cited in Department of Commerce,2005: 3.14
[29] Ibid.

To remedy the situation, the Newstan coal loader came into operation in 1958, its completion having been assisted by private enterprise. It provided immediate relief to the coal loading pressure. Federal Government Funding assisted the next phase of the Port upgrade. Commencing in 1964 and completed in 1967, The Basin Coal Loader replaced all the Hydraulic cranes and the now outdated electric cranes.

In 1967, the last coal loaded by the moveable hydraulic cranes was landed in its vessel, the pipe runs noted no longer to be watertight.[30] With the last of the hydraulic cranes decommissioned, work commenced on stripping out the now redundant equipment from the Hydraulic Engine House. The accumulators had to be cut into pieces to remove them from their towers. Between 2007-20099, the north side additions to the building including the substation were demolished.

Crane bases No. 7 and 8 were fitted with ship's bollards in the 1980's, along with a concrete roadway bridge spanning over base No. 10. Crane base No. 7 was also later surrounded by a concrete "Dolphin" berth as a temporary cruise ship terminal.

Currently standing empty, there is only a small fraction of the original equipment still extant in the Carrington Hydraulic Engine House to date, with one small remnant motor in the generator room, some metal fixtures, gangways and ladders etc mounted to the internal walls, and various pipework and fragments of industrial archaeology extant in the engine room sub-floor cavity.

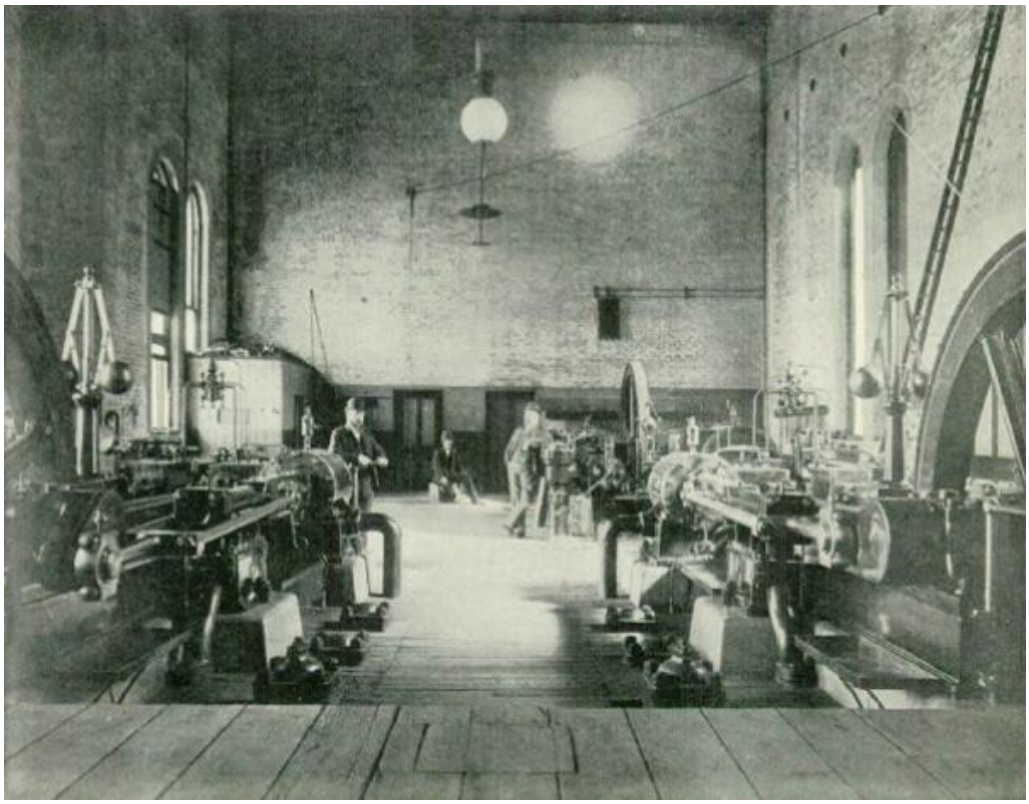

Figure 16. The CHEH Engine Room, complete with its machinery, 1895.

The Town and Country Journal, 18 May 1895, p31.

[30] Damaris Bairstow, '*Hydraulic Power and Coal Loading*', p65 in; SHR Listing.

2.8 CONTEMPORARY CONSERVATION

In 1995, the roof of the building was conserved and recovered in Penrhyn slate, removing earlier asbestos sheeting. Windows, the main doors and some ceiling timbers, originally of red cedar, were conserved or reconstructed in Douglas Fir at this time. The timber roof monitors are conserved and reconstructed; the ceiling of the Auxiliary Engine House is later replaced in plywood after a fire. Protective Perspex covers to the south side windows were also installed around this time.

A large-scale masonry conservation, repair and reconstruction works package was undertaken to the south façade and accumulator towers in 2018-2020, along with the creation of a public plaza to the south side of the building. The building works were designed and documented by *EJE Architecture*, the landscape and Plaza by *Terras Landscape Architects*, and the head contractor for the project was *Stone Mason and Artist* of Sydney. Work included masonry conservation, repair and reconstruction, reconstruction of the accumulator tower roofs and upper brickwork, reconstruction to original details of boiler room windows, removal of termite damaged beams to accumulator towers, plant growth removal and limited cleaning of the facade, repointing, stone repair and addition of lead cappings to the pediment, some cornices and stone details. The design of the public plaza on the south side of the building represented the full scale "blueprint" of the original engine room machinery. Internal and external 3D scanning and archival recording of the building was also undertaken by Airsight Australia. Underpinning of the north-east corner of the building was also undertaken in 2019 to resolve localised settlement in this area.

In 2020, the Port of Newcastle undertook extensive asbestos removal works internally, with all parts of the building (at the time of writing) now clear of asbestos hazard, except for the main engine room. The engine room has been cleaned of asbestos from the ceiling down to the level of the floor grates, but with remnant asbestos material present in the openings of the floor grates and embedded within the sub-floor cavity fabric itself.

In early 2021, a new stage of masonry conservation works to the north, east and west facades has begun, aiming to make the shell of the building weathertight and vermin proof so that future stages of conservation work can be completed on the internal spaces. The 2021 works package has been designed and documented by EJE Architecture, with contractors *Murphys Remedial Builders* of Sydney. The project includes reconstruction of the north generator room window to original details, repointing, stone repair and replacement, addition of lead cappings, lead paint removal and general masonry cleaning. Repair of termite damage to western boiler room roof timbers has also been undertaken, with further termite treatment planned. Other works include protective paint treatment to the existing structural steel in the non-original north side opening, and construction of a lightweight CFC clad infill wall with interpretive artwork to this north façade. This works package is currently due to be completed in November 2021.

3. PHYSICAL CONDITION AND CONTEXT

3.1 THE SITE

The site covers an area of around 7900sq.m. Roughly triangular in shape, the Engine House building sits in the centre of the site, facing slightly east of south. The lot is mostly covered in grass lawns, along with a mulched embankment containing mature fig trees along the street (western) boundary, and a public interpretive plaza to the south side.

3.2 THE BUILDING

The Carrington Hydraulic Engine House, constructed by William H Jennings 1877-78, is a face brick and sandstone structure built originally to house hydraulic engines and machinery used to operate cranes on the adjacent wharfs. The building is monumental in stature, effectively three stories in height although only encompassing a single void internally.

The main facade addresses the south, breakfront and symmetrical in appearance, with a central projecting pedimented portico with stone quoins and detailing. The height of the building is strengthened visually on the south facade with over height window and door openings in painted timber (originally Australian Red Cedar).

The central volume of the building (the engine room), is flanked by two tall accumulator towers, square in plan, and set back slightly from the main facade. The building originally featured two tall square chimney stacks set aside and back from the accumulator towers; these were demolished due to safety concerns in the 1960's. Behind the location of the chimney stacks are the eastern and western boiler rooms, built sequentially after initial construction of the building. Between these a substantial lean-to addition known as the Dynamo Room was also later constructed, and since demolished.

The rear facade of the building shows evidence of where additional lean-to additions have been constructed and removed. These included a battery room and an electrical substation building and workshop (linked to the main building by a covered walkway).

Internally, the engines and hydraulic machinery of the building have long since been removed from the site, although the substantial footings of the equipment still remain.

The Item's State Heritage Register listing provides a comprehensive description of the building's modifications and dates prior to 2018:

https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=5055925

For contemporary works (2018-2021), refer Part 2.8 *CONTEMPORARY CONSERVATION* within this *Statement of Heritage Impact*.

3.2.1 Exterior Photographs

Figure 17. The Carrington Hydraulic Engine House and interpretive public plaza, January 2020.

Terras Landscape Architects

Figure 18. Aerial view, south side interpretive Plaza.

Terras Landscape Architects

Figure 19. Entry to the site from the access point at the corner of Bourke St & Cowper St (2019). The landscape plaza at the front of the building (the area immediately south of the south facade) was constructed during the 2018-2019 phase of works. The temporary fence in this image has since been removed.

Figure 20. CHEH, looking east from pedestrian entry pathway.

Figure 21. The Carrington Hydraulic Engine House, South Façade (2019). This 2018-2019 conservation works focussed on this public face of the building, along with reconstruction of the accumulator tower roofs.

Figure 22. Accumulator tower roofs at the completion of 2018-2019 reconstruction works.

Figure 23. Southeast corner (2019). The plaza was at this time fenced off to prevent unauthorised access prior to its official opening. The fence has since been removed.

Figure 24. CHEH Aerial view, southwest corner, looking east into industrial landscape of the Port of Newcastle.

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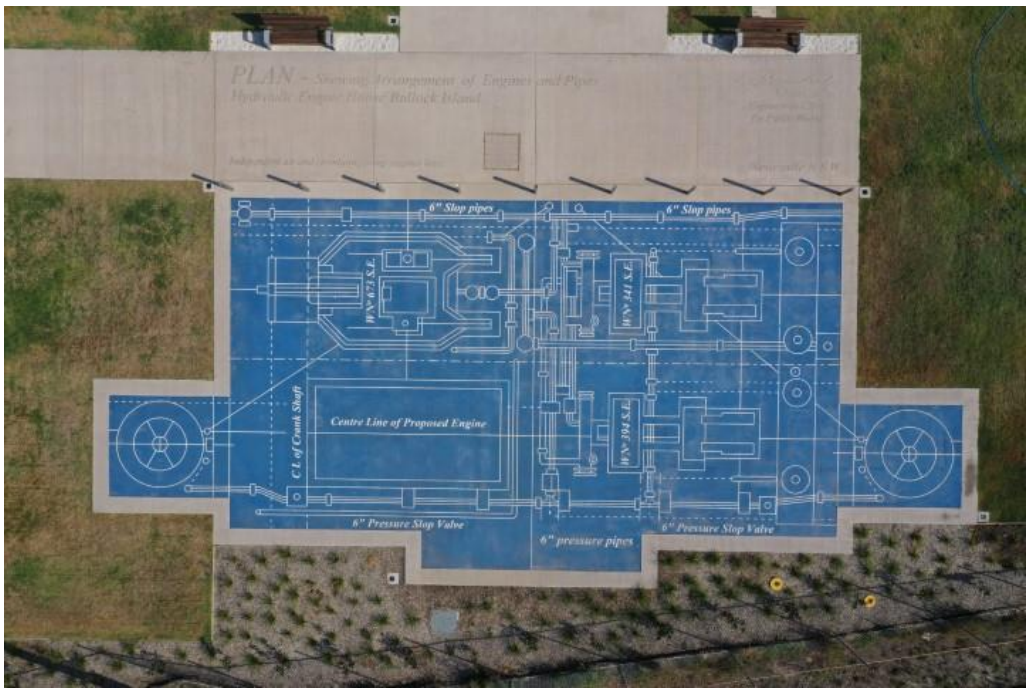

Figure 25. Plan view, interpretive plaza.

Terras Landscape Architects

Figure 26. CHEH North façade (October 2021, part way through Stage 2 Conservation works).

Figure 27. CHEH East façade (October 2021, part way through Stage 2 Conservation works).

Figure 28. CHEH West façade (October 2021, part way through Stage 2 Conservation works).

3.2.2 Interior Photographs

Figure 29. Engine Room 2018, prior to first stages of asbestos removal works, looking west. All openings through to generator room and other rooms are currently sealed temporarily to encapsulate asbestos hazard within the Engine Room.

Airsight Australia

Figure 30. Engine Room, looking south across lowered floor section.

Airsight Australia

Figure 31. Engine Room, looking north east, large opening through to generator room (currently sealed temporarily to encapsulate asbestos hazard).

Airsight Australia

Figure 32. Engine Room, looking north, large concrete engine footings extant.

Airsight Australia

Figure 33. Engine Room, looking North.

Airsight Australia

Figure 34. Engine Room, looking east.

Airsight Australia

Figure 35. Engine Room – looking South.

Airsight Australia

Figure 36. Engine Room – Detail, Cast Iron Floor grates.

Figure 37. Generator Room, looking west, (2021).

Figure 38. Generator Room, looking North at the west end (during works 2021)

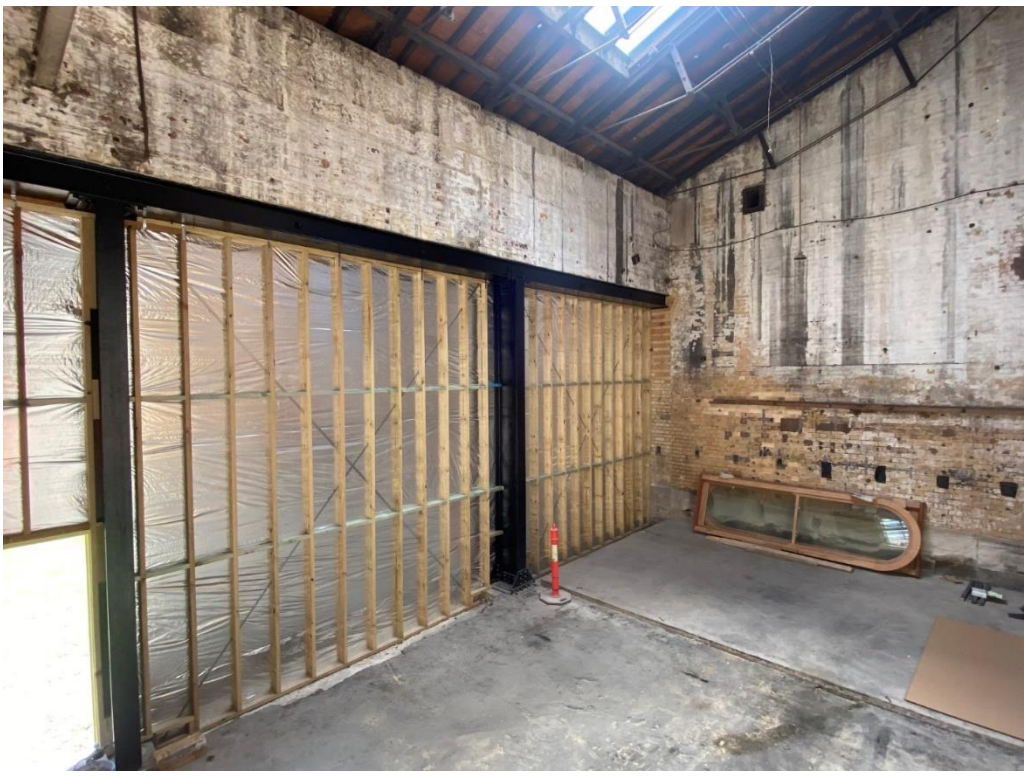

Figure 39. Generator Room, lightweight infill wall and treated steelwork. Operable windows ready for installation.

Figure 40. Generator Room, looking East (during works 2021).

Figure 41. Generator Room, looking South (during works 2021).

Figure 42. Generator Room, looking north-west (during works 2021).

3.2.3 Boiler Room 1

Figure 43. Boiler Room 1 – Looking south, (during works 2021).

Figure 44. Boiler Room 1 – Looking west, (during works 2021).

Figure 45. Boiler Room 1 – Looking north, (during works 2021).

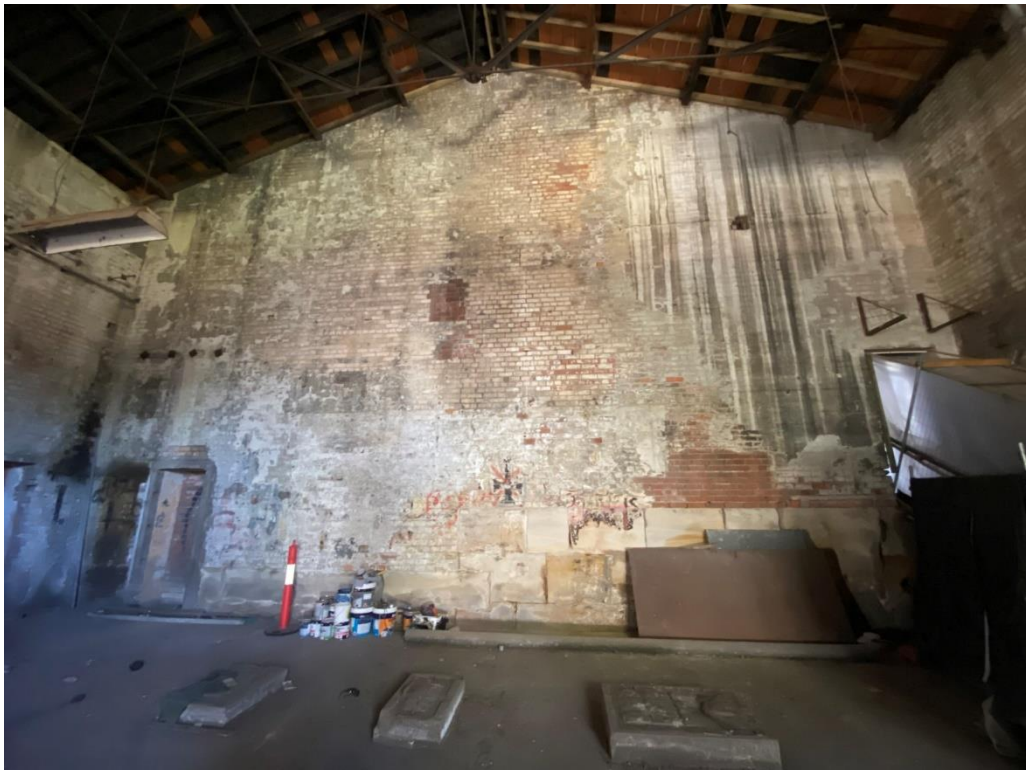

Figure 46. Boiler Room 1 – Looking east, (during works 2021).

3.2.4 Boiler Room 2

Figure 47. Boiler Room 2 – Looking north, (during works 2021).

Figure 48. Boiler Room 2 – Looking east to window, (during works 2021).

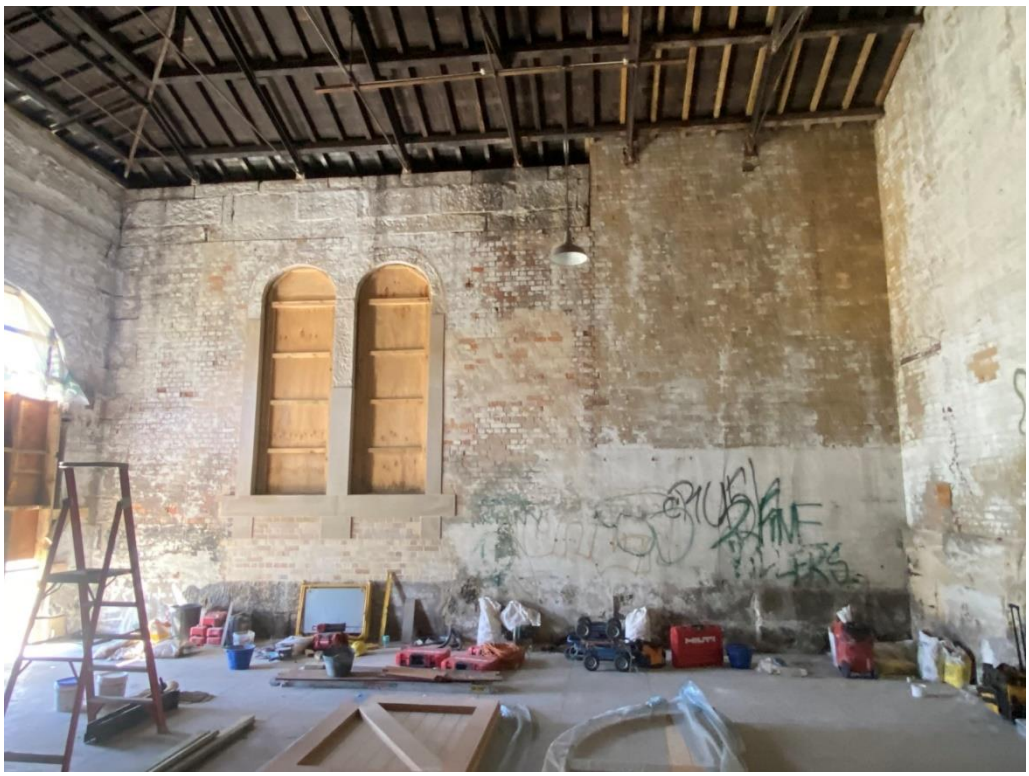

Figure 49, Boiler Room 2 – Looking south, (during works 2021).

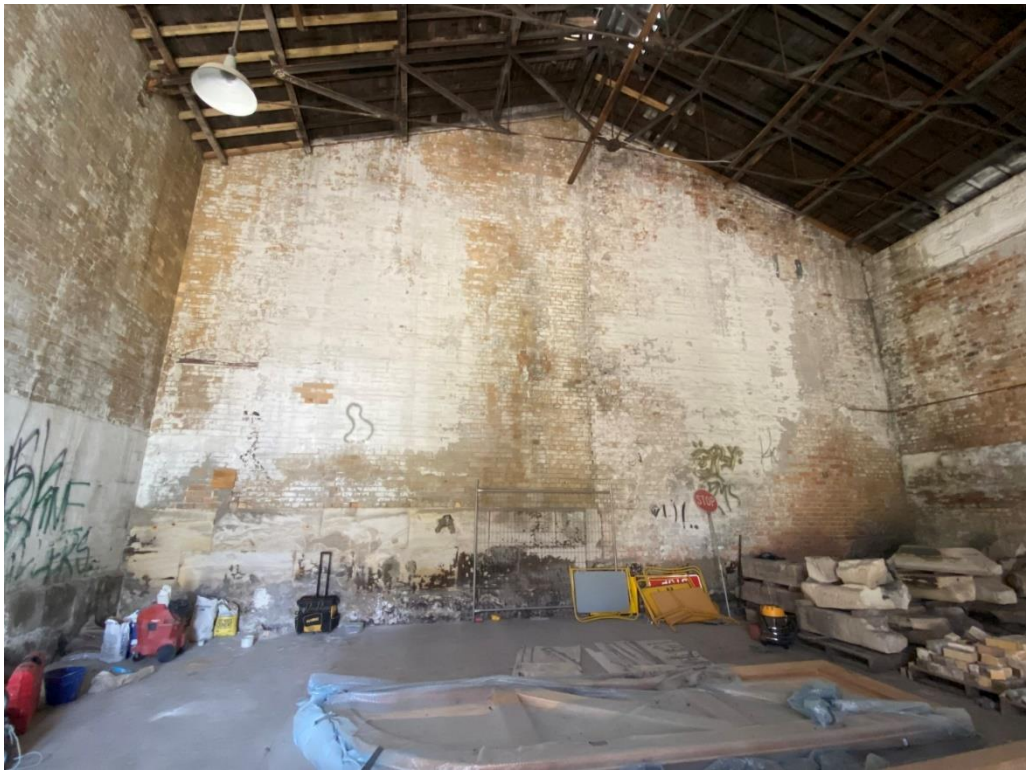

Figure 50. Boiler Room 2 – Looking north, (during works 2021).

Figure 51. Engine Room sub-floor cavity 2020.

Note the significant corrosion to the column base (typical to all columns).

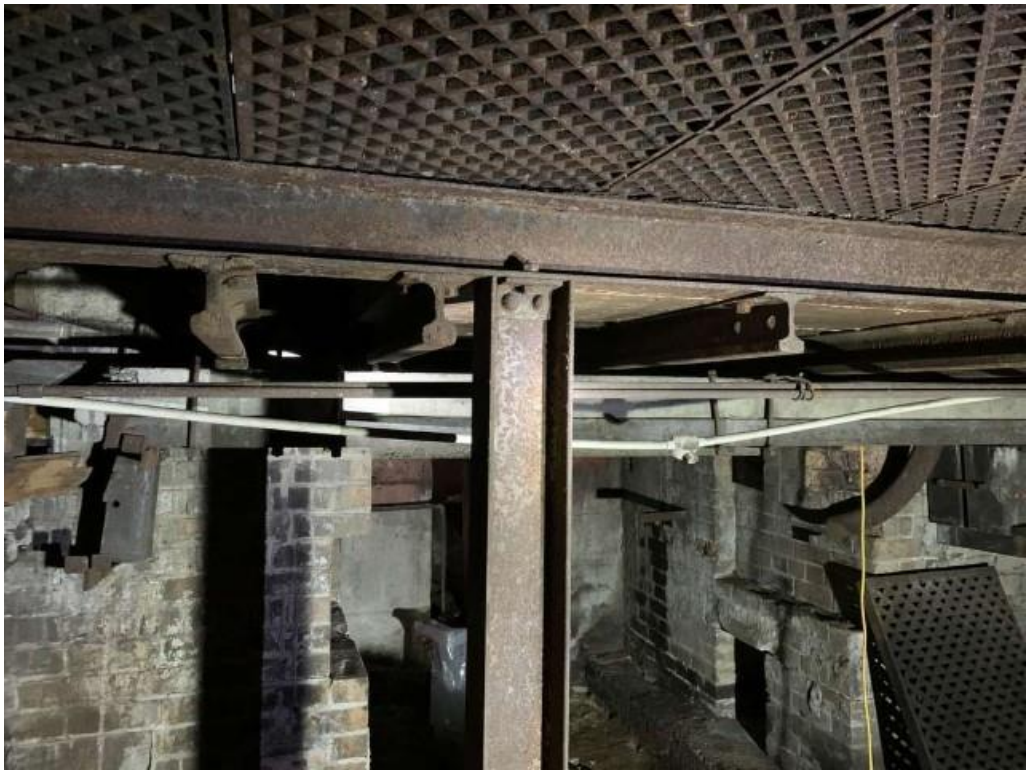

Figure 52. Engine Room sub-floor cavity 2020. Column and framing to cast iron floor grates.

Figure 53. Engine Room sub-floor cavity 2020. Central sump pit with drains to exterior.

Figure 54. Engine Room sub-floor cavity. File embedded within floor substrate.

3.3 CURRENT USE

The Carrington Hydraulic Engine House is currently vacant and the main Engine Room sealed off from human access due to an asbestos hazard present within this room. The public plaza is open and in use for casual public visitors.

3.4 CONDITION

The condition of the exterior facades and accumulator towers is good, having been the subject of two conservation projects during 2018-2019 and 2021-2021.

Internally, the condition of the building fabric is fair to poor with evidence of salt damage, cracking and general deterioration to the sandstone and brickwork. Asbestos removal works have remediated this hazardous material risk within all internal rooms of the building except the main Engine Room, where Asbestos risk is still known to be present associated with the floor grates and in the sub-floor cavity.

The landscape curtilage of the site is well maintained and presentable.

3.5 SURROUNDING CONTEXT

The Carrington Hydraulic Engine House is located at the apex of The Basin, on the north side of Newcastle Harbour. The building's orientation is aligned to Honeysuckle and is prominently viewed from this hospitality precinct to the south across the water. The building is separated from the water however by rail lines and wharf frontage directly to the south.

The building is physically removed from any other building within the Port of Newcastle site, and originally would have been one of the largest structures in the area, although in today's context it is dwarfed by the infrastructure of the port such as the silos and coal loaders.

The building is situated adjacent to the main personnel entry to the Port of Newcastle site with an empty area of lawn between the building and this roadway.

Figure 55. Looking south from the Engine House front steps, railway and wharf infrastructure surround the subject site on its south and eastern sides.

4. HERITAGE SIGNIFICANCE

The NSW heritage assessment criteria encompass four generic values in the Australian ICOMOS *Burra Charter 2013*: historical significance; aesthetic significance; scientific significance; and social significance.

These criteria will be used in assessing heritage significance of the place.

The basis of assessment used in this report is the methodology and terminology of the *Burra Charter 2013*; James Semple Kerr, *The Conservation Plan: A Guide to the Preparation of Conservation Plans for Places of European Cultural Significance*;[31] and the criteria promulgated by the Heritage Branch of the NSW Office of Environment and Heritage. The *Burra Charter 2013*, Article 26, 26.1, states that:

> *Work on a place should be preceded by studies to understand the place which should include analysis of physical, documentary, oral and other evidence, drawing on appropriate knowledge, skills and disciplines.*

Places and items of significance are those which permit an understanding of the past and enrich the present, allowing heritage values to be interpreted and re-interpreted by current and future generations.

The significance of the place is determined by the analysis and assessment of the documentary, oral and physical evidence presented in the previous sections of this document. An understanding of significance allows decisions to be made about the future management of the place. It is important that such decisions do not endanger its cultural significance.

The *NSW Heritage Manual*, prepared by the former NSW Heritage Branch and Department of Urban Affairs and Planning, outlines the four broad criteria and processes for assessing the nature of heritage significance, along with two added criteria for assessing comparative significance of an item.

Heritage Significance Criteria

The NSW assessment criteria listed below encompass the following four values of significance:

- Historical significance
- Aesthetic significance
- Research/technical significance
- Social significance

[31] (7thed). Burwood: Australia ICOMOS, 2013.

Listed below are the relevant Heritage Assessment Criteria identified in the Heritage Act:

Criterion (a) An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (b) An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

Criterion (c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

Criterion (d) An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.

Criterion (e) An item has the 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).

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).

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 places; or cultural or natural environments).

An Assessment of Significance requires that a level of significance be determined for the place. The detailed analysis uses the levels of significance below:

LOCAL	Of significance to the local government area.
STATE	Of significance to the people of NSW.
NATIONAL	Exhibiting a high degree of significance, interpretability to the people of Australia.

4.1 ANALYSIS OF SIGNIFICANCE

The following Analysis of Significance is quoted directly from the State Heritage Register. It was prepared when the Carrington Hydraulic Engine House and Crane Bases 7, 8, 9 & 10 were placed on the register as recently as 2017 and is the product of extensive research and effort. EJE Heritage considers it to be an accurate and reliable summary of the significance of the combined item.

Historical Significance

Criterion (a) An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance for their historical values. As relics of an industrial wonder of their age, they demonstrate ninety years of the development of port infrastructure in support of coal exports, one of the trades upon which the economic development of NSW depends. The first of their kind in Australia, they demonstrate the significance of the port of Newcastle to the colonial economy. They are intimately associated with the nineteenth century Public Works Department scheme for the transformation of Port Hunter from a swampy estuary into the largest coal port of the Southern Hemisphere, and a mainstay of the NSW coal mining industry. While the Engine House has been altered through the removal of plant, and three of the crane bases have been reused, they otherwise remain sufficiently intact to be fully legible to diverse audiences. The crane bases are associated with the original order for four hydraulic cranes, and are readily distinguished by their square shape.

Criterion (b) An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance in providing evidence as to the progress of the architectural and engineering professions in NSW between the 1870s and the 1960s. In demonstrating the introduction into NSW of hydraulic coal loading technology they are strongly associated with engineers Edward Orpen Moriarty and Cecil Darley, and the Harbours and Rivers Branch of the Department of Public Works; with engineer John Whitton of the NSWGR; with Harbours and Rivers engineer Percy Allan and NSWGR Chief Electrical Engineer Orlando Brain; potentially with James Barnet and Edmund Spencer of the Colonial Architect's Branch of the PWD; and especially with Sir W.G. Armstrong and Co. Ltd (Engine House and Crane Bases) and Cowans, Sheldon and Co. Ltd (Auxiliary Engine House/dynamo room), engineering companies of world importance. They also have a special association with the public and private sector workers who constructed, operated and maintained the Bullock Island coal handling complex.

Aesthetic And Technical Significance

Criterion (c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance for their aesthetic and technical values. They are associated with high levels of creative and technical achievement, both in their ability to house the state-of-the art machinery and equipment necessary for the development and transmission of hydraulic (and later electric) power and in their built form. Although the Engine House now lacks its chimneys it remains aesthetically distinctive, particularly with regard to its architectural elements, size and materials. It exemplifies an industrial application of the Victorian Academic Free Classical style of architecture with some Victorian Romanesque features. Situated near the apex of The Basin and visible across a wide area, the Engine House is a landmark of the second-largest city in NSW. Despite their re-use for other port-related purposes, Crane Bases Nos. 7, 8, 9 and 10 remain aesthetically and technically distinctive in a NSW context, and with one exception are also highly visible.

Social Significance

Criterion (d) ***An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons***.

Not Applicable

Research Significance

Criterion (e) ***An item has the 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).***

The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance for their potential to yield further scientific and archaeological information as to Armstrong hydraulic plant in a maritime setting. Information concerning the siting and operation of engines, chimneys and boilers is provided by footings, sub-floor voids, underground pipe runs and the like. The design and fabric of the building includes substantial load-bearing masonry and long-span metal trusses, and illustrates design techniques for the housing of nineteenth century hydraulic machinery and engines. The Engine House is of state heritage significance, also, in its size and setting, and in the esteem in which it is held by contemporary NSW engineers. The design and fabric of Crane Bases Nos. 7, 8, 9 and 10 demonstrate the nature and application of nineteenth century hydraulic crane technology, and are of state heritage significance because of their unusual square shape. Both the Engine House and Crane Bases Nos. 7, 8, 9 and 10, which along with the railway complex and The Dyke demonstrate the nineteenth century transformation of Port Hunter by the public sector, and constitute benchmarks for understanding the generation and application of hydraulic power in colonial NSW.

Rarity Significance

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).***

The Hydraulic Engine House is of state heritage significance as one of only two nineteenth century hydraulic power facilities extant in NSW, and as the only one related to coal handling. As the only example of its type in NSW, it demonstrates defunct processes and techniques of exceptional historical and technical interest. Hydraulic Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance as the only examples of their type in NSW, and provide rare evidence of nineteenth century coal handling via Armstrong hydraulic cranes. Their square bases, the result of their being supported by similarly-shaped caissons, are unusual. They are intimately associated with the establishment of the Engine House, and demonstrate a defunct process formerly of great importance to the economy and society of NSW. The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 constitute at both state and national levels the most complete example of a coal loading system predating the introduction of conveyor belt-based loading technology.

Representative Significance

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 places; or cultural or natural environments).***

The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance as fine examples of their type, exemplifying the principal characteristics of hydraulic and electric coal loading technology as developed and applied by Sir W.G. Armstrong and Co. Ltd, and Cowans, Sheldon and Co. Ltd, companies of world importance. As unique examples of their type in a NSW and Australian context, they are representative of diverse applications of the hydraulic system, and are outstanding in their setting and size. Situated near The Dyke and The Basin, they demonstrate the nineteenth century transformation of Port Hunter from a swampy estuary into the largest coal port of the Southern Hemisphere. They are of state heritage significance in representing a significant variation in hydraulic crane technology as applied in NSW, and form part of a group collectively illustrating the early application and progress of hydraulic technology.

4.2 STATEMENT OF SIGNIFICANCE

As per the Item's State Heritage Register listing:

> *The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10, Carrington, are of state heritage significance for their strong association with the port-related application of hydraulic and electrical power in NSW. As relics of an industrial wonder of their age, the Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 form part of a group collectively illustrating the early application and progress of technologies historically important in the economic development of NSW. They are specially associated with the development of coal handling in Port Hunter, the largest coal port in the Southern Hemisphere and one of great importance in the development of the NSW coal industry. The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are the only examples of their type in NSW, and at both state and national levels constitute the most complete example of a coal loading system predating the introduction of conveyor belt-based loading technology.*
>
> *The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance for their association with Sir W.G. Armstrong and Company Ltd. and Cowans, Sheldon and Co. Ltd, engineering companies of world importance; with NSW government engineers Edward Orpen Moriarty; Cecil Darley; John Whitton; Percy Allan and Orlando Brain, and potentially with NSW government architect James Barnet and Edmund Spencer, one of his assistants; and with the public and private sector workers who constructed, operated and maintained the Bullock Island coal handling complex. Although some of the fabric has been depleted or removed over time, both the Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance for their design, materials and setting. They may also be of state heritage significance as constituting landmarks of the public sector-driven transformation of Port Hunter from a swampy estuary to a deep water harbour of national importance. The Hydraulic Engine House and Crane Bases Nos. 7, 8, 9 and 10 are of state heritage significance in yielding scientific and archaeological information as to the nineteenth century transfer of hydraulic technology from the UK to NSW.*
>
> *Date significance updated: 21 Aug 17.*[32]

[32]https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=5055925

5. PROPOSED WORKS

5.1 ASBESTOS HAZARD BACKGROUND

An asbestos hazard is currently present within the floor grates and sub-floor cavity floor surface of the main Engine Room of the building, which prevents any human access to the space without appropriate PPE and decontamination procedures in place. Temporary seals are in place around all openings in this room. The building thus is unable to be used for any purpose while this hazard remains. Please refer *Options Analysis* report submitted with this application for further details of the asbestos hazard.

An additional hazard is the poor structural integrity of the original steel floor framing in this room, with almost all columns supporting the cast-iron grates being corroded through more than 90% of their sectional area at their base. The main Engine Room floor section is as such non-trafficable in its current condition, and at extreme risk of collapse with any movement or interventions in the space.

Figure 56. The floor of the Carrington Hydraulic Engine House main Engine Room is partially covered in original cast-iron floor grates suspended above a deep cavity on a steel column/beam structure. The grates are exceptionally heavy (not able to be lifted safety without a hoist).

Figure 57. The cast iron floor grates present an asbestos hazard, with their porous surface containing remnant fibres despite previous cleaning in the room. Note also the large cavities present across parts of the floor. The project hygienist has described that it would be implausible to fully clean the grates of asbestos in-situ, given the myriad openings and porous surface.

Figure 58. A very deep sub-floor cavity is present below the grates, which has been cleaned of asbestos as best as possible.

Figure 59. The solidified base surface however presents an asbestos hazard, with detectable asbestos physically embedded within the surface material.

Figure 60. Typical photo of steel columns supporting the cast iron grates. All are suffering extreme corrosion at their base with over 90% section loss, meaning that the grates above are non-trafficable and at significant risk of collapse.

5.2 PROPOSED ENGINE ROOM ASBESTOS ENCAPSULATION

A systematic approach has been undertaken for selection of a system to ameliorate the asbestos hazard in the Engine Room, as a step to make the building ready for a future re-use. Analysis of options has considered various criteria including for example efficacy of the asbestos removal, safety and cost, as well as heritage impact on the building. Refer separate *Options Analysis* Report for full details.

Following the analysis process, a proposal for *encapsulation* of the asbestos hazard underneath a floating concrete slab has been selected as the best overall solution to the current issues the building faces (as opposed to removal of the asbestos material from the site entirely). The proposed concrete slab also vastly improves the useability and flexibility of the room for an adaptive re-use as it provides a safe, level and trafficable floor surface, which the extant building does not currently have. (Regardless of the asbestos hazard, a new floor surface would likely need to be provided in the space for almost any new use).

The proposed scope of work of the asbestos encapsulation project within the Engine Room is thus described roughly chronologically as follows. We note this is the assumed methodology, with the actual procedure being the responsibility of the Contractor to confirm. Refer Architectural Drawing package for full design and proposal details.

- Install temporary decontamination unit through sealed personelle entrance to Engine Room (location to be confirmed by the contractor, previously the unit has been located within the western boiler room). All construction works are to be undertaken via access through this unit until asbestos clearance of the room is given by the project's hygeinist.
- Install temporary propping to corroded steel floor structure to provide safe working environment in sub floor.
- Install new cast concrete pad footings around the corroded base of all existing corroded steel floor columns (15x total) as per structural engineer's documentation as permanent supports. New concrete pad footings are based on the size of existing original concrete pad footings within the subfloor for continuity. The modern concrete colour will be identifiable visually from the 1877 concrete plinths.
- With the floor structure made safe, apply permanent clear PVA spray seal to all extant floor grates and sub-floor base in-situ to prevent spread of the asbestos contaminated dust during the works and provide a back-up encapsulation system to the hazard.
- Undertake select elements of demolition and clean out within the sub-floor and existing floor structure to facilitate the new slab & services, including but not limited to:
    - Clear out light non-original debris from base of accumulator towers, shift elements of heavy industrial debris within the sub-floor to facilitate new structure where required (heavy debris remains in sub-floor cavity).
    - Deconstruction/trimming of existing steel columns, pipes and beams where they would intersect with the new proposed slab and ramps. All steel fabric proposed to be deconstructed is to be placed into the sub-floor cavity for permanent storage.
    - Demolish/ existing loose timber beams and wall plates which are rotten or intersect with the new proposed slab and ramps. All timber fabric demolish is to be removed from the site to avoid a future termite problem.
    - Demolish/trim down some masonry fabric, including sub-floor dwarf walls, where they would intersect with the new slab & ramps. Bricks to be retained and re-used in the works where possible.
    - Enlarge existing vent opens to south-side plaza to facilitate new HEPA filters (see later). Decontamination procedures to be out in place during this process which breaches the sealed zone of the Engine Room.
    - Carefully lift up cast iron grates within entry door niche where they intersect with the proposed slab, use several to replace grates lost/broken across other parts of the floor, remove a number of panels for full asbestos decontamination off site (and re-use in the works), place the remaining panels into the floor cavity for long term storage.
    - Remove existing handrail near sunken floor, decontaminate off site for reinstallation in original position above the new slab.

    - Remove internal degraded downpipes, patch openings, place metal downpipes in cavity for long term storage, dispose of PVC components.
    - Grind down one section of raised concrete plinth near concrete floor and trim down one section of raised masonry cross wall in front of east accumulator tower doorway where they would protrude above the new floor slab.
    - Demolish contemporary lightweight timber gangway across floor.
- Install new services to sub-floor cavity including:
    - Long-life industrial LED feature lighting (to highlight view of cavity through new glass floor panels).
    - HEPA grade mechanical air exhaust system to sub-floor cavity through two of the existing four sub-floor vents across the building's south façade. The purpose of the mechanical system is to prevent issues with moisture build up in the sealed cavity (short term such as condensation on the glass viewing panels or long term such as corrosion of steel elements). The filter system has been designed to allow servicing and replacement of filters from the outside of the building, accessed via the vent openings.
    - 9x "Floor Box" electrical outlets within the proposed floor slab, each with multiple conduits and draw wires allowing the provision for 240v power outlets, three-phase power outlets, data and comms cabling. The purpose of these floor boxes is to put in place the infrastructure that allows maximum flexibility for a future user of the Engine Room without the need to access the contaminated cavity.
    - 3x 100mm/110mm future services conduits running between an existing opening in the sunken floor section of the Engine Room, and the (non-contaminated) base of the eastern accumulator tower. These pipes are sized to allow future connections of trade waste, water, gas and further electrical connections if required, without need to access the sub-floor cavity.
- As the building is not currently connected to mains power, the mechanical ventilation system and sub-floor lights are proposed to be semi-permanently powered by a new 2kw Solar PV array, proposed to be located on the building's north roof at its east end. This location has been chosen as it is of minimal visual impact, seen mainly from within the Port of Newcastle site and not from any key vistas of the building from the public realm. The system could be removed if mains power is installed to the building in future.
- A new semi-permanent main switch board, solar inverter and battery system are proposed to be wall mounted in the base of the eastern accumulator tower. An existing penetration through this wall into the sub-floor cavity will accept most of the proposed services conduits, which will then be sealed around. The equipment is to be mounted to the wall lower than the floor level of the engine room, so that a future level floor structure could be placed over the top in the tower without affecting the services (not part of this scope of works). These services could be removed or relocated in the future if the building is connected to mains power, but will adequately run the ventilation system and be able to demonstrate the function of the sub-floor lighting in the meantime.
- Create an air-tight seal around the walls of the sub-floor cavity to ensure encapsulation of the asbestos hazard, sealing masonry openings with equivalent brick, sandstone or mortar, and sealing pipe openings with a permanent flexible mastic seal.
- Create 2x new fully sealing and lockable maintenance access hatches to the sub-floor area within the two existing sub-floor air vents that are not to be occupied by the mechanical ventilation units. Create custom replica steel grilles to the hatches and the mechanical ventilation units based on design of original 1877 vent grilles (not extant).
- Install new 150mm concrete floor slab across engine room, air-sealed at all edges, supported on permanent formwork as per structural engineer's details. The floor slab is designed for a 5kPa live load and 2.5kPa SDL for future flexibility in uses. The slab includes 3x trafficable glass viewing windows through to points of interest in the subfloor (two of typical cast iron grates, one of embedded historic file in sub-floor, large cavity opening and concrete engine buttress), all to be illuminated with feature lighting.
- Apply metallic penetrating stain finish to concrete floor in pattern to interpret the location of concrete engine buttress and masonry cross walls below the slab at 1:1 scale. This interpretation method continues the theme of the existing south side public plaza which represents the original hydraulic layout of the Engine Room at 1:1 scale.

- Reinstate decontaminated floor grates to original position above slab in entry niche with a glass cover plate over, and decontaminated handrail to original position beside sunken floor. Note that grates/glass will be aligned to give flush transition at the door threshold.
- Construct new handrails to ramps and stairway (see part **Error! Reference source not found. Error! Reference source not found.** upcoming).
- Specialist cleaning of internal surfaces of Engine Room (now isolated form the subfloor) with non-abrasive methods, and obtain hazmat clearance from project hygienist.
- Remove decontamination unit and all temporary asbestos seals from the Engine Room.
- Construct temporary 1000mm lightweight timber barriers at existing openings around room (such as large opening through to Generator Room) to prevent fall hazard.

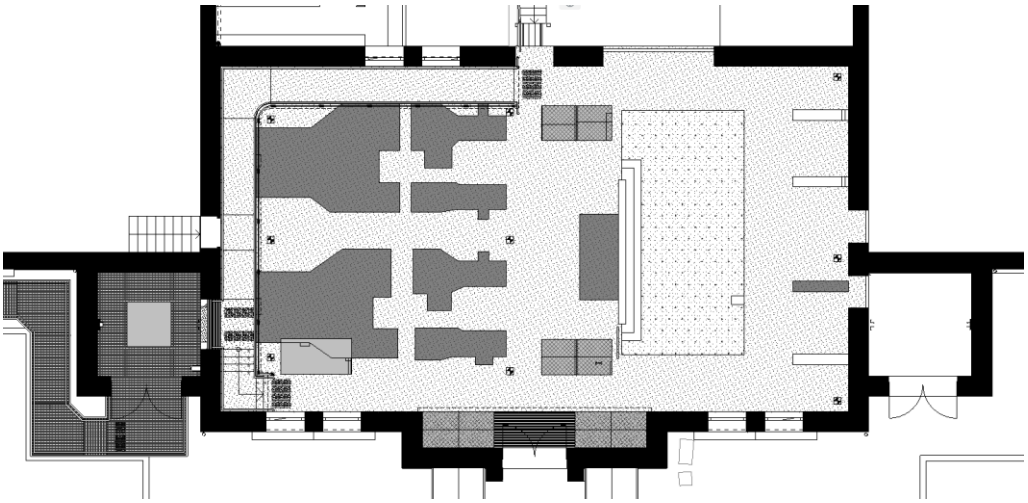

Figure 61. Proposed concrete floor slab within CHEH Engine Room – Refer Architectural Documentation for full design notes.

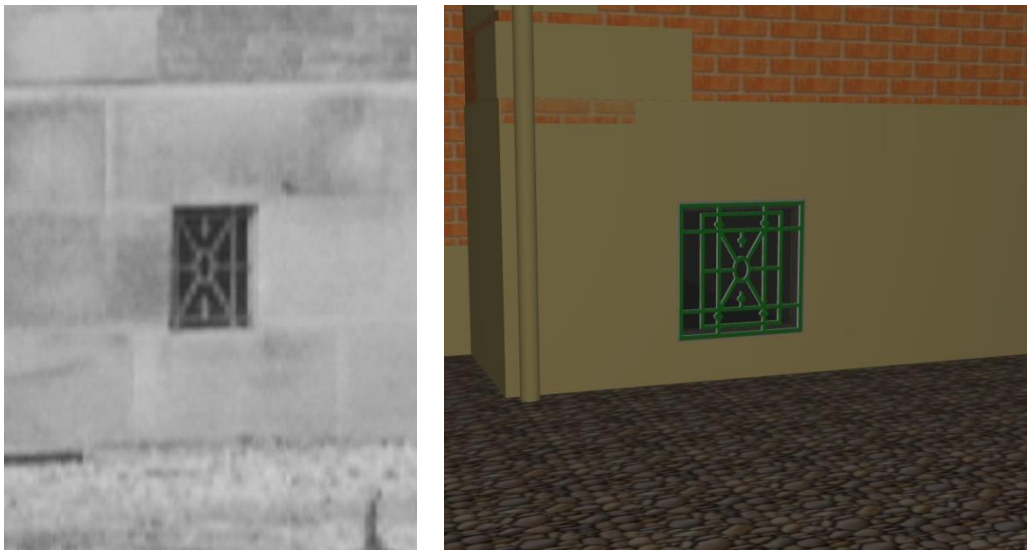

Figure 62. CHEH Original 1877 sub-floor vent grille (left) and proposed replica vent to be reinstated in the same position (right). (Colours/materials in the proposed are not indicative of reality). Note that the proportion of the proposed vent has changed to accommodate the dimensions of the mechanical ventilation assembly (no adequate system could be developed that fitting within the width of the original vent opening). Note also that the ground level of the building been filled considerably since its original construction, as the proposed vent is located in the same stone course as the original, though it appears lower to the ground.

University of Newcastle Special Collections (Left) / EJE Heritage (Right)

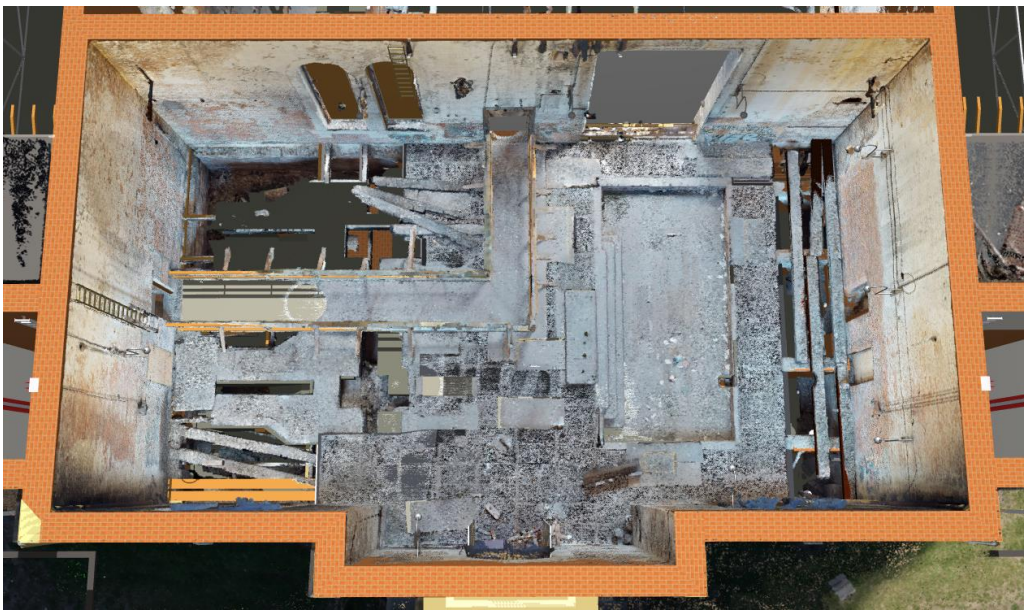

Figure 63. Existing CHEH Engine Room, birds-eye view with roof removed, 3D Architectural Model /Point-Cloud scan. The floor of the Engine Room is non-trafficable given the corroded structure below, inaccessible given the asbestos hazard and has large openings through to the subfloor.

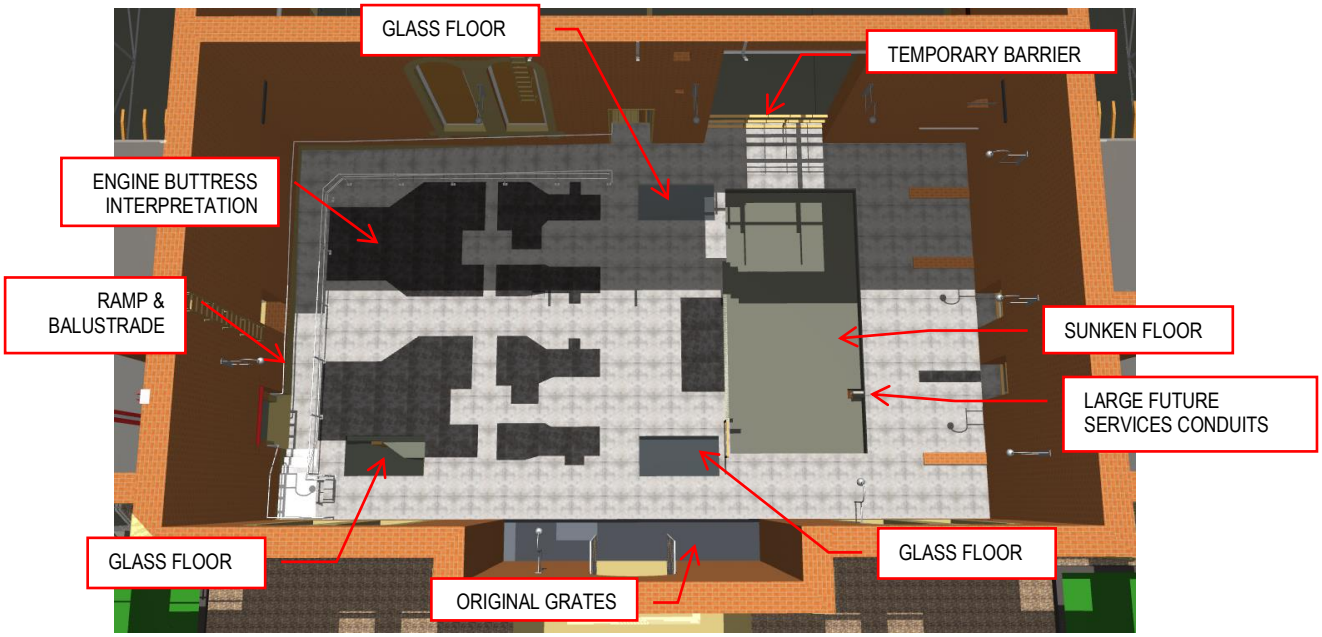

Figure 64. Proposed CHEH Engine Room, birds-eye view with roof removed, 3D Architectural Model. (Colours/materials in the image are not indicative of reality). The new floor slab provides a level floor surface and encapsulates the asbestos hazard below. Engine buttresses are interpreted, and glass floor panels provide a view to the subfloor. Original grates are reinstalled in the door niche, and the sunken floor section is left in place to provide options for a future fitout.

Figure 65. Existing CHEH Engine Room, perspective view looking east, 3D Architectural Model /Point-Cloud scan. Many large openings are present across the floor plate, loose timber beams and panels scatter the floor, and a lightweight contemporary timber walkway spans across the non-trafficable floor structure.

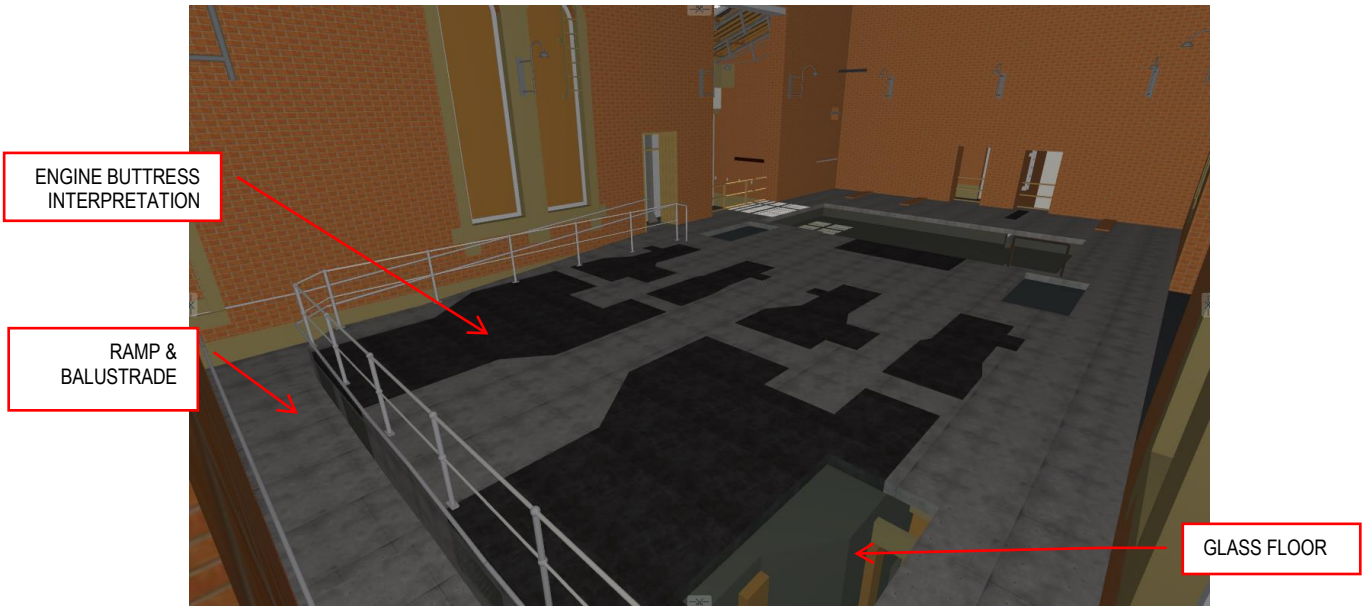

Figure 66. Proposed CHEH Engine Room, perspective view looking east, 3D Architectural Model. (Colours/materials in the image are not indicative of reality). The level floor structure with in-built conduits for future services allows flexibility for many uses.

5.3 ACCESSIBILITY & DDA BACKGROUND

The existing Engine Room Floor Level is approximately 1.47m above the exterior ground level (at the base of the front stairs), and 1.67m above the interior existing floor level of the Generator Room. Existing entry points to the Engine Room (when not sealed off by the temporary asbestos barriers) is by staircases at the front (south) plaza, within the western Boiler Room, or within the Generator Room. No disabled access is hence available to the Engine Room. Note that the introduction of the proposed concrete floor slab within the Engine Room will raise these levels a further 15cm.

While the future use of the Engine House is unknown, it would be legislatively obligatory for any future tenant to provide access to any parts of the building used for a public or commercial purpose compliant to AS1428.1 2021 *Design for Access and Mobility* and the *Disability Discrimination Act 1992*. It is safely assumed that as the largest, most ornamented and grandiose part of the building, the Engine Room would be the most attractive space within the Engine House for a tenant to re-use for such a purpose, hence disabled access will likely one day need to be provided in some form.

While the proposal for the new floor slab within the Engine Room was being developed, the project design team considered multiple options for accessible entries that could be implemented within the confines of the building, and whether they would be most practical to incorporate now or leave for a future date. A summary of these options, pro's and con's is included following:

5.3.1 Stair Climber – Front Entry

Description: A rail mounted single seat stair climber could be installed to the existing sandstone staircase off the front plaza of the building.

Pro's:
- Direct and simple access into the building for wheelchair/ambulant users.
- Economical for proponent.
- Simple installation & potentially reversible.
- Does not need to be installed in conjunction with slab works.

Con's:
- Not user friendly, does not allow access for users with prams, deliveries with trolleys etc. Does not allow solo wheelchair user to access the building (chair needs to be lifted upstairs).
- Visual impact on significant central front portico of the heritage building.
- Vandal target.
- Exposed location for mechanical equipment, maintenance issues.
- Conflict with existing front doors (there is a step at the door threshold and another up into the new slab). How does the rail get through the doors, up the threshold and up onto the new slab internally?

Conclusion: Implausible

5.3.2 Stair Climber – Internal

Description: As per above, but to an internal staircase (Boiler Room or Generator Room

Pro's:
- Economical for proponent.
- Simple installation & potentially reversible.
- Does not need to be installed in conjunction with slab works.

Con's:
- As above, (sans exposed location).
- Conflict with DDA and not user friendly as not located at primary entry point (south façade).

Conclusion: Implausible

5.3.3 Passenger Lift – Accumulator Tower

Description: A custom constructed passenger lift could be created within the base of the western accumulator tower, this could be an open platform or enclosed car.

Pro's:
- Interesting and experiential for users.
- User friendly, and functional for a wide variety of users.
- Hydraulic lift would have sympathetic historical connotations.
- Does not need to be installed in conjunction with slab works.

Con's:
- Expensive installation & ongoing maintenance
- Accumulator Tower existing door threshold is approx. 0.65m above exterior ground level – to cut down the doorway would have significant visual/physical impact on the front façade of the building and original fabric.
- Problematic integration of existing 7m high accumulator tower timber hinged doors with the lift car doors.
- Building is not connected to mains power.

Conclusion: Possible, but not preferable given significant cost and heritage impact.

5.3.4 Passenger Lift – Internal

Description: A more standard format passenger lift or platform lift could be installed within the building's interior, through an existing opening such as between the Generator Room and Engine Room.

Pro's:
- Relatively simple installation & reversible
- Hydraulic lift would have sympathetic historical connotations.
- No visual impact to the building exterior.
- Does not need to be installed in conjunction with slab works.

Con's:
- Expensive installation & ongoing maintenance (less than custom lift).
- Conflict with DDA, not located at primary entry point (south façade).
- Building is not connected to mains power.

Conclusion: Possible, but compliance with DDA would depend on future tenant's design scheme for use of the building – main patron entry would need to be near the lift, NOT via the south plaza and main front doors.

5.3.5 Pedestrian Ramp - Internal

Description: A compliant 1:14 grade pedestrian ramp could be installed within the building, between the Boiler Room or Generator Room floor level and the Engine Room floor level,

Pro's:
- Simple installation & reversible (if utilising existing openings).
- User friendly, and functional for a wide variety of users.
- Economic solution, minimal maintenance.
- No requirement for power.

Con's:
- 25m compliant grade ramp length + landings take up an inordinate amount of space within the building, very difficult to ensure complying design.
- Reduces flexibility for future fitout/ use
- Conflict with DDA, not located at primary entry point (south façade).

Conclusion: Implausible, given amount of space required to achieve compliant length/grade.

5.3.6 Pedestrian Ramp – External: Front Doors

Description: A compliant 1:14 grade pedestrian ramp could be installed to the exterior of the building, leading to the front door entry at the south façade.

Pro's:
- Simple installation
- User friendly, and functional for a wide variety of users.
- Economic solution, minimal maintenance.
- No requirement for power.

Con's:
- Unacceptable visual/physical impact on significant central front portico of the heritage building.
- Conflict with existing front doors (there is a step at the door threshold and another up into the new slab). How does the ramp get inside the building?
- Conflict with large sandstone buttresses on either side of original entry stairs, cut through or go over?

Conclusion: Implausible, ineffective at front door threshold and unacceptably impactful on heritage significance.

5.3.7 Pedestrian Ramp – External/Internal: Western Accumulator Tower

Description: A compliant 1:14 grade pedestrian ramp could be installed partly externally and partly internally, leading through the existing raised doorway of the western accumulator tower and up internally integrated with the proposed new internal Engine Room floor slab around the edge of this room.

Pro's:
- Simple installation
- User friendly, and functional for a wide variety of users.
- Economic solution, minimal maintenance.
- No requirement for power.
- No impact on external original fabric.
- Utilises existing raised door threshold which cannot be otherwise accessed, allowing user experience of the significant Accumulator tower interior.
- Fully DDA compliant (access is via south plaza).
- Allows potential airlock entry into Engine Room for user amenity (two doors through tower), and could function as main patron entry to the building rather than south façade doors (large and unwieldy/ unsafe to operate).
- Good integration of ramp to potential car park on west side of building (if required by future tenant and approved).

Con's:
- Enlarged opening required through original brick wall between accumulator tower and engine room.
- Must be completed in tandem with Engine Room slab works.

Conclusion: Preferred selection which allows a fully complying entry with maximum amenity and flexibility for a variety of potential building users, with minimum impact on heritage significance.

5.4 PROPOSED ACCESSIBLE ENTRY RAMP

To be undertaken in tandem with the proposed new concrete slab within the Engine Room, the scope of works for provision of a new accessible entry ramp to the interior of the CHEH Engine Room is as follows. We note this is the assumed methodology, with the actual procedure being the responsibility of the Contractor to confirm. Refer Architectural Drawing package for full design and proposal details.

- Clear out light (non historic) debris from base of western accumulator tower.
- Remove timber components of existing doorway between tower and Engine Room, widen and lower the existing door opening within the original masonry wall to achieve accessible clearances required for compliant ramp, salvage bricks for re-use.
- Carefully cut out portion of extant accumulator guide rail where it conflicts with the new door (retain metal components for interpretation).
- Trim bottom edge of existing (non-original) timber door leaves approx. 40mm to accommodate new metal landing decking coming through doorway.
- Line base of tower with geofabric, and fill with 200mm of industrial blue metal gravel.
- Salvage visually interesting components of previous building fabric (under direction of Heritage Architect) from existing stockpile in eastern boiler room (elements of sandstone and metal componentry replaced/repaired in previous stages of work have all been retained on site), and portion of guide rail removed, and arrange on top of the blue metal gravel for visual interpretation.
- Install new steel framed "Webforge" open metal deck landing within the full floorplate of the accumulator tower above the gravel and historic display. Feature LED lighting to be installed below the decking to highlight fabric interpretation on gravel below.
    - The level of the landing is set to allow the decking to pass hard over the existing exterior door threshold within the Accumulator Tower (0.65m above the exterior ground level).
- The Accumulator Tower landing connects through the new enlarged door opening in the tower wall (with new sandstone still) to an integrated concrete ramp within the Engine Room floor slab.
    - The Engine Room internal ramp features "Mono-Wills" steel industrial balustrading, as an interpretation feature referencing an original rail from the Generator Room.
    - The Engine Room internal ramp allows an alternate small staircase for ambulant users to take a short cut between the tower entry landing and the Engine Room.
    - The Engine Room ramp includes a flat landing adjacent to the existing door opening between the western Boiler Room and the Engine Room. While not currently at the correct level, this opening could in future be cut down to provide a stairway, platform lift or ramp accessway between the Engine Room and Boiler Room (subject to approval, not part of this scope of works).
    - The side walls of the engine Room Ramp are in parts constructed flush with the side faces of the concrete engine buttresses, exposing their surface for view.
- Install compliant 1:14 grade accessible entry ramp to exterior of building, beginning in alignment with the western façade of the building and running parallel to the southern façade walls to turn and enter the western Accumulator Tower via its existing large hinged doors at the existing sill level.
    - Exterior ramp will be lightweight steel framed, with open "Webforge" metal decking and generally with an industrial appearance in support of the building's industrial history.
    - The exterior ramp uses an accessible compliant standard version of a "Mono-Wills" type balustrade.
    - The exterior ramp is separated from the fabric of the exterior sandstone and masonry facades of the building, not touching, connecting too or impacting them.
    - The ramp will be supported on generously spaced lightweight steel columns, offset inward from the outer edges of the ramp for minimal visual intrusion. The footings of these columns will be buried under the existing gravel mulch bed surrounding the front façade of the building.
    - The ramp does not span outside the confines of the existing gravel bed, and does not protrude past the central front portico of the south façade of the Engine House.

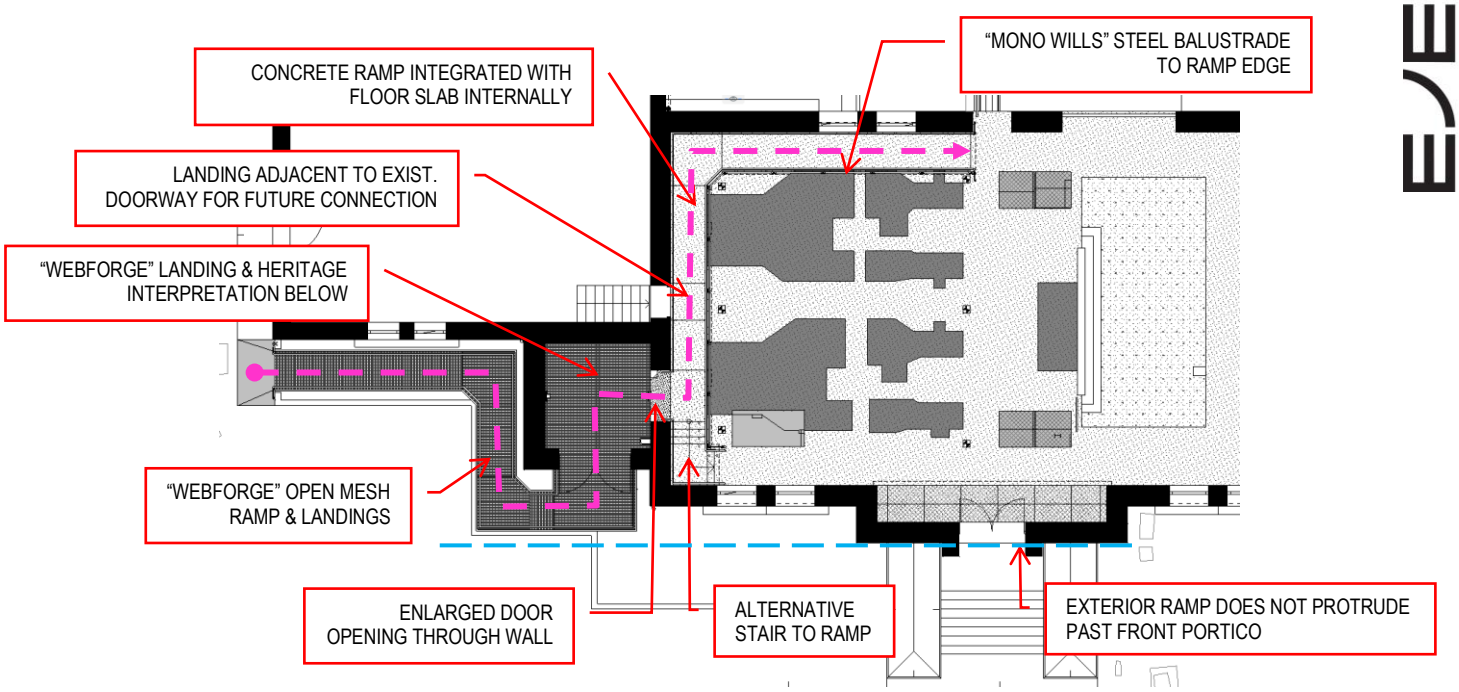

Figure 67. Proposed accessible entry ramp through western Accumulator Tower to the CHEH Engine Room – Refer Architectural Documentation for full design notes.

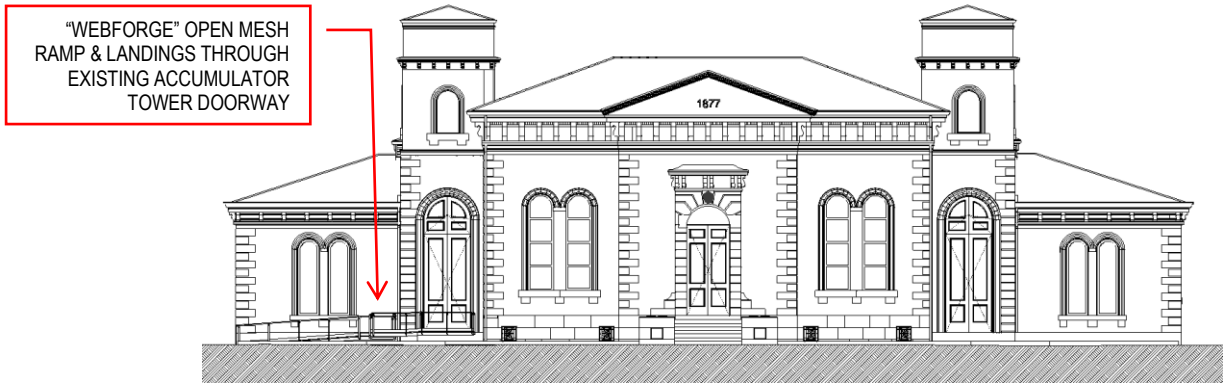

Figure 68. Proposed accessible entry ramp through western Accumulator Tower to CHEH Engine Room – the design is purposely industrial, reflecting the building's historic use, but also intentionally lightweight and visually recessive compared to the monumental south façade. The ramp does not protrude beyond the front face of the main central portico, and is lower than the main door threshold at the centre of the building façade.

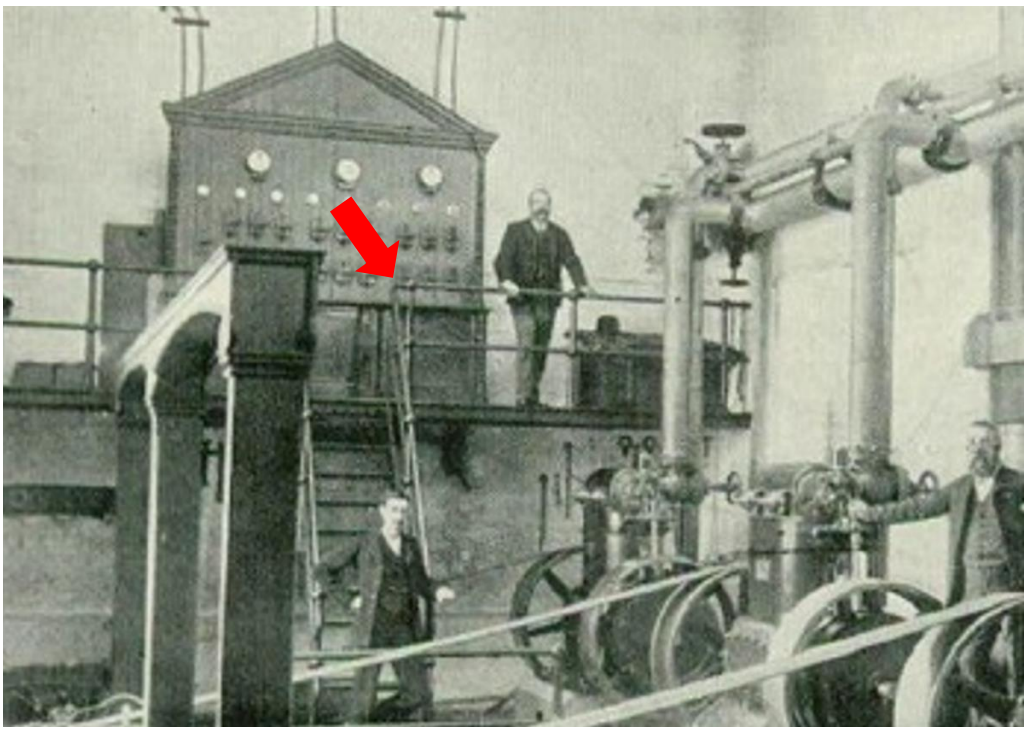

Figure 69. Historic Image within the CHEH Generator Room, note the two-rail "Mono-Wills" industrial balustrade used on the elevated walkway.

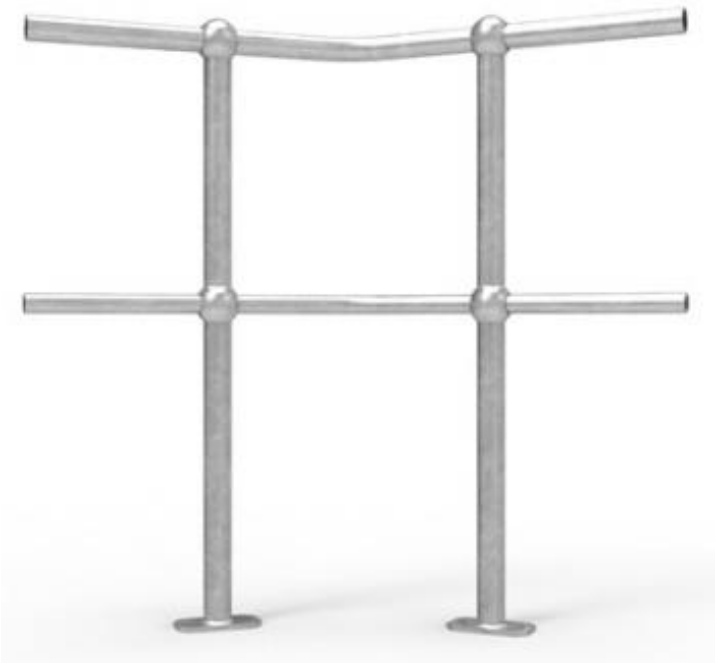

Figure 70. The equivalent Mono-Wills industrial balustrade today, not much has changed. The proposed ramp uses this balustrade along the edge of the top slab as a fall barrier, and an accessible compliant version (to AS1428 with an additional handrail and kerb rail) along the edges of the exterior ramp and landings.

5.5 INTERPRETATION BACKGROUND

In tandem with the production of the 2021 revision of the Item's *Conservation Management Plan* and as requested by Heritage NSW, EJE Heritage has produced a comprehensive *Heritage Interpretation Strategy* for the ongoing promotion of the Carrington Hydraulic Engine House's historic significance in the community. This document, appended to the CMP, had been reviewed by Heritage NSW as part of the production of the CMP, and within proposed a variety of interpretation devices, both publicly and privately accessible, to be incrementally considered for installation at the site across the course of its development and use. Consideration of the content of the Interpretation plan is referenced in the policies of the CMP, noting however that the proposed interpretation concepts described within the document are not hard and fast proposals, and can be adapted and amended as appropriate to the site context at the time.

In tandem with conservation of the CHEH building (aimed at eventual adaptive re-use), PON has expressed desire to continue to implement elements of the Interpretation Plan as the situation allows.

Figure 71. CHEH Heritage Interpretation Strategy 2021.

5.6 INTERPRETATION DEVICES PROPOSED WORKS

This application proposes two new interpretation devices in line with the concept proposals of the Interpretation Strategy.

5.6.1 Crane Base Plaques

A specific request from Heritage NSW during the production of the CMP and Interpretation Strategy was that devices be included related to the historic crane bases east of the building that are encompassed within its heritage listing. Proposed within this application is a series of low-level bronze plaques, mounted to reclaimed pieces of original sandstone from earlier stages of the CHEH works, which will identify the historic cranes bases and their year of construction. As the site of the crane bases is an internal area of the working port and not publicly accessible, the design of these plaques is intentionally simplified and without detailed historical information. The intent of their design is rather to mark the heritage status of the crane bases visually amongst the other working infrastructure of the port foreshore.

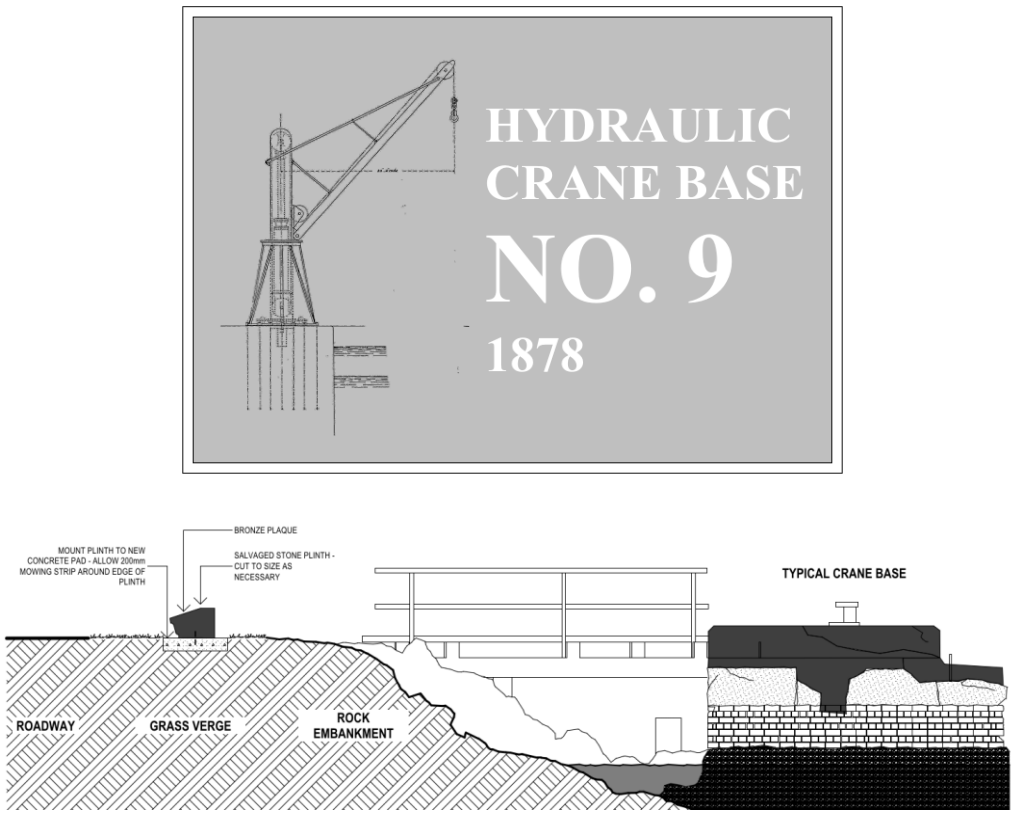

Figure 72. Proposed cast bronze heritage interpretation plaques at the site of the historic hydraulic crane bases.

5.6.2 Stainless Steel Interpretive Sign.

An element of the Interpretation Strategy identified a need for responders to look outward away from the building, and consider its historic connection to the man-made geography of the port, specifically The Dyke and its shipping berths, and the view across the harbour to the port city of Newcastle.

The proposed works include a low level acid-etched stainless steel artwork sign, depicting a historic photograph of ships berthed at the Dyke, also mounted to reclaimed original sandstone.

The device is a simple addition to the existing building courtyard, but develops it's interpretation potential with its orientation directing views away from the building rather than toward it, thus expanding the responders interpretation of the historic context of the site.

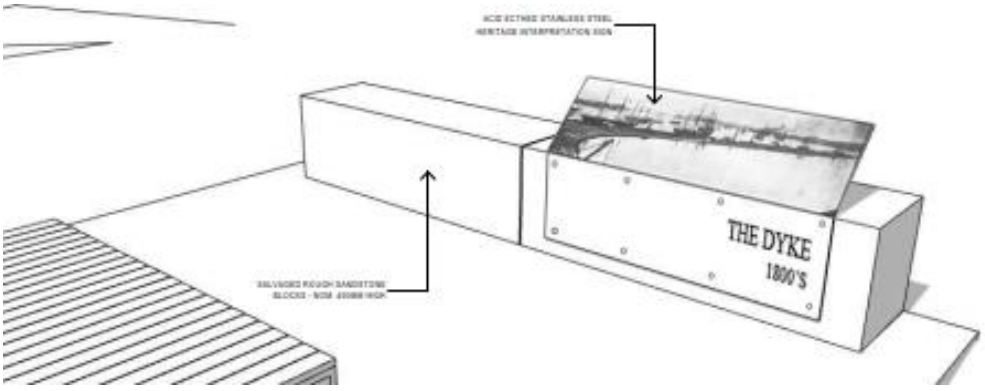

Figure 73. Proposed stainless steel heritage interpretation artwork - CHEH plaza.

5.7 EXCAVATION & ARCHAEOLOGY

No significant excavation is proposed in connection with the proposed works, the extent of any digging being new localised post-holes for the proposed accessible ramp columns and their footings.

The historical context of the site notes that it is built upon land reclaimed from the harbour, and as such has very low likelihood of containing Aboriginal archaeological deposits. For the whole of its lifespan since reclamation, the site has been utilised for industrial purposes and has been consistently disturbed with the introduction and removal of infrastructure related to the port, railways, roadway, and hydraulic machinery. No archaeological significance has previously been attributed to the site and the potential of the discovery of a deposit would be very low. The proponent proposes as such that no archaeological management is required during the work, and an unexpected finds protocol would instead be appropriate, as below:

Any items discovered that are properly classified as relics within the meaning of the *Heritage Act 1977* (NSW) should, if unearthed, be reported to the Heritage Division of the NSW Office of Environment and Heritage at 3 Marist Place, PARRAMATTA NSW, Tel. (02) 9873 8500; heritage@heritage.nsw.gov.au .

The proposed works are not anticipated to unearth historical relics within the meaning of the *Heritage Act 1977* (NSW), s. 4(1), as set out below:

> ***relic*** *means any deposit, artefact, object or material evidence that:*
> *(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
> *(b) is of State or local heritage significance.*

There is, therefore, no requirement for application for an Excavation Permit under s. 139:

> ***139 Excavation permit required in certain circumstances***
> *(1) A person must not disturb or excavate any land 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 unless the disturbance or excavation is carried out in accordance with an excavation permit.*
> *(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.*

Despite this, should any items properly described as relics in fact be unearthed in the course of site or construction works, notification must be made in accordance with s. 146, as follows:

> ***146 Notification of discovery of relic***
> *A person who is aware or believes that he or she has discovered or located a relic (in any circumstances, and whether or not the person has been issued with a permit) must:*
> *(a) within a reasonable time after he or she first becomes aware or believes that he or she has discovered or located that relic, notify the Heritage Council of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic, and*
> *(b) within the period required by the Heritage Council, furnish the Heritage Council with such information concerning the relic as the Heritage Council may reasonably require.*

6. STATEMENT OF HERITAGE IMPACT

This is the Statement of Heritage Impact for:	The Carrington Hydraulic Engine House - Stage 3 Restoration Works – Engine Room Asbestos Encapsulation and Accessible Entry Ramp
Date:	This statement was completed in April 2022
Address and Property Description:	106 Bourke St, Carrington, NSW. Lot 30 DP 1190075
Prepared by:	EJE Group
Prepared for:	The Port of Newcastle

The following aspects of the proposal respect or enhance the heritage significance of the item or area for the following reasons:

- The existing asbestos hazard within the Engine Room is preventing any option for adaptive re-use of the building, or even inspection of the building by potentially interested parties. Remediation of this hazard strongly supports the heritage significance of the item, paving the way for an adaptive re-use that will drive value, care and maintenance of the building for the long term.
- The proposed works have been selected via robust multi-disciplinary options, aiming to achieve the best outcome for the building's fabric, its heritage stature, its proponent, and any future building user.
- Permanent elements of Heritage Interpretation are in-built within the scheme, which do not rely on a future user to be executed. These include:
    - Interpretation of the concrete engine buttresses within the new floor slab via metallic penetrating stain. The metallic component references the significant metal machinery once present in the space. The interpretation of the engine buttresses at 1:1 scale within the slab continues an interpretation theme from the existing southern plaza, which represents the original hydraulic layout of the Engine Room also at 1:1 scale.
    - Visual interpretation of sub-floor fabric through glass floor panels with feature lighting.
    - Reuse of elements of original fabric, such as the re-used cast iron metal floor grates within the entry niche, and the re-installed metal handrail beside the sunken floor.
    - Exposure of the side walls of the engine buttresses in parts of the integrated concrete ramp.
    - Display of elements of original building fabric (salvaged carved stone, industrial metal componentry etc), beneath the glass floor of the tower landing.
- Implementation of the two heritage interpretation devices shows compliance with the policies of the CMP and Interpretation Strategy, and supports both public and private understanding of the historic context of the site.

The following aspects of the proposal could detrimentally impact on the heritage significance of the item or area for the following reasons:

- Introduction of the new internal floor slab removes physical and visual connection between an occupant of the room, and the original heritage fabric of the building (being the cast iron floor grates, the concrete engine buttress, and the remnant industrial componentry of the sub-floor cavity. Having said this, in the existing state of asbestos contamination within the Engine Room, there is also no physical or visual connection to these features. The proposal includes interpretation devices within the new slab to allow connection to these features through means other than physical, and so improves the current situation and hence does not detract from the building's heritage significance.

- Removal/demolition/modification of items of original fabric such as masonry walls around the perimeter of the Engine Room, and steel and timber beams in the subfloor will affect the integrity of the item. The proposal directs to keep all steel componentry that is cut/modified on site within the sub-floor cavity so that it is not removed from the site (for future study), and all brickwork removed is noted to be retained for re-use wherever possible. A thorough archival quality 3D internal and external scan of the building has been undertaken to record the condition of the fabric to ensure its previous format is recorded for future study.
- Introduction of the external ramp affects the symmetry of the front façade of the building. A through study of options for integration of an accessible entry to the building has determined that this proposal is the best and most sympathetic way of providing compliant accessible entry to the building which will help attract a future user for the building, which will in turn support its heritage significance in the long term. The ramp is intentionally constructed in an industrial design to sit comfortably with the building's history and context, but will also be clearly a contemporary addition given its stainless-steel fabric.
- Introduction of the Photovoltaic Panels to the roof of the building will be visually out of place with the heritage fabric. We note the panels are only considered to be "semi-permanent" as a stop-gap to run the mechanical ventilation system before the building is connected to mains power. The panels are located as discreetly as possible away from public view of the building. It is also noted the building has always had a strong association with cutting edge industrial technology specifically in power generation, which is continued with use of solar energy through this stage of the project.

The following sympathetic design solutions were considered and discounted for the following reasons:

- Refer *Options Analysis Report* for full details regarding the following Asbestos remediation design solutions considered and discounted:
    - Decontamination of contaminated fabric in-situ
    - Decontamination of contaminated fabric off site and reconstruction as original
    - Mass concrete encapsulation
    - Bulk fill and capping slab encapsulation
    - Glass floor encapsulation with/without concrete seal to cavity floor
    - Concrete floor encapsulation with sealed cavity floor
    - Complete demolition/removal of fabric
    - Permanent closure of the Engine Room

- Refer Part *5.3* ACCESSIBILITY & DDA BACKGROUND for full details regarding the following assessable entry design solutions considered and discounted:
    - Stair climber, external
    - Stair climber, internal
    - Passenger lift, Accumulator Tower
    - Passenger lift, internal
    - Pedestrian Ramp, internal
    - Pedestrian Ramp, front entry doors (South façade)

The following actions are recommended to minimise disturbance and/or enhance the interpretation of the heritage significance of the item or area:

- All conservation works should be undertaken by experienced specialists and overseen by a Conservation Architect.
- Regular site photography during construction should be undertaken to record the works and document any new original building details observed.
- The Item's Conservation Management Plan and Heritage Interpretation Strategy should be made available to any potential tenants interested in the building early in negotiations to highlight the heritage significance of the Item and make them aware of potential opportunities and constraints.

7. CONCLUSION

Once the chief glory of Newcastle's industrial heartbeat, the Carrington Hydraulic Engine House building saw a period of declined in its integrity and condition in the decades following its redundancy in the 1960's.

A structure of cultural, architectural and historical significance, there is clear community interest in the Engine House building, and desire by the asset owners, The Port of Newcastle to return the building to a feature of the suburb and city of which residents can be proud.

While monumental and picturesque when viewed from the exterior, via the recently completed south-side public plaza, or at the apex of the Basin across the harbour from Honeysuckle, the Carrington Hydraulic Engine House needs a long-term adaptive re-use internally to regain its full potential as a significant historic icon. The Port of Newcastle is resolved to achieve this aim in the future, with works as proposed in this application furthering progress to the goal.

Conservation works beginning in 2018 and continuing in stages to the time of writing have made a significant step in remediating the neglected condition of the building. With works currently under way (October 2021), it is anticipated that the buildings outside shell will be made completely weathertight and stable within a few months' time.

Asbestos remediation works undertaken in 2020 have ensured that all internal spaces of the building are safely accessible, except the main engine room, which is a significant barrier preventing adaptive re-use of the building. The works as proposed in this Statement of Heritage Impact will remove this barrier, and while necessarily introducing non-original fabric to the heritage structure, overall result in a positive outcome for the heritage significance of the building, being a safe and habitable space that is ready for re-use.

A robust options analysis package has been presented with this application that explains the decision-making process by which the proposal has been developed. Early communication with NSW Heritage through concept presentation meetings and discussions has also ensured that the proposal is reviewed and checked against Heritage stakeholder requirements.

Lengths have been taken to ensure permanent methods of heritage interpretation are included in the proposal, whilst also allowing sufficient flexibility for a range of future use typologies, so as not to restrict the future options for the building's activation.

EJE Heritage recommends that the proposed works at the State Listed Carrington Hydraulic Engine House are carefully considered, thoroughly justified, and appropriate for the significance of the building. In terms of their *Heritage Impact*, we believe that the proposed works be approved.

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National Library of Australia: http://www.nla.gov.au/

Nearmap (by license) - http://au.nearmap.com/

Newcastle City Council Local Environment Plan 2012:

http://www.newcastle.nsw.gov.au/Development/Land-Use-Planning/Local-environmental-plans

Newcastle Region Library: http://www.newcastle.nsw.gov.au/Library/Home

NSW Government State Environmental Planning Policy (Three Ports) 2013:

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