



artefact

19 May 2020

David Field
Senior Geotechnical Engineer
GHD

Dear Mr Field,

Re: Non-Aboriginal (Historic) Heritage Impact Assessment (HIA) for WaterNSW Rockfall stabilisation program at Broughtons Pass

Artefact Heritage has been engaged by GHD to prepare a HIA for rockfall remediation works proposed as part of the WaterNSW stabilisation program at Broughtons Pass. These works are located within the curtilage of the State Heritage Register (SHR) listed Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) (SHR 01373), the Broughtons Pass Weir Wollondilly Local Environmental Plan (LEP) 2011 listing (LEP 115), and the Upper Nepean System WaterNSW Section 170 (s170) heritage item.

This document will outline the potential impact of the proposed works to the heritage significance of the listed item, determine if the works are consistent with standard exemptions and provide management recommendations.

This report was prepared by Alyce Haast (Senior Heritage Consultant) and Sarah Hawkins (Heritage Consultant) of Artefact Heritage.

1.1 Project background

GHD has been engaged by WaterNSW to carry out slope remediation design for 16 dam locations across the greater Sydney area. The slopes subject to the current assessment have been prioritised for treatment on the basis of risk assessment carried out on previous studies.

In 2018 WaterNSW engaged Jacobs Group (Australia) Pty Ltd to undertake geotechnical Quantitative Risk Assessment of 10 selected dam sites. Based on this report one site was selected within the Broughtons Pass site to be subject to remediation, as outlined in Table 1. The objective of the current project is to remediate areas assessed as being of 'high' and 'medium' risk rockfall hazards to reduce the risk of infrastructure damage and personal injury.

1.2 The study area

The study area consists of a proposed rockfall stabilisation work site at Broughtons Pass Weir, located within the boundaries of Lot 10 DP 1085929. The study area is located within located in the Wollondilly Local Government Area (LGA).

A summary of proposed work site locations is provided in Table 1 and illustrated in Figure 1.

Table 1. Study area and site descriptions at Broughtons Pass

Site name	Site location
Site 001	<p>Site 001 is located on the right abutment slopes of the reservoir, extending upstream and just downstream of the weir. The site covers the area above the weir infrastructure and comprises a lower sandstone cutting approximately 100m long and approximately 2m to 8m high. The overall height of the slope is approximately 43m. This cutting is overlain by steep and vegetated natural slopes. Several old 'drystone' walls up to about 3m high of varying condition are located at various heights across the natural slopes. The walls all comprise loosely stacked makeshift rock walls. The vertical slope height is approximately 40m. A number of service pipelines descend down the slope. The irregular height rock face is generally near vertical with some excavated terraces and natural overhangs along the crest. The cutting comprises locally weathered seams and fractured rock masses immediately adjacent to access walkway and stairs.</p>

Figure 1: Location of proposed rockfall stabilisation



1.3 Heritage management framework

There are several items of State legislation that are relevant to the current study. A summary of these Acts and the potential legislative implications follow.

1.3.1 *Heritage Act 1977*

The NSW *Heritage Act 1977* (Heritage Act) provides protection for items of 'environmental heritage' in NSW. 'Environmental heritage' includes places, buildings, works, relics, movable objects or precincts considered significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. Items considered to be significant to the State are listed on the SHR and cannot be demolished, altered, moved or damaged, or their significance altered without approval from Heritage NSW, Department of Premier and Cabinet (Heritage NSW, DPC).

1.3.1.1 **State Heritage Register**

The SHR was established under Section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. The SHR is administered by Heritage NSW, DPC) and includes a diverse range of over 1,500 items, in both private and public ownership. To be listed, an item must be deemed to be of heritage significance for the whole of NSW.

The study area is within the curtilage of the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) (SHR 01373).

1.3.1.2 **Section 170 registers**

Under the Heritage Act all government agencies are required to identify, conserve and manage heritage items in their ownership or control. Section 170 (s170) requires all government agencies to maintain a Heritage and Conservation Register that lists all heritage assets and an assessment of the significance of each asset. They must also ensure that all items inscribed on its list are maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Government on advice of Heritage NSW, DPC. These principles serve to protect and conserve the heritage significance of items and are based on NSW heritage legislation and guidelines.

Broughtons Pass Weir is identified as a contributory element of the Upper Nepean Scheme which is listed on the WaterNSW s170 register.

1.3.2 Environmental Planning and Assessment Act 1979 (NSW)

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits.

The EP&A Act also requires that local governments prepare planning instruments (such as Local Environmental Plans and Development Control Plans [DCPs]) in accordance with the EP&A Act to provide guidance on the level of environmental assessment required. Broughton Pass Weir falls within the boundaries of the Wollondilly LGA. Local heritage items within the Wollondilly LEP are listed on schedule 5 of the Wollondilly LEP 2011.

The study area is located within the curtilage of the Upper Nepean Scheme – Broughtons Pass Weir (Wollondilly LEP I15).

1.3.3 Summary of heritage listings

There are several listed heritage items associated with Broughtons Pass Weir located in the vicinity of the study area. These items are outlined in Table 2 and illustrated in Figure 2.

Table 2. Results of register search for the study area

Register	Listing
World Heritage List	Not listed
National Heritage List	Not listed
Commonwealth Heritage List	Not listed
State Heritage Register	The study area is within the curtilage of the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) (SHR 01373)
Section 170 Registers	Listed as part of the Upper Nepean Scheme (WaterNSW s170 4580004)
Wollondilly LEP 2011	The study area is located within the curtilage of the Upper Nepean Scheme – Broughtons Pass Weir (I15)

Figure 2. Heritage Curtilages within and nearby the Study Area



1.4 Historical context

1.4.1 Aboriginal histories of the locality

The study area was thought to have been located within the Dharawal language group area. The Dharawal language group was largely coastal and extended from the Shoalhaven River in the south, to Botany Bay in the north and inland to the Georges River.¹ The study area was likely to have been located close to the boundaries of the Dharawal language group with the neighbouring Darug and Gundungurra language groups. The hinterland and coastal dialects of the Darug language group together covered an area stretching from the northern side of Botany Bay, west of the Georges River and across the western Sydney Cumberland Plain.² The Gundungurra language group covered parts of the south-western Sydney area and the Blue Mountains.

The area covered by the Dharawal language included a variety of landscape and resource types. These included coastal and estuarine environments, rolling hills and creeks bordering the coastal environment, plus the large sandstone escarpment and plateau. Movement across these different terrain types and resource areas may have been dictated by the season or purpose.³ Additionally, exchange with people from surrounding language groups included Gundungarra and Wiradjuri people travelling to the coast to exchange foods and raw materials, whilst the Dharawal and Awabakal (Central Coast region) shared ceremonies.⁴

Long-term areas of interaction and ‘travel corridors’ for movement between different language groups may have existed where there were shared boundaries. Archaeologist Laila Haglund has suggested that the Campbelltown area in south-west Sydney may have represented the intersection between the boundaries of the Dharawal, Darug and Gundungurra, and that the Narellan Valley may have been part of a ‘travel corridor’ facilitating movement between different regions.⁵

British colonisation had a profound effect on the Aboriginal population of the Sydney region. In the early days of the colony, Aboriginal people were disenfranchised from their land as the British occupied areas for settlement and agriculture. The colonists, often at the expense of the local Aboriginal groups, also claimed resources such as pasture, timber, fishing grounds and water sources. It is thought that during the 1789 smallpox epidemic over half of the Aboriginal people of the Sydney region died. By the 1820’s Aboriginal groups had established unofficial camps on the fringes of European settlement.⁶

The study area lies in close proximity to a large range of natural resources. The coastal plain at the base of the Illawarra Escarpment comprised freshwater, marine and estuarine resources, as well as terrestrial resources.

The raised escarpment and plateau area to the west of the study area would have provided a different range of resources. Early European observations of the plateau region to the west indicated that the Aboriginal population of the area was either sparsely distributed or that the local Aboriginal people were deliberately avoiding contact.⁷ Rich suggested that ‘the region was probably occupied

¹ Val Attenbrow, *Sydney’s Aboriginal Past: Investigating the Archaeological and Historical Records*, 2nd Ed. (Sydney: UNSW Press, 2010), 34.

² Attenbrow, *Sydney’s Aboriginal Past*, 34.

³ Sue Wesson and Kate Gahan, *A History of Aboriginal People of the Illawarra 1770 to 1970* (Hurstville: Department of Environment and Conservation, 2005), 8.

⁴ Wesson and Gahan, *A History of Aboriginal People of the Illawarra*, 8.

⁵ Jo McDonald, *Archaeological Investigation of the Oran Park Precinct in the South West Growth Centre, Camden, NSW. Report to APP* (Lilyfield: Jo McDonald Cultural Heritage Management, 2007). 21.

⁶ Dictionary of Sydney, Aboriginal life around Port Jackson after 1822, https://dictionaryofsydney.org/entry/aboriginal_life_around_port_jackson_after_1822 (accessed 15 May 2020)

⁷ E. Rich, *Wingecarribee River Proposed Management Project: Archaeological Survey for Aboriginal and Historic Sites. Report prepared for the Water Board* (1988), 25; Umwelt Environmental Consultants,

all year by mobile family groups', and that the population was probably lower than on the coast.⁸ The Wodi Wodi may have used the area through Bong Bong and Mittagong further to the south of the current study area to reach the Cowpastures and Burrogorang in the south-west Sydney region.⁹

Types of shelter utilised in the region would have included bark huts and naturally occurring sandstone overhang formations. Bark huts were generally located in tandem with a fire (hearth), were constructed with bark removed from nearby gum trees, and could vary in size depending on the extent of the family group.¹⁰ Sandstone overhangs were frequent features of the region based on the exposure of the underlying sandstone geology along weathered scarps and well-incised drainage channels. Use of sandstone overhangs is evidenced in the archaeological record mainly by sub-surface archaeological deposit and pigment or charcoal motifs on shelter walls. Evidence of bark hut use is harder to discern, as bark removal scars on gum trees would have largely disappeared with European vegetation clearance, and archaeological excavation would generally be required to determine the presence of absence of hearths in any particular area. The variety of landforms in the area, including creeks, rivers and swamps, would have provided a wide range of subsistence resources.

Early European observations in the area made reference to the wide variety of food types consumed by the local Aboriginal inhabitants. In 1802, Barrallier observed that Aboriginal people in the vicinity of the current study area ate diverse animal foods, including kangaroos, possums, wombats, wild dogs, lizards, lizard eggs, large ant eggs, fish, shellfish, eels, platypuses, parrot eggs and honey.¹¹

1.4.2 Early water supply schemes

A comprehensive history of Sydney's early water supply schemes is available in the Metropolitan Dams Conservation Management Plan (CMP). The following historical background has been adapted from the Metropolitan Dams volume of the CMP.¹²

Captain Arthur Phillip, the founding governor of New South Wales, in his *Voyage to Botany Bay*, recorded that 'the different coves of this Harbour (Port Jackson) were examined with all possible expedition, and the preference was given to the one that had the finest spring of water'. This 'spring of water' which flowed into Sydney Cove (now Circular Quay), later became known as the Tank Stream by virtue of the three large cisterns which were excavated in its rock banks. Sydney was thus founded on the basis of security of water supply, and the development of Australia's first water supply system can therefore be recorded as occurring at the time of the founding of European settlement in January 1788. Other sources of potable water for the town's supply included water from springs at Ultimo and near Oxford Street, and from the numerous public and private wells.

Sydney's second water supply was developed from September 1827 by John Busby, the colony's mineral surveyor and civil engineer. Busby's scheme necessitated the construction of a series of reservoirs on the Lachlan Swamps (now part of the Centennial Park lakes system) which supplied the city with water by gravitational feed through an underground tunnel to an outlet at Hyde Park. Busby considered the water of the swamps as 'perfectly transparent and colourless, free from every taste and smell, and so soft as to be fit for washing and every domestic purpose'.¹³ Busby's

Environmental Impact Statement – Proposed Lynwood Quarry, Marulan. Appendix 11, Aboriginal Archaeology Assessment. Report to Readymix Holdings (Newcastle: Umwelt Environmental Consultants, 2005), 3–4.

⁸ Rich, *Wingecarribee River Proposed Management Project*, 35.

⁹ Rich, *Wingecarribee River Proposed Management Project*, 35.

¹⁰ Rich, *Wingecarribee River Proposed Management Project*, 29.

¹¹ Rich, *Wingecarribee River Proposed Management Project*, 29.

¹² Graham Brooks & Associates, *Metropolitan Dams N.S.W.: Conservation Management Plan, Vol. 1 – Metropolitan Dams* (Sydney: Graham Brooks & Associates, 2003), 17–18.

¹³ John Busby to Sir Thomas Brisbane, 28 June 1825, in *Historical Records of Australia*, Series 1, Vol. XI (Melbourne: The Library Committee of the Commonwealth Parliament, 1916), 683–4.

ambitious tunnelling scheme was initiated by the colonial administration, and constructed by convict labour. Working at times 24 hours a day, the tunnel took ten years to complete. The scheme continued to supply Sydney with water until 1860.

By the commencement of the 1850s, the city's population had increased to 39,000 with the impetus for further growth coming with the discovery of gold and the subsequent large scale influx of migrants. The Lachlan Swamps had reached its supply potential for water and was by now considered 'insufficient for the wants of the population'¹⁴. In 1852 a board of enquiry was set up by the NSW Legislative Council at the instigation of Governor Sir Charles Fitzroy. The Commission recommended the development of the Botany Swamps situated to the south of the Lachlan Swamps as an alternative water supply.

The Botany Swamps, which drain into Botany Bay, are located on the south-eastern edge of the city in an area now partly occupied by the Kingsford-Smith International Airport. The water resource of the swamps had been first utilised for industrial purposes with the building of a small dam and mill by prominent local merchant Simeon Lord in 1815.

The Botany Swamps scheme was implemented by the Sydney Corporation under the city engineer, Edward Bell, and included the requirement for the construction of a steam water pumping station to deliver water to large underground reservoirs situated at Crown Street, Surry Hills and another reservoir at Oxford Street, Paddington. The scheme was completed in stages between 1859 and 1864. With the completion of the scheme a reasonably secure source of water for the city had been found, although in the dry months of many years domestic supply was often rationed to a few hours per day. The Botany Swamps eventually served Sydney for 28 years between 1859 and 1887.

1.4.3 Upper Nepean Scheme

The following historical background has been adapted from the Metropolitan Dams CMP.¹⁵

In 1867, the growing needs of Sydney and recurring dry seasons brought the pressing need for a water supply, larger and more reliable than the existing Botany Swamps source into sharp focus. The Governor (Sir John Young) appointed a special Commission to investigate how an adequate long-term supply might be achieved.

The Commission reported in 1869 and recommended the establishment of the Upper Nepean Scheme. This scheme would allow water from the head of the Upper Nepean River and its tributaries, the Avon, Cordeaux and Cataract Rivers to be moved by canal, tunnel, pipe and aqueduct to a storage reservoir built at Prospect. From there another canal would carry the water to a basin at Guildford from where it would be piped to a smaller service reservoir at Potts Hill for distribution to Sydney.

No decision was made on the commission for six years and a number of alternative proposals were circulated. The government engaged an eminent English civil engineer, W. Clark, M.I.C.E., to review the various proposals. Clark reviewed the eight schemes and strongly endorsed the Upper Nepean Scheme.

An Appropriation Act was passed in July and work commenced in 1880. Construction was carried out by contractors under the direction of the Harbours and Rivers Branch of the Public Works Department. The head of that branch was Edward Orpen Moriarty, who contributed to several public engineering works of the time. He was responsible for the both the design and execution of the

¹⁴ Graham Brooks & Associates, *Metropolitan Dams*, Vol. 1, 16

¹⁵ Graham Brooks & Associates, *Metropolitan Dams*, Vol. 1.

works and had a number of site engineers under him. His signature appears on most of the plans of the Scheme.

When the Scheme was initially proposed in 1869, Moriarty had then drawn up plans for parts of the system, such as weirs and aqueducts. Between 1869 and when work actually commenced in the 1880s, alterations had been made to the initial plans. In 1869, Moriarty had proposed to bridge the creeks, which the Upper Canal (Figure 3) would cross by means of aqueducts with approaches built on top of dry rubble stone walls. When the Scheme was finally under construction in 1884, he drew up new plans to cross these creeks with wrought iron inverted syphons.¹⁶

The final Upper Nepean Scheme consisted of two weirs built on the Avon and Nepean rivers and, with over 64 km of tunnels, canals and aqueducts – known as the Upper Canal – diverted water to Prospect Reservoir.¹⁷ From Prospect Reservoir, via a second canal known as the Lower Canal, water was carried to 'Pipehead' at Guildford and then to Sydney.¹⁸

Figure 3. Upper Canal. Unknown Date. (Source: WaterNSW)¹⁹



Drought between 1901 and 1902, however, brought Sydney's water catchment system perilously close to depletion and the Nepean Scheme was found to be inadequate. As a result, four dams were constructed to greatly increase the Upper Nepean Scheme's capacity (Figure 4).²⁰

A Royal Commission was appointed in 1902 to report on the water supply situation and recommended the construction of the Cataract Dam, with construction completed in 1907. In 1918, after interruption by World War I, construction commenced on the second dam, Cordeaux. In 1921 – five years before completion of the Cordeaux Dam – construction of a third dam commenced. The

¹⁶ NSW Office of Environment and Heritage, *Upper Nepean Scheme*, <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4580004> (accessed 14 May 2020).

¹⁷ WaterNSW, *Our Dam Histories: Cataract Dam*, <https://www.watnsw.com.au/supply/heritage/dam-histories#> (accessed 14 May 2020).

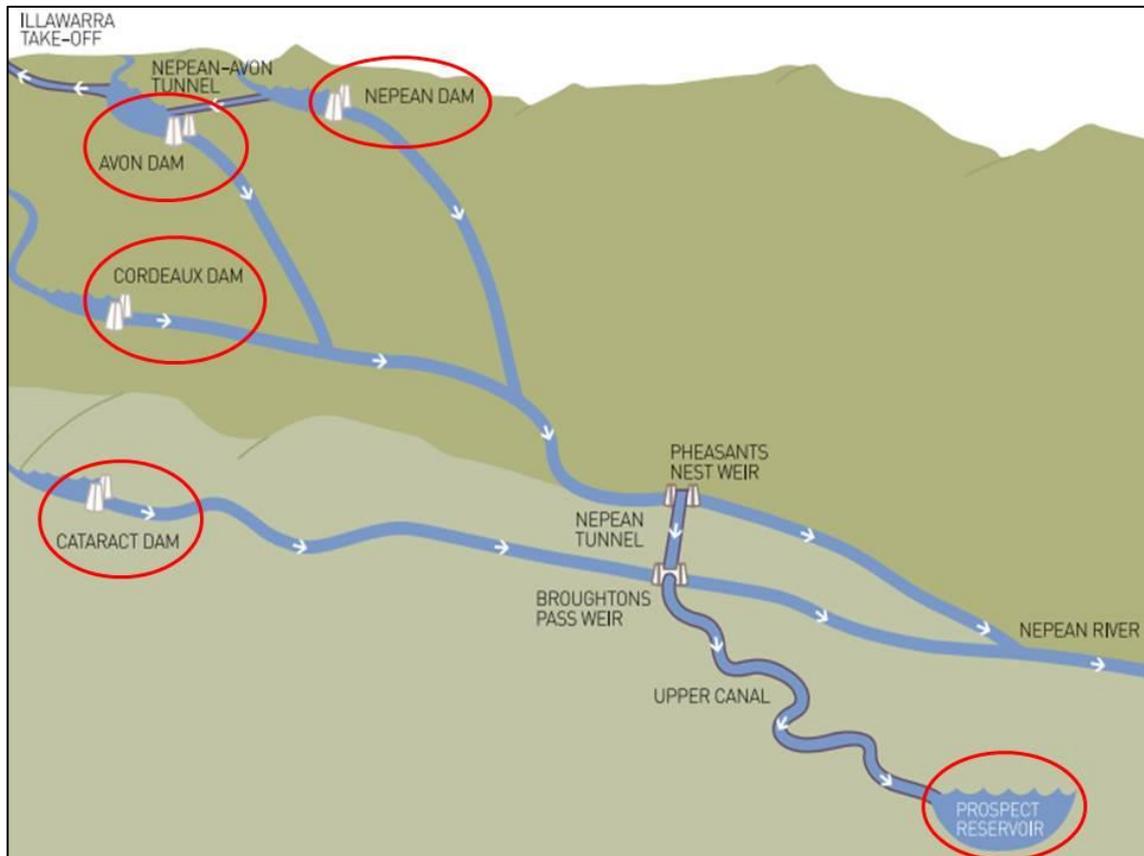
¹⁸ NSW Office of Environment and Heritage, *Avon Dam*, <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5051468> (accessed 14 May 2020).

¹⁹ Accessed on 11/3/2015 at <http://www.sca.nsw.gov.au/water/heritage/water-schemes/upper-nepean-scheme-anniversary/the-upper-canal-an-unsung-hero-of-sydneys-history>

²⁰ Biosis Research, *Camden Gas Project: Northern Expansion Part 3A Historic Cultural Heritage Assessment*, prepared for AECOM on behalf of AGL Gas Production (Alexandria: Biosis Research, 2010), 54–5.

highest and largest of the four dams, the Avon Dam was completed in 1927. An article in the *Picton Post* details how with the completion of Avon Dam, it would “greatly exceed the total capacities of the Cordeaux and Cataract dams”.²¹ Work on the final dam, Nepean Dam, commenced in 1925. However, with building disrupted by the Great Depression, it was not completed until 1935.²²

Figure 4. Diagram of Upper Nepean Scheme. (Sydney Catchment Authority: Dams of Greater Sydney and Surrounds, Upper Nepean Brochure.)



1.4.4 Broughtons Pass Weir

The weir forms part of the Upper Canal System, which stretches from Pheasants Nest to Prospect Reservoir, comprising a significant component of the Upper Nepean Scheme. The Upper Canal System has undergone several maintenance upgrades and improvements, but overall it remains relatively unchanged from its original construction.²³ By 1869 it was determined that two diversion weirs for the Upper Nepean Scheme would be constructed; one at Pheasant’s Nest and one at Broughton’s Pass.²⁴ Broughtons Pass Weir was constructed with a series of tunnels, canals and aqueducts which would then feed into the Upper Canal System.²⁵ The extensive water supply system would carry the water from Broughtons Pass Weir to the Prospect Reservoir, which was completed in 1888. The Upper Canal System was constructed to operate as a gravity supply and the

²¹ ‘Avon Dam’, *Picton Post*, 14 November 1923.

²² NSW Office of Environment and Heritage, *Avon Dam*.

²³ NSW Office of Environment and Heritage, *Upper Canal System (Pheasants Nest Weir to Prospect Reservoir)*, <https://www.environment.nsw.gov.au/heritageapp/ViewHeritageltemDetails.aspx?ID=5051481> (accessed 24 February 2020).

²⁴ NSW Office of Environment and Heritage, *Upper Canal System*.

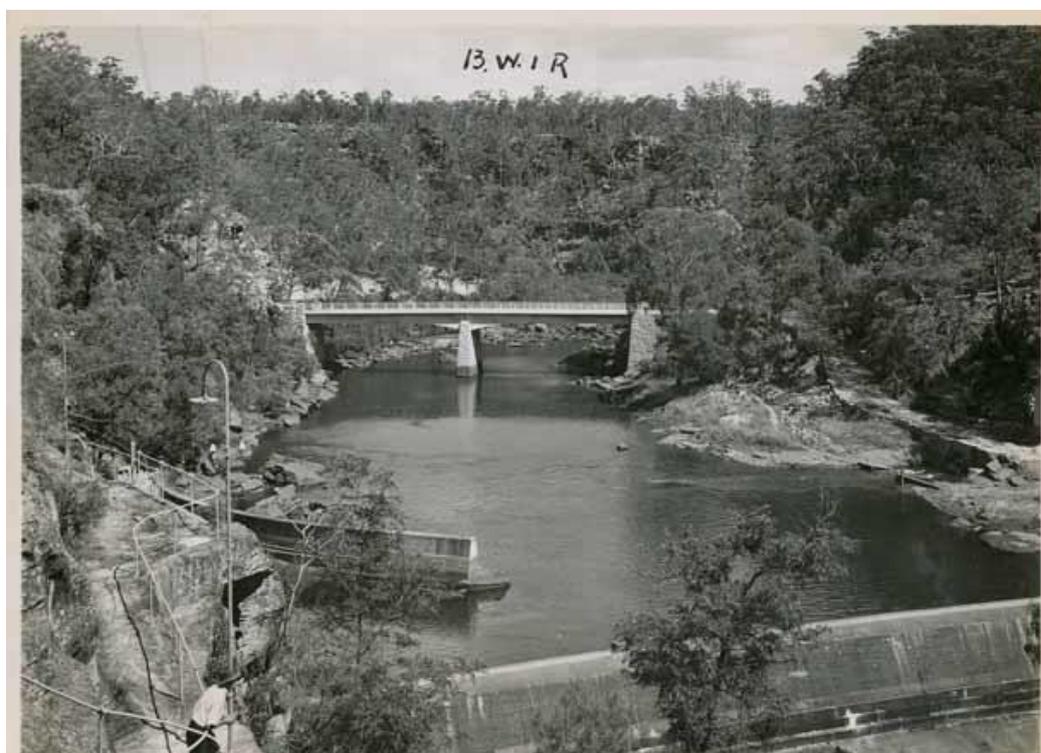
²⁵ NSW Office of Environment and Heritage, *Upper Canal System*.

variety of landscapes that the canal system needed to traverse to arrive at Prospect resulted in the use of several construction methods and materials.²⁶

Broughtons Pass Weir was constructed on the Cataract River between 1880 and 1888, and is located to the east of the Pheasants Nest Reservoir.²⁷ The original weir was 3.5m in height.²⁸ The original Broughtons Pass Weir was destroyed by flood on 14 February 1898 as a result of abnormally high rainfall.²⁹ The engineer who assessed the damage identified the masonry construction of the original weir as a key component in its failure, citing that the adjacent weir at Pheasants Nest was not destroyed because it was built entirely of concrete.³⁰ Following the engineer's suggestion, the Weir was rebuilt in concrete, with a solid concrete apron added downstream in 1901 (Figure 5).³¹

The Weir has undergone several maintenance upgrades and updates throughout its history, including the construction of the Macarthur Filtration Plant on the western (downstream) side of the weir. These upgrades however, have not impacted significant fabric or altered the weir itself.

Figure 5. Weir across Cataract River at Broughtons Pass, n.d. Source: State Archives & Records NSW.³²



²⁶ NSW Office of Environment and Heritage, *Upper Canal System*.

²⁷ Australian Museum Business Services, *Statement of Heritage Impact: Pheasants Nest and Broughtons Pass Weirs Environmental Flow Releases for the Upper Hawkesbury-Nepean River. Report prepared for SMEC Australian on behalf of Sydney Catchment Authority* (Sydney: Australian Museum Business Services, 2008), 8.

²⁸ WaterNSW, 'Changes to the scheme over time', <https://www.watnsw.com.au/supply/heritage/water-schemes/upper-nepean-scheme-anniversary/changes-to-the-scheme-over-time> (accessed 24 February 2020).

²⁹ Australian Museum Business Services, *Statement of Heritage Impact: Pheasants Nest and Broughtons Pass Weirs*, 9.

³⁰ *Sydney Morning Herald*, 19 February 1898, 12.

³¹ Australian Museum Business Services, *Statement of Heritage Impact: Pheasants Nest and Broughtons Pass Weirs*, 9.

³² [Weir across Cataract River at Broughton Pass (NSW)], n.d., State Archives & Records NSW, NRS-12932-1-[X2447]-7-7, records.nsw.gov.au/image/12932-a012-a012X2447000032 (accessed 20 February 2020).

1.5 Site Inspection

The Broughtons Pass Weir heritage item and proposed work site 001 was inspected on 4 February 2020 by Alyce Haast (Senior Heritage Consultant) and Sarah Hawkins (Heritage Consultant) of Artefact Heritage. David Field (Senior Geotechnical Engineer) of GHD attended the site inspection. The inspection was undertaken on foot. Due to the nature of the proposed works, the site inspection focused on the areas of works and distant heritage items were not inspected.

The proposed works at Broughtons Pass Weir are located within one site, known as Site 001. The site is located at the eastern side of the concrete weir, above an artificial metal platform constructed for several items of pumping infrastructure. The site features a near-vertical sandstone cliff face, accessed by metal stairs and rock-cut stairs built into the rockface. There is extensive vegetation throughout the site. Historic dry-stone walls are evident in the higher, less visible portions of the cliff face. There is no noticeable shotcrete extant within the site. The site provides significant and unobstructed views towards several significant areas of the Broughtons Pass heritage item, including the concrete weir wall, the natural gorge environment, and the Wilton Bridge. The site is partially visible from the Wilton Bridge and across the weir at a viewing platform.

Figure 6. Site 001, metal ladder on cliff face



Figure 8. Part of infrastructure at Site 001



Figure 7. Site 001, natural cliff face with plaster wall



Figure 9. View to Weir from Site 001



1.6 Heritage significance

Determining the significance of heritage items is undertaken by utilising a system of assessment centred on the *Burra Charter* of Australia ICOMOS. The principles of the charter are relevant to the assessment, conservation and management of sites and relics. The assessment of heritage significance is outlined through legislation in the *NSW Heritage Act 1977* and implemented through the *NSW Heritage Manual* and the *Archaeological Assessment Guidelines*.³³ If an item meets one of the seven heritage criteria, and retains the integrity of its key attributes, it is considered to have heritage significance.

'State heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

'Local heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.³⁴

The heritage significance assessment criteria are included in Table 3 and Table 4.

1.6.1 Heritage significance of Broughtons Pass Weir

The heritage significance of Broughtons Pass Weir has been previously assessed against the NSW heritage significance criteria.³⁵ This assessment has been included in Table 3.

Table 3. Assessment against the NSW heritage criteria

Criteria	Discussion
A – Historical Significance	<i>Historically associated with water supply.</i> Broughtons Pass Weir meets the threshold of local significance under this criterion.
B – Associative Significance	Broughtons Pass Weir does not meet the threshold of local significance under this criterion.
C – Aesthetic Significance	<i>Site of high aesthetic value for its natural setting. Local landmark.</i> Broughtons Pass Weir meets the threshold of local significance under this criterion.
D – Social Significance	Broughtons Pass Weir does not meet the threshold of local significance under this criterion.

³³ NSW Heritage Office 1996; 25-27

³⁴ This section is an extract based on the Heritage Office, *Assessing Significance for Historical Archaeological Sites and Relics* (Parramatta: NSW Heritage Office, 2009), 6.

³⁵ NSW Office of Environment and Heritage, *Upper Canal System*.

Criteria	Discussion
E – Research Potential	<p><i>Together the weir and pumping station have some research potential as an engineering example.</i></p> <p>Broughtons Pass Weir meets the threshold of local significance under this criterion.</p>
F – Rarity	<p>Broughtons Pass Weir does not meet the threshold of local significance under this criterion.</p>
G – Representativeness	<p>Broughtons Pass Weir does not meet the threshold of local significance under this criterion.</p>

1.6.1.1 Statement of significance

The following statement of significance has been extracted from the LEP listing for Broughtons Pass Weir:

Broughtons Pass Weir, together with the pumping station as a contributory item and the curtilage of the surrounding gorge, is of landmark, aesthetic, historic and research significance. The weir and pumping station are located in a site of high aesthetic value for its natural setting. It is historically associated with local water supply and has some research potential as an engineering example. The nearby sandstone pier bridge is also of aesthetic value.³⁶

The Conservation Management Plan for the Upper Canal System has graded the Broughtons Pass Weir as being of exceptional significance.³⁷

³⁶ NSW Office of Environment and Heritage 'Broughtons Pass Weir', 2007, <https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2690369> (accessed 24 February 2020).

³⁷ NSW Public Works, Government Architect's Office, *Upper Canal: Pheasant's Nest to Prospect Reservoir – Conservation Management Plan* (Sydney: Government Architect's Office, 2016), 236.

1.6.2 Heritage significance of the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir)

The heritage significance of the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) has been previously assessed against the NSW heritage significance criteria.³⁸ This assessment, provided within the 2016 CMP for the item, has been included in Table 4.

³⁸ Government Architect's Office, *Upper Canal*, 18.

Table 4. Assessment against the NSW heritage criteria

Criteria	Discussion
A – Historical Significance	<p><i>The Upper Canal, as part of the Upper Nepean Scheme, has been in use as a gravity-fed water supply system and a key part of Sydney’s water supply without substantial alteration to its fabric since its completion in 1888. It operates in essentially the same way as was originally envisaged as a gravity-fed system utilising open canals and closed tunnels and aqueducts to transport water over a long distance.</i></p> <p><i>As a key component in the Upper Nepean Scheme, the Upper Canal is related to the major NSW historic theme of utilities. The provision of potable water is a first priority in any settlement and influences the success of all settlement building endeavours. The Upper Canal supported the development and expansion of Sydney, NSW’s largest and most important settlement, particularly during the late nineteenth and early twentieth centuries, a period of rapid population growth and industrial development. The local water supplied from the Upper Canal also allowed the agricultural development of the areas along its route.</i></p> <p><i>The route of the Upper Canal is associated with a large number of early colonial estates, many of which have given the local areas their current names including Meadowvale, Beulah, Mount Gilead and its extant landmark mill ruin, Glenlee, Glen Alpine, Gledswood, Varroville, Denham Court, Ingleburn, Leppington, Horningsea Park and Horsley. The names of various elements along the Canal also record previous local names that no longer exist except within the Upper Canal easement, such as Molles Main and Devil’s Back. For over half of its route the Canal follows, and at one point crosses, the Old Cowpasture Road, which is one of the earliest European travel routes in Australia.</i></p> <p><i>The Upper Canal has STATE heritage significance under this criterion. These values are embodied in the:</i></p> <ul style="list-style-type: none"> - <i>Key original components of the Canal including open canal sections, tunnels, aqueducts, weirs and offtakes and the support structures that allowed it to function such as flumes, access roads, depots, cottages, telegraph lines and bridges;</i> - <i>Ongoing use of the Canal as a gravity fed water supply system for Sydney and a key element in the Upper Nepean Scheme;</i> - <i>Names of the various sections of the Canal and individual elements within it;</i> - <i>Rural landscape setting of the Canal and the topography that allowed it to operate as a gravity fed system.</i>

Criteria	Discussion
<p>B – Associative Significance</p>	<p><i>The construction of the Upper Canal is strongly associated with Edward Orpen Moriarty, the head of the Harbours and Rivers Branch of the NSW Public Works Department who was a key figure in the development of plans for Sydney’s water supply in the 1870s and 80s. The successful completion of the Canal and its continuation of use as a major element in Sydney’s water supply system are a lasting testament to the professional capabilities of the late Victorian era generation of engineers of the Public Works Department including Moriarty.</i></p> <p><i>The operation of the Canal is strongly associated with the Board of Water Supply and Sewerage, established in 1888, but renamed the Metropolitan Water Sewerage and Drainage Board in 1924. The Board in both its incarnations was a powerful and influential government body throughout the late nineteenth and early to mid twentieth centuries.</i></p> <p><i>The Upper Canal has STATE heritage significance under this criterion. These values are embodied in the:</i></p> <ul style="list-style-type: none"> - <i>Key original components of the Canal including open canal sections, tunnels, aqueducts, weirs and offtakes and the support structures that allowed it to function such as flumes, access roads, depots, cottages, telegraph lines and bridges;</i> - <i>Remaining fabric relating to the phase of upgrading flumes and bridges by the Metropolitan Water Sewerage and Drainage Board in the 1920s and 30s.</i>

C – Aesthetic/Technical Significance

Technical

The Upper Canal contributed to the major advance made by the Upper Nepean Scheme from depending on local water sources to harvesting water in upland catchment areas, storing it in major dams and transporting it to the city by means of major canals and pipelines.

It is an excellent example of the ingenuity of late nineteenth century hydraulic engineering, in particular for its design as a gravity-fed water supply system through difficult terrain. It illustrates the techniques of canal building (often at extremely small grades), the progressive improvements in both pipe manufacture and pipeline construction and the construction of wrought iron aqueducts.

The Upper Canal provides detailed and varied evidence of engineering construction techniques prior to the revolution inspired by reinforced concrete construction. Although concrete was later used to improve the durability of the System, much of the earlier technology is still evident along the Canal.

It also provides extensive evidence of the evolution of engineering practice, such as the replacement of timber flumes by wrought iron flumes to be followed by concrete flumes. The early utilization of concrete for many engineering purposes, also demonstrates the growing emergence of an engineering technology based upon man-made rather than natural materials.

Many of the original control installations such as the ‘Stoney gates’, stop logs, penstocks, gate valves are still in service and continue to illustrate the technology of the original construction period of the Canal. Where these elements have been replaced it is generally with like technology using modern materials, thereby continuing the essential character of the Canal and its originally intended operation.

Aesthetic

Many of the surviving plantings along the Upper Canal function as major landmarks in the local rural landscape – either as strong linear designs (pine avenues) or distinctive small groups or solitary trees (Bunya and Hoop Pines). Plantings are used along the Canal to mark significant items of infrastructure and the arrival of Prospect Reservoir. The Canal itself is an impressive landscape element with its sandstone and concrete lined edges and serpentine route – based on gentle engineered curves – as it negotiates the complex topography along its route. In many sections it still retains its historic setting, although this is increasingly under threat from surrounding development for housing and light industry.

The Upper Canal has STATE heritage significance under this criterion. These values are embodied in the:

- *Key original components of the Canal including open canal sections, tunnels, aqueducts, weirs and offtakes and the support structures that allowed it to function such as flumes, access roads, depots, cottages, telegraph lines and bridges;*
- *Ongoing use of the Canal as a gravity fed water supply system for Sydney and a key element in the Upper Nepean Scheme;*
- *Rural landscape setting of the Canal and the topography that allowed it to operate as a gravity fed system;*

Criteria	Discussion
	<ul style="list-style-type: none"> - <i>The contrast of the grass and introduced plantings within the Canal corridor with the stone, concrete and brick structures of the Canal;</i> - <i>Planned historic plantings within the Canal corridor including avenues of pines and cultural plantings associated with depots and cottages.</i>
<p>D – Social Significance</p>	<p><i>The social significance of the Upper Canal has not been formally assessed through community consultation. The Canal is not a public access area and many people, even in the local community are likely to be unaware of its existence and significance. Nevertheless it is likely that the Canal has heritage significance under this criterion. The Canal is recognized by the NSW Heritage Council; the National Trust of Australia; and a number of local councils along its route. It is expected that engineering heritage groups in NSW and across Australia would have a strong interest in, and association with, the Canal as an outstanding and rare example of its type of late nineteenth century hydraulic engineering.</i></p>
<p>E – Research Potential</p>	<p><i>The Upper Canal is an outstanding benchmark site demonstrating a range of late nineteenth century engineering techniques and innovations in water supply technology, over a long distance in complex topography.</i></p> <p><i>There may be some historical archaeological evidence of the original construction camps, providing an insight into life for the construction workers in temporary accommodation in the late nineteenth century that is not available in historic sources. There may also be some limited archaeological evidence associated with life for the maintenance men and their families in cottages along the Canal easement.</i></p> <p><i>Aboriginal sites within the Canal easement are likely to contribute further information about Aboriginal people in the local area prior to the construction of the Canal in the 1880s.</i></p> <p><i>The Upper Canal passes through various remnant Indigenous vegetation communities. These are likely to have scientific interest and require further specific study.</i></p> <p><i>The Upper Canal has LOCAL heritage significance under this criterion. These values are embodied in the:</i></p> <ul style="list-style-type: none"> - <i>Key original components of the Canal including open canal sections, tunnels, aqueducts, weirs and offtakes and the support structures that allowed it to function such as flumes, access road, depots, cottages, telegraph lines and bridges;</i> - <i>Historical archaeological evidence at construction camp sites and cottage sites within the Canal corridor;</i> - <i>Aboriginal sites within the Canal corridor;</i> - <i>Remnant native vegetation within the Canal corridor</i>

Criteria	Discussion
F – Rarity	<p><i>The Upper Canal has functioned as part of Sydney’s main water supply system for 125 years and continues to do so. It has changed little in its operational principles since it was completed in 1888, continuing to operate as a gravity fed system, utilising open canals and closed tunnels and aqueducts to transport water over a long distance.</i></p> <p><i>The Canal is unique in NSW, being the only extensive gravity fed water supply canal system to supply a large city and its population with fresh water from a distant source in the hinterland. This type of water supply system also appears to be rare in Australia. The rarity of the Canal is enhanced by its integrity and its continuing operation largely using the original infrastructure built in the 1880s which still operates as originally intended. Such intact systems demonstrating an array of nineteenth century engineering techniques are rare.</i></p> <p><i>Surviving long avenues of single and mixed pine species as a late 19th/early 20th century landscape feature are becoming increasingly rare within the Cumberland Plain. The Upper Canal route has two such features – the mixed pine avenue at Kenny Hill and the lines of Stone Pines and Bunya Pines near the Old Cowpasture Road at Leppington. Winbourne at Mulgoa still has its impressive Stone Pine avenue while another early line of Stone Pines at Glen Lorne, off the Appin Road, has all but died out. Impressive lines of Bunya Pines remain at Bella Vista (Seven Hills) and at Horsley Park while at Prospect Reservoir there is the long mixed avenue of Hoop and Bunya Pines.</i></p> <p><i>The Upper Canal has STATE heritage significance under this criterion. These values are embodied in the:</i></p> <ul style="list-style-type: none"> - <i>Key original components of the Canal including open canal sections, tunnels, aqueducts, weirs and offtakes and the support structures that allowed it to function such as flumes, access roads, depots, cottages, telegraph lines and bridges;</i> - <i>Ongoing use of the Canal as a gravity fed water supply system for Sydney and a key element in the Upper Nepean Scheme;</i> - <i>Planned historic plantings within the Canal corridor, particularly the avenues of pines.</i>
G – Representativeness	<p><i>This criterion does not apply to this site, except with regard to the landscape plantings. The choice of plantings along the Canal route is representative of the late 19th/early 20th century period. Further research or investigation may reveal additional information relevant to this criterion.</i></p>

1.6.2.1 Statement of significance

The following statement of significance has been extracted from the CMP for the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir).³⁹

The Upper Canal has STATE heritage significance.

The Upper Canal, as part of the Upper Nepean Scheme, has been in use as a gravity fed water supply system and a key part of Sydney's water supply without substantial alteration to its fabric since its completion in 1888. It operates in essentially the same way as was originally envisaged.

The Upper Canal is unique in NSW, being the only extensive gravity fed water supply canal system to supply a large city and its population with fresh water from a distant source in the hinterland. This type of water supply system also appears to be rare in Australia. The rarity of the Canal is enhanced by its integrity and its continuing operation largely using the original infrastructure built in the 1880s which still operates as originally intended. Such intact systems demonstrating an array of nineteenth century engineering techniques are rare.

As a key component in the Upper Nepean Scheme, the Upper Canal is related to the major NSW historic theme of utilities. The provision of potable water is a first priority in any settlement and influences the success of all settlement building endeavours. The Upper Canal supported the development and expansion of Sydney, NSW's largest and most important settlement, particularly during the late nineteenth and early twentieth centuries, a period of rapid population growth and industrial development.

It is an excellent example of the ingenuity of late nineteenth century hydraulic engineering, in particular for its design as a gravity-fed water supply system through difficult terrain. The Upper Canal is an outstanding benchmark site demonstrating a range of late nineteenth century engineering techniques and innovations in water supply technology, particularly techniques in use prior to the revolution inspired by reinforced concrete construction. Although concrete was later used to improve the durability of the Canal, much of the earlier technology is still evident along the Canal.

The Canal itself is an impressive landscape element with its sandstone and concrete lined edges and serpentine route – based on gentle engineered curves – as it negotiates the complex topography along its route. There are numerous areas of significant plantings along the route of the Canal, particularly some avenues of pines dating to the construction of the Canal. The Canal corridor is known to contain a range of historical archaeological sites associated with the construction of the Canal. The Canal corridor is known to contain a range of historical archaeological sites associated with the construction and operation of the Canal as well as Aboriginal sites that pre-date the Canal's construction. These sites may contribute knowledge about the local area and the lives of the construction workers not available from other sources.

³⁹ Government Architect's Office, *Upper Canal*, 18.

1.7 Impact assessment

1.7.1 Methodology

An impact assessment is provided for direct, visual impact, and potential indirect impacts. Each type of impact is described in Table 5 below. In order to consistently identify the potential impact of the proposed works, the terminology contained in Table 6 has been referenced throughout this document. This terminology, and corresponding definitions, are based on those contained within guidelines produced by the International Council on Monuments and Sites (ICOMOS).⁴⁰

Table 5. Terminology for heritage impact types

Impact	Definition
Direct	Impacts resulting from works located within the curtilage boundaries of the heritage item.
Visual	Impact to views, vistas and setting of the heritage item resulting from proposed works inside or outside the curtilage boundaries of the heritage item.
Potential indirect	Impacts resulting from increased noise, vibrations and construction works located outside the curtilage boundaries of the heritage item.

Table 6. Terminology for assessing the magnitude of heritage impact

Grading	Definition
Major	<p>Actions that would have a long-term and substantial impact on the significance of a heritage item. Actions that would remove key historic building elements, key historic landscape features, or significant archaeological materials, thereby resulting in a change of historic character, or altering of a historical resource.</p> <p>These actions cannot be fully mitigated.</p>
Moderate	<p>Actions involving the modification of a heritage item, including altering the setting of a heritage item or landscape, partially removing archaeological resources, or the alteration of significant elements of fabric from historic structures.</p> <p>The impacts arising from such actions may be able to be partially mitigated.</p>
Minor	<p>Actions that would result in the slight alteration of heritage buildings, archaeological resources, or the setting of an historical item.</p> <p>The impacts arising from such actions can usually be mitigated.</p>
Negligible	Actions that would result in very minor changes to heritage items.
Neutral	Actions that would have no heritage impact.

⁴⁰ Including the document *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*, (Paris: ICOMOS, 2011).

1.7.2 Proposed works

1.7.2.1 Summary of potential rockfall stabilisation treatments

The proposed works will include a series of rockfall stabilisation measures, including scaling, vegetation removal, and the installation of rock bolts, shotcrete and rock mesh⁴¹. Temporary anchors may be drilled to the top of the cliff-face to enable abseiling for contractors to complete works. A temporary site compound would also be located within the Broughtons Pass depot. A summary of the proposed work types is included below, and the proposed works by location are outlined in Table 7.

General preparatory works

Prior to treatment works being executed, preparatory rock face works would be carried out across all cuttings/slopes. The rock faces will be prepared for rock bolting/ meshing via a combination of scaling, grooming and tree lopping. Works will include the disposal of removed rock, soil and vegetation, material offcuts and excess grout to an approved disposal site.

Vegetation removal/ Lopping

Vegetation removal includes the removal of trees growing on rock cuttings/ slopes and within 3m slope distance of the cutting crest. The removal of vegetation will include the follow up poisoning of any cut stumps.

Scaling and grooming

Scaling and grooming involves excavation, removal and/or reshaping of materials present at the rock face or crest in order to remove the hazard presented by that material or to prepare it for specialist treatment. Scaling is the removal of potentially unstable rock blocks from the rock face/ slope. Grooming is the removal of leaf litter, small rock fragments and soil accumulations from ledges.

While specified areas of scaling and grooming have been identified within the projects scope of works, requirements for additional areas of scaling and grooming may be identified during de-vegetation with additional works undertaken as required.

Scaling and grooming may be undertaken either by hand or by mechanical methods.

Rock bolts

The installation of rock bolts involves the insertion of steel reinforcing bars into the rockface through pre-drilled holes. The rock bolt will subsequently be grouted into the rock face to ensure the rock bolt is fully encapsulated in the drill sleeve. The end of each rock bolt will include a bearing plate and washer which will be visible on the rock face following the completion of works.

Shotcrete

The installation of shotcrete involves the application of sprayed concrete to the surface of excavation to provide protection and structural support. Preparation works for the installation of shotcrete include the cutting back of loose, detached or protruding material, the cleaning down of the face area to be treated, installation of dowels and reinforcing mesh and the provision of weep holes and strip drainage as appropriate.

Rock mesh

⁴¹ GHD 2020, *WaterNSW, Greater Sydney Rockfall Stabilisation Project Detailed Design*, Report to Water NSW

Rock mesh stabilisation processes involves the installation of a draped rock fall mesh across the rock face. Anchorage of the mesh to the rock face involves connection of the mesh to galvanised wire ropes held in position by anchors located along the top and bottom of the rock face.

Rock fence

Rock fencing involves the installation of Geobrugg vertical rock fall barriers. This involves drilling 200mm holes vertically into the rockface for the installation of anchors and lateral post, which would be secured in place with tension wires, concrete and/or grout.

Table 7. Proposed works at Broughtons Pass Weir

Description of proposed works	Proposed Quantity
Broughtons Pass Weir, Site 001	
General rock scaling and devegetation	2710m ²
Targeted rock removal and scaling, jack hammer etc.	30m ³
Supply and installation of 6m rock bolts	10
Supply and installation of 4m rock bolts	6
Supply and installation of 3m rock bolts	11
Supply and installation of 2m rock bolts	4
Supply and installation of Geobruff T35 Rockfall Barrier	45m ²
Supply and installation of pinned rockfall mesh	152m ²

Note: The proposed quantities have been developed based on inspection by GHD. The current assessment has assessed impacts based on the assumption that the treatment quantity may vary based on site conditions. The impact assessment has assessed the works based on an assumed variance in quantity of rock bolts of up to +20% with all other stabilisation measures assessed to a variance of up to +10%.

Figure 10: Rock bolt details (Source: GHD 2020)

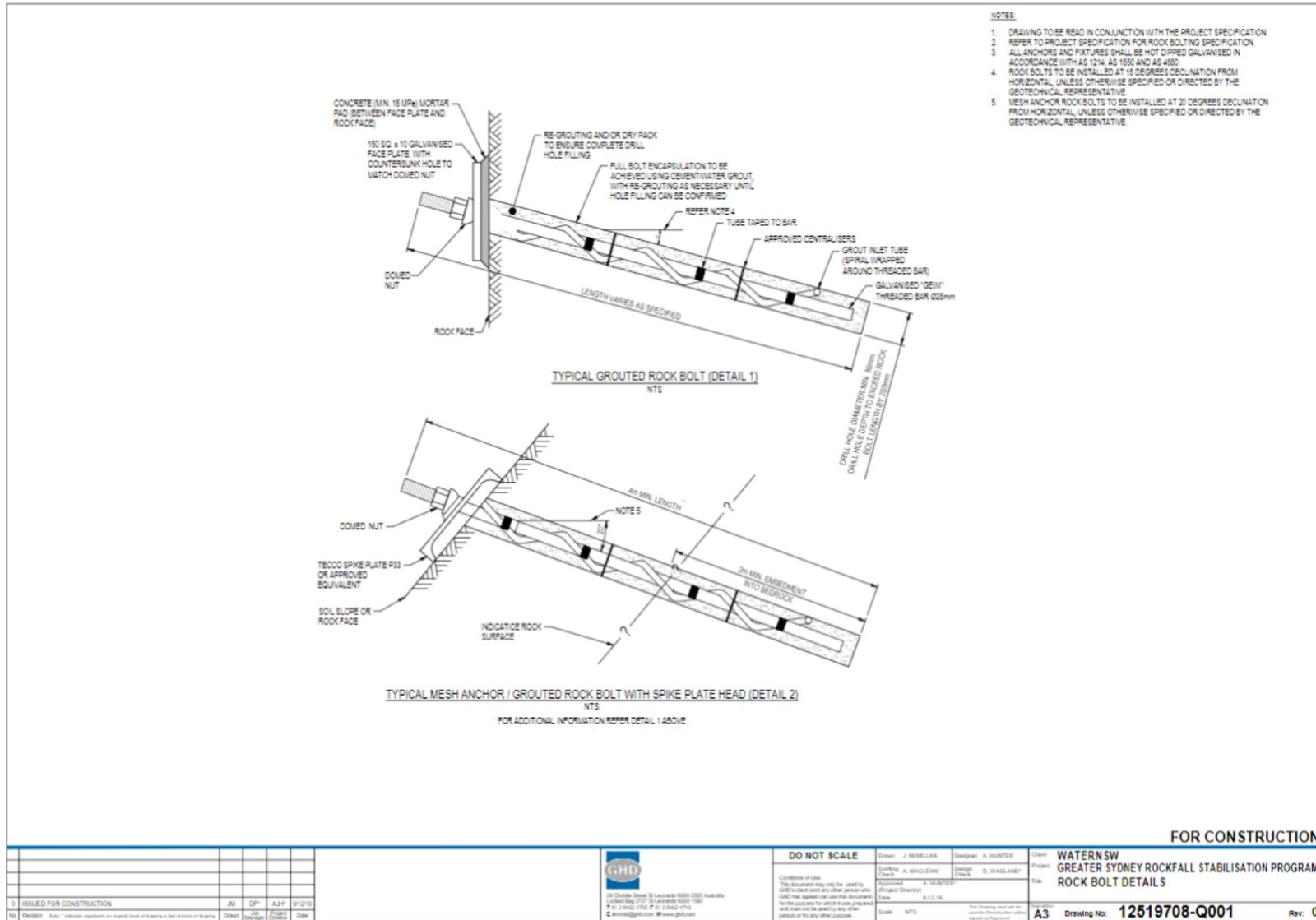


Figure 12. Draped mesh slope treatment (Source: GHD 2020)

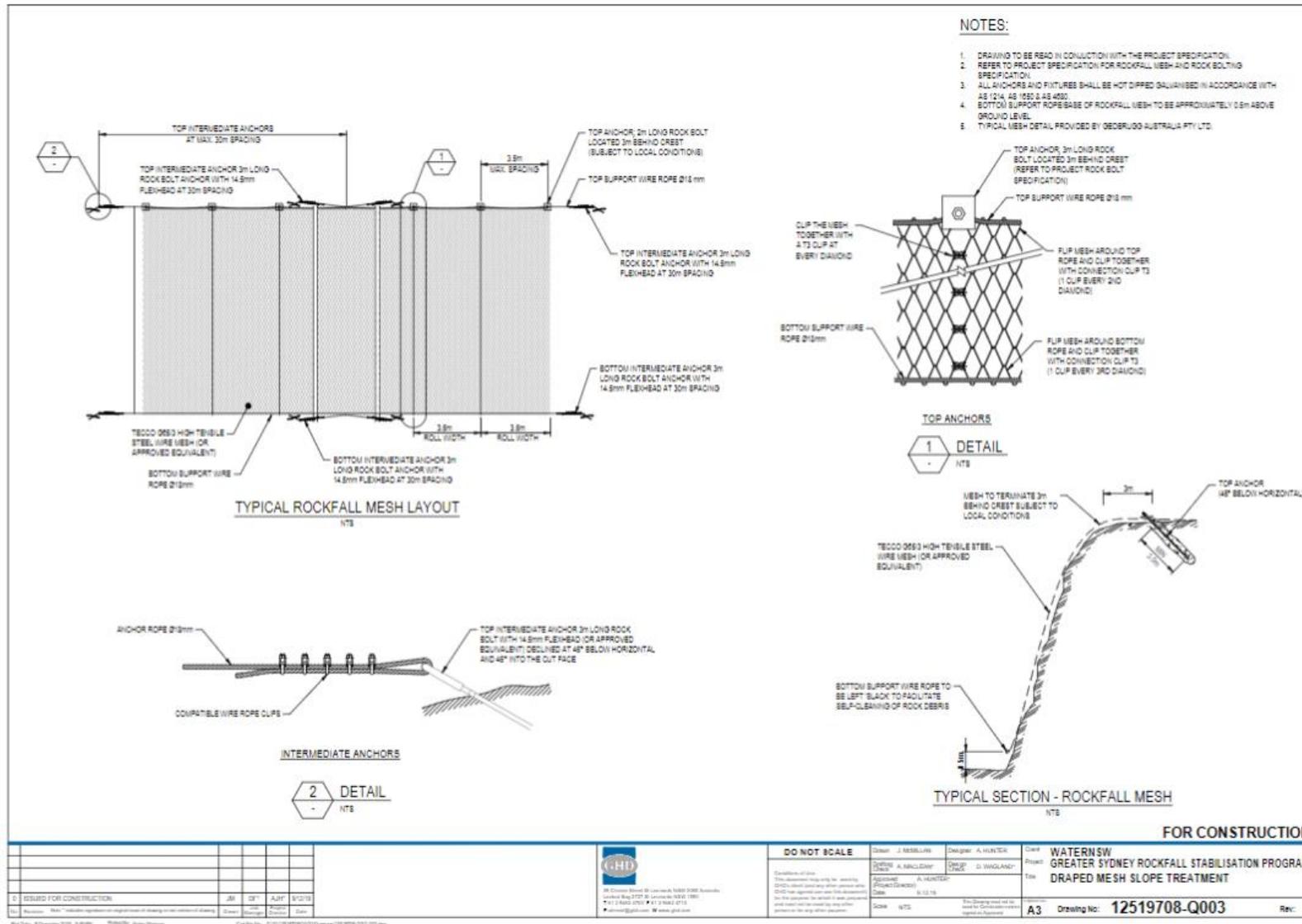


Figure 13. Pinned mesh treatment details (Source: GHD 2020)

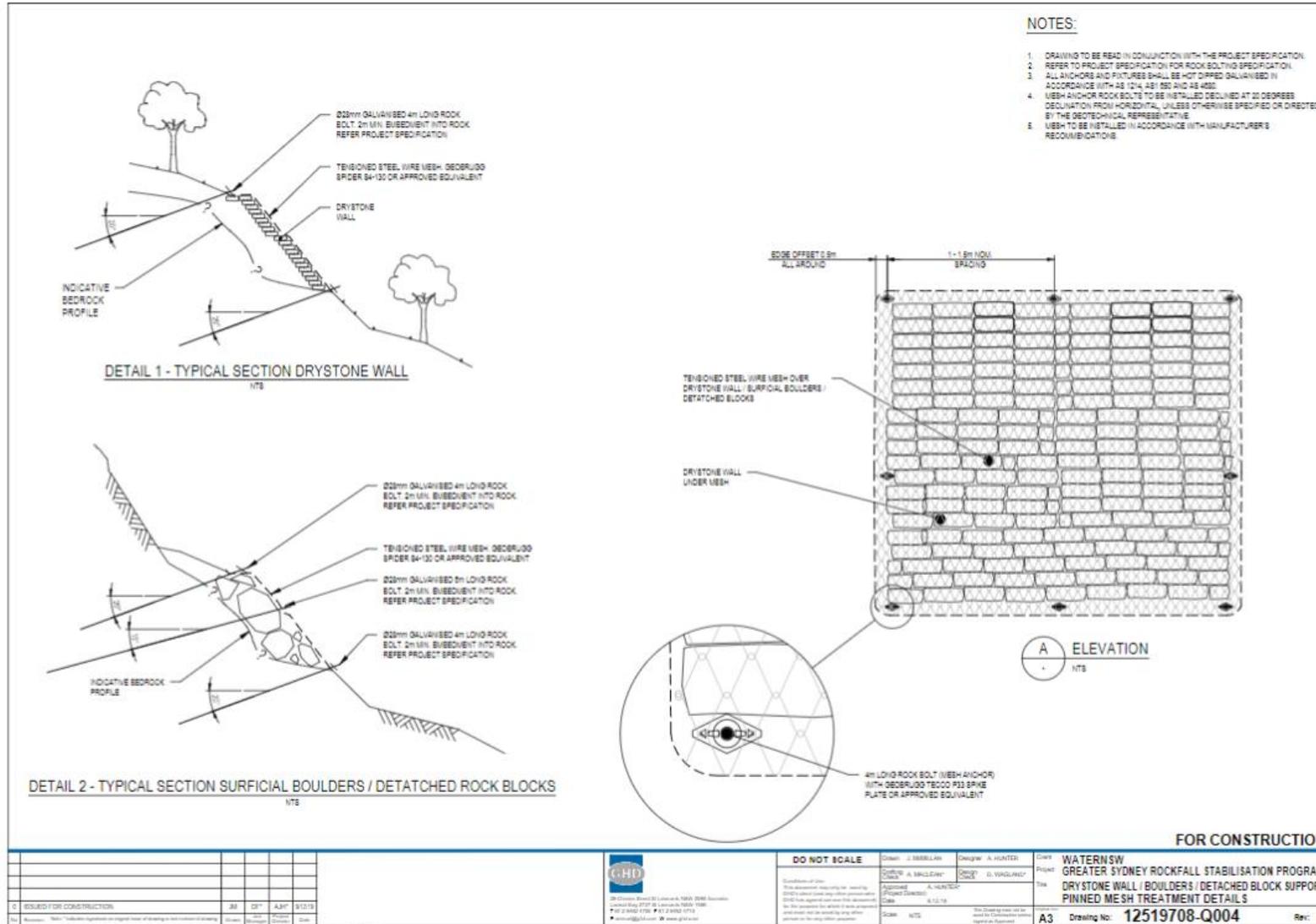


Figure 14. Proposed Works at Broughtons Pass Weir Sheet 2 (Source: GHD 2020)

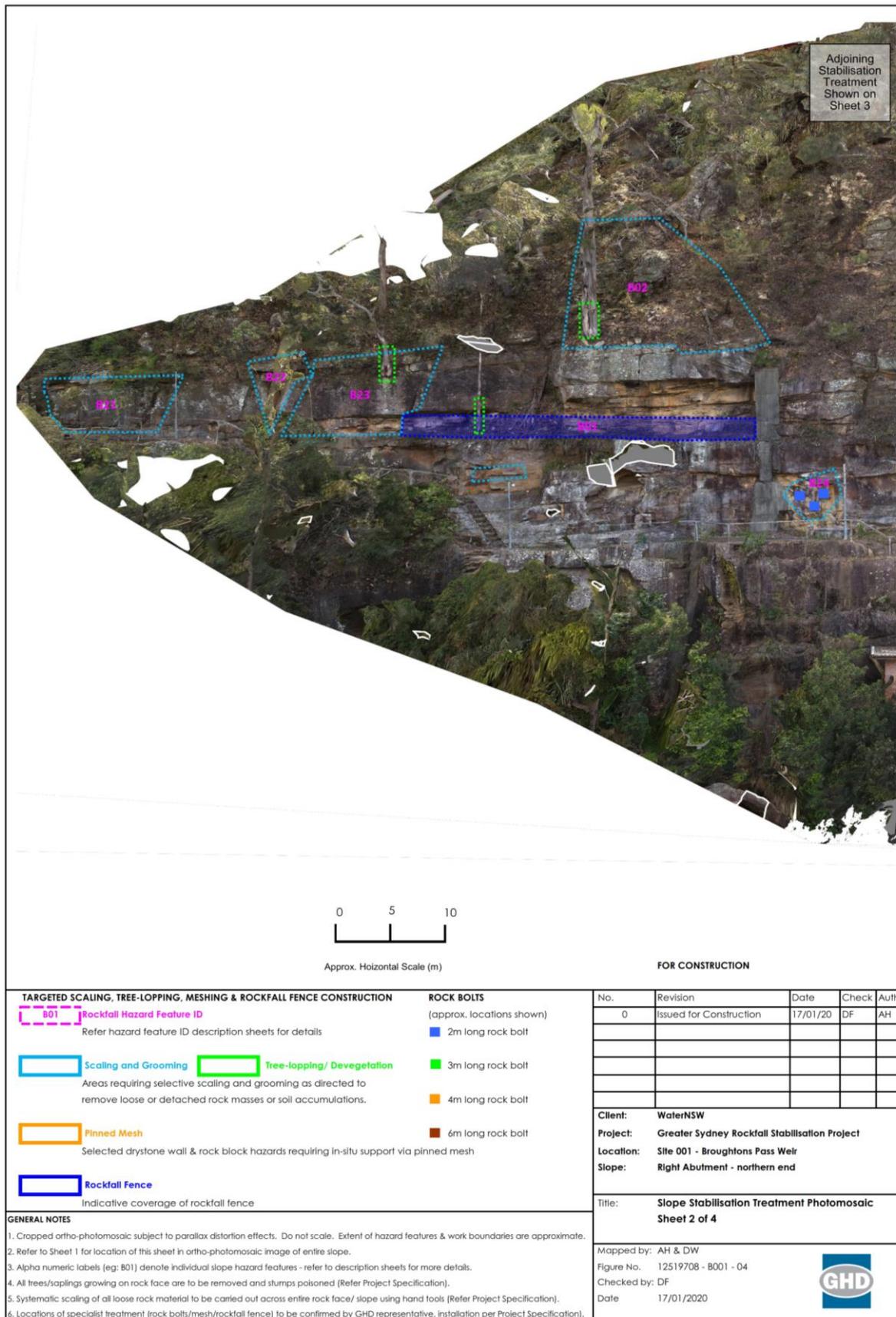


Figure 15. Proposed works at Broughtons Pass Weir Sheet 3 (Source: GHD 2020)

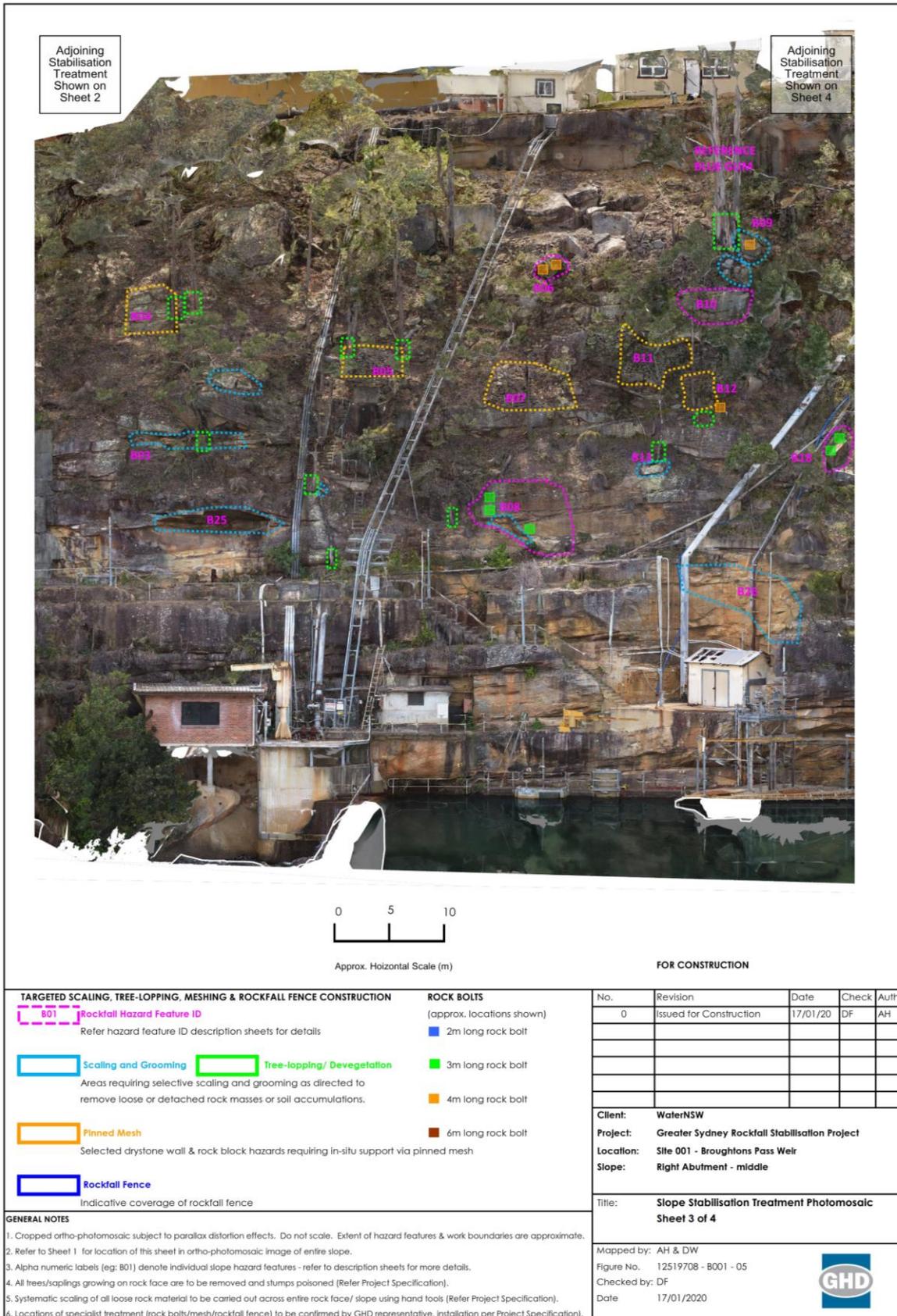
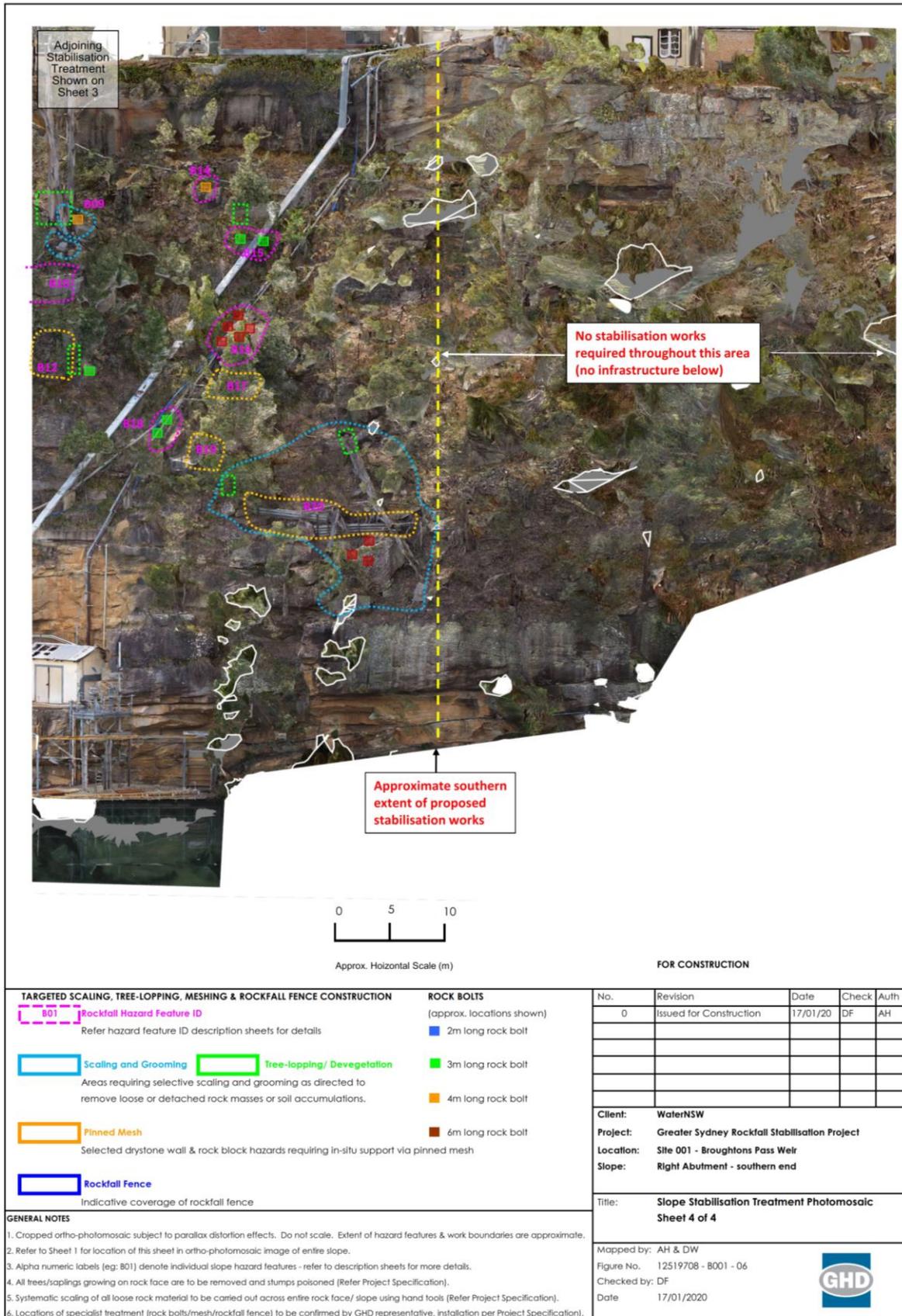


Figure 16. Proposed works at Broughtons Pass Weir Sheet 4 (Source: GHD 2020)



1.7.3 Assessment of impact to significance of Broughtons Pass Weir

1.7.3.1 Direct impacts

The Wollondilly LEP listing for the Broughtons Pass Weir lists the natural gorge setting of the weir as a contributory aesthetic element of the heritage significance of the item. The sandstone cliff faces and vegetation are not listed as significant fabric in the Broughtons Pass LEP listing or in the Upper Canal System SHR listing. The installation of rock fence at a height of 1.5m would require drilling of bolts and anchors into the rockface, resulting in localised impacts to the sandstone. Installation of rockfall mesh will require drilling of anchor points into the rock face, and while this would be frequently used to cover historic retaining walls, the anchors would impact the sandstone as opposed to the fabric of the walls. The proposed works would not result in direct impacts to significant fabric associate with either listing. Furthermore, the works are limited to necessity and would be largely removable and reversible, not resulting in permanent impacts.

Overall, the proposed works would result in a **negligible** direct impact to significant fabric associated with the Broughtons Pass Weir and Upper Canal System heritage items.

1.7.3.2 Indirect impacts

As discussed above, the natural gorge setting is a contributing element to the aesthetic significance of the Broughtons Pass Weir heritage item. The proposed works are concentrated in one site near significant fabric associated with the pumping system of the weir, however the works would not overall be intrusive or highly noticeable from elsewhere in the heritage curtilage, particularly from the publicly accessible areas of the Wilton Bridge. The use of rock fencing will be somewhat noticeable at a height of 1.5m, although overall the fencing would not be visually dominant. The works would see some localised cumulative visual impacts, however there is no proposed use of shotcrete or other highly noticeable methods. The proposed works, such as installation of rock bolts and selective scaling would not be highly noticeable.

Overall, the proposed works would result in a **negligible** visual impact to the Broughtons Pass Weir heritage item.

1.7.4 Statement of heritage impact

Table 8 provides a statement of heritage impact for the proposal.

Table 8. Terminology for assessing the magnitude of heritage impact

Development	Discussion
What aspects of the proposal respect or enhance the heritage significance of the study area?	<p>Within the heritage curtilage of the Broughtons Pass Weir, the proposed works methodology has sought to utilise non-intrusive and small-scale methods where possible.</p> <p>The proposed works would not impact any significant fabric associated with the Broughtons Pass Weir or the surrounding built heritage environment.</p>
What aspects of the proposal could have a detrimental impact on the heritage significance of the study area?	<p>Overall, the impact of the proposal on the heritage significance of the Broughtons Pass Weir is considered to be negligible. While the proposed works may result in minor localised cumulative visual impacts, it would not be considered detrimental to the significance of the Broughtons Pass Weir heritage item.</p>

Development	Discussion
Have more sympathetic options been considered and discounted?	N/A

1.8 Approvals

The proposed works will occur within the SHR curtilage of the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) (as per LPI mapping data dated to 26/2/2020; see Section 1.3.1.1).

To carry out activities within the curtilage of an item listed on the SHR, approval must be gained from the Heritage NSW, DPC by securing a Section 60 permit. In some circumstances, under Section 57(2) of the Heritage Act, a Section 60 permit may not be required if works are undertaken in accordance with the NSW Heritage Branch document *Standard Exemptions for Works Requiring Heritage Council Approval*,⁴² or in accordance with agency-specific exemptions. This includes works that are only minor in nature and will have minimal impact on the heritage significance of the place.

This assessment has found that the proposed works will have negligible adverse impact on the heritage significance of the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) State heritage item. The proposal is therefore exempt from the requirement to obtain approval under s60 of the NSW Heritage Act 1977 under the following Standard Exemptions:⁴³

Standard Exemption 7: *Minor activities with little or no adverse impact on heritage significance.*

Anything which in the opinion of the Director-General is of a minor nature and will have little or no adverse impact on the heritage significance of the item does not require approval under subsection 57(1) of the Act.

A section 57(2) notification under Standard Exemption 7 requires a statement be provided to Heritage NSW demonstrating that the activity is of a minor nature and will not adversely affect the heritage significance of the item. This statement of heritage impact included in this HIA can be used to demonstrate the minor nature of the proposal.

1.9 Conclusions

- The proposed works are located within the curtilages of the following heritage items:
 - Upper Canal System (Pheasants Nest Weir to Prospect Reservoir), State Heritage Register (SHR 01373; as per LPI mapping data dated to 26/2/2020)
 - Upper Nepean Scheme, WaterNSW s170 Heritage and Conservation Register (SHI 4580004)
 - Broughtons Pass Weir, Wollondilly LEP 2011 (I15)

⁴² NSW Heritage Branch, *Standard Exemptions for Works Requiring Heritage Council Approval* (Parramatta: Heritage Branch, 2009).

⁴³ NSW Heritage Branch, *Standard Exemptions for Works Requiring Heritage Council Approval*.

- The proposed works would result in a **negligible** direct impact to the heritage significance of the Broughtons Pass Weir heritage item and the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) heritage item
- The proposed works would result in a **negligible** visual impact to the heritage significance of the Broughtons Pass Weir and Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) heritage item
- Assuming the works will occur with a listed SHR item curtilage, the proposed works would be exempt under Standard Exemption 7, as outlined in the *Standard Exemptions for Works Requiring Heritage Council Approval*. As such, a Section 57 exemption form must be submitted to Heritage NSW, DPC. A Section 60 approval would not be necessary for the proposed works unless deemed so by Heritage NSW, DPC.

1.10 Recommendations

- This report should accompany a Section 57 exemption for works within the Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) SHR curtilage.
- Any project redesign resulting in new works must be assessed in an addendum to this HIA.
- Prior to the commencement of works a heritage induction should be prepared for all contractors to complete. The induction should identify significant fabric in proximity to the proposed works and outline any protection measures in place.