

APPENDIX E

ALEXANDRA CANAL SUB-PLAN

FINAL

WestConnex

Project:
WestConnex New M5
Urban Design and Landscape Plan

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Appendix E: Alexandra Canal Sub-Plan

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DRAGADOS



BY



TABLE OF CONTENTS

E1 INTRODUCTION	331	E8.3 Future Uses	340
E1.1 Project Description	331	E8.4 Rationale	340
E1.2 Ministers condition of approval	331	E9 DESIGN	341
E1.3 Site and Locality	331	E9.1 Approach	341
E1.4 Terminology	332	E9.2 Bridges 8 and 9	342
E2 PHOTOGRAPHIC SURVEY	333	E9.3 Bridge 10	343
E3 STATUTORY CONTEXT	335	E10 HERITAGE IMPACT ASSESSMENT	344
E4 BRIEF HISTORY	336	E10.1 Built Heritage	344
E4.1 History of Alexandra Canal	336	E10.2 Views and Settings	344
E4.2 Canal Construction	336	E10.3 Future Uses	344
E5 PHYSICAL DESCRIPTION	338	EC10.4 Heritage In The Vicinity	344
E5.1 Overview	338	E10.5 Local Planning Controls	345
E5.2 Material Composition	338	E11 STATUTORY CONTROLS	345
E6 SETTING, VIEWS AND CURTILAGE	337	E12 NON-STATUTORY CONTROLS	345
E6.1 Landscape Setting	337	E12.1 Alexandra Canal Conservation Management Plan 2004	345
E6.2 Views	337	E13 CONCLUSION	347
E6.3 Curtilage	338		
E7 STATEMENT OF SIGNIFICANCE	339		
E8 PROPOSED WORKS	340		
E8.1 Bridges 8 and 9	340		
E8.2 Bridge 10	340		

List of figures

Figure E-1 - The Conservation Management Plan separates the Canal into a series of Reachs which have been used to define the various landscapes along the full length of the CMP. (Source: Alexandra Canal Conservation Management Plan 2004)

Figure E-2 - The western approach of the Campbell Street/Road bridge. The building in the background is Rudders Bond, which has been approved for demolition as a part of the SSI.. The approach to the bridge will make use of the open yard and the space provided through the demolition of Rudders Bond.

Figure E-3 - The western approach to the Gardeners Road bridge. The area is heavily developed in terms of industrial factories and warehouses. The approach makes use of existing open yards, but will require the demolition of factories and warehouses which are of little significance.

Figure E-4 - Another view of the Gardeners Road bridge western approach. The area is heavily developed in terms of industrial factories and warehouses. The approach makes use of existing open yards, but will require the demolition of factories and warehouses which are of little significance.

Figure E-5 - This large open yard provides the approach for the Gardeners Road bridge. The structure in the background is the State Archives building.

Figure E-6 - Alexandra Canal is a large open span of water with earthen banks lined by primarily sandstone blocks. The wall has been modified at various sections with different materials, however the Archives reach remains primarily intact.

Figure E-7 - The views in and around the canal benefit from the wide open space of the canal. Any proposed bridges need to respect this openness and seek to maintain the clear visual corridors along and across the canal.

Figure E-8 - The canal wall within the Archives reach is one of the most intact sections of the canal, featuring the original fabric and form of the canal wall.

Figure E-9 - There are a few existing stormwater outlets into the canal within this section. This have been co-located at various points along the river, such as the location shown in this image.

Figure E-10 - The western approach to the Campbell Street/Road bridge. As with the Gardeners Road bridge, the area is primarily industrial with the bridge route making use of existing open yards where possible.

Figure E-11 - The intersection associated with the western approach to the Campbell Street/Road bridge.

Figure E-12 - The intersection associated with the western approach to the Campbell Street/Road bridge. Figure 14-13 -

Figure E-13 - The western approach to the Campbell Street/Road bridge. As with the Gardeners Road bridge, the area is primarily industrial with the bridge route making use of existing open yards where possible.

Figure E-14 - This open yard will form the main approach to the Campbell Street/Road bridge. This lines up with the eastern approach on the opposite bank and the proposed alignment into Campbell Street/Road.

Figure E-15 - This open yard will form the main approach to the Campbell Street/Road bridge. This lines up with the eastern approach on the opposite bank and the proposed alignment into Campbell Street/Road.

Figure E-16 - Looking south down the canal from 34 Burrows Road.

Figure E-17 - Looking north up the canal from 34 Burrows Road.

Figure E-18 - Section of eastern wall in the vicinity of the proposed Bridge 10.

Figure E-19 - Section of western wall in the location of Bridge 10

Figure E-20 - Western wall in the location of Bridge 10.

Figure E-21 - Eastern wall in the location of the proposed Bridge 10.

Figure E-22 - SHR curtilage map. Source: NSW OEH, SHR listing sheet for Alexandra Canal.

Figure E-23 - The plan for the development of the Canal was significantly influenced by the swampy winding nature of Shea's Creek. This plan shows the original Creek channel overlaid with plans for the Canal extending from the Confluence with the Cooks River to Ricketty Street. It can be seen how the line of the creek is much narrower than the Canal and that the northern end meanders considerably. The mud flats can also be seen at the southern end of the creek. Source: DPWS Plan Room Drg 34313

Figure E-24 - Discovery of the Dugong bones during construction of the Canal, 1894. Source: South Sydney Council State of the Environment Report 2000.

Figure E-25 - "Natives of Botany Bay" in Phillip, Arthur. The Voyage of Governor Phillip to Botany Bay. 2nd ed. (London, John Stockdale, 1790) Ferguson, 90.

Figure E-26 - Early construction of the Canal (below Ricketty Street) included sandstone walling with stone ballast as the footing. Source: DPWS Plan Room Drg 32440

Figure E-27 - The 1911 plan of the Alexandra Canal shows the finished Canal and the locations of the Wharf/s and the lots for the Woolsheds in the Woolshed Reach section. Source: DPWS Plan Room Drg 29429.

Figure E-28 - An undated plan of the Alexandra Canal by 1889 showing the Canal and fascine dyke up to Ricketty Street completed and construction beyond Ricketty Street has commenced.

Figure E-29 - 1984 view of abandoned Wool Sheds along Alexandra Canal. Source: Graeme Andrews 'Working Harbour' Collection: 80134. GKA. City of Sydney Archives, file no. 080/080134

Figure E-30 - As well as a land based curtilage, there is an air space curtilage around the canal based on the image above. The Conservation Management Plan establishes a curtilage of around 2 metres above the high water mark and 2 metres below the base of the canal.

Figure E-31 - The curtilage of Alexandra Canal based on the Conservation Management Plan prepared by the Government Architects Office of NSW, establishes a minimum distance of 3 metres either side of the top of the canal wall. The curtilage is shown as an orange line on the adjacent image.

Figure E-32 - Site plan showing Bridges 8, 9 and 10 (Source: Urban and Landscape Plan, p. 257)

Figure E-33 - Bridges 8 and 9 (Source: Urban and Landscape Plan, p. 255)

Figure E-34 - Site plan showing Bridges 8, 9 and 10 (Source: Urban and Landscape Plan, p. 258)

E1 Introduction

E1.1 Project Description

This Alexandra Canal Sub-Plan has been prepared to satisfy the Ministers Condition of Approval B62(e) (SSI6788). This Sub-Plan details the design and integration of the bridges over the Alexandra Canal and summarises the heritage impact assessment undertaken for the proposed bridges works, demonstrating compliance with the relative heritage policies and guidelines including the Alexandra Canal Heritage Conservation Plan.

The proposed works at Alexandra Canal includes three concrete road bridges known as Bridges 8, 9 and 10.

Bridges 8 and 9 will rise from Gardeners Road at 697 Gardeners Road over the eastern bank of Alexandra Canal, connecting to the western bank at 12-18 Burrows Road through to the St Peters Interchange where it divides into three separate routes. Bridges 8 and 9 provide multiple lanes connecting the local road network at Gardeners Road with the interchange and the inbound tunnel from the M5 extension.

Bridge 10 consists of a new road bridge between Burrows Road and Bourke Road, connecting the St Peters Interchange to the eastern bank of Alexandra Canal at 34 Burrows Road (along the alignment of Campbell Street/Road) to the western bank at 16/67 Bourke Road. Bridge 10 services primarily the local road network connecting the eastern side with Campbell Road/ Street and the Euston Road intersection with the St Peters interchange. Both approaches will make use of existing open yards.

E1.2 Ministers Conditions of Approval

Condition B61 requires, prior to the commencement of permanent built surface works, or as otherwise agreed by the Secretary, an Urban Design and Landscape Plan is to be prepared. The UDLP must be approved by the Secretary.

Condition B62 contributes to the final presentation and content of the plan, with the requirement for specific sub-plans. B62(e) requires the preparation of a sub-plan for the bridge works at Alexandra Canal.

B62(e): An Alexandra Canal Sub-plan which details the design and integration of the bridges over the Alexandra Canal, including a Heritage Impact Assessment addressing any heritage impacts to the canal and its setting taking into account future and current accessibility plans for the Canal and the heritage sensitivity of the setting as set out in the Alexandra Canal Heritage Conservation Plan.

E1.3 Site and Locality

Location

Alexandra Canal is a tributary of the Cooks River (which runs from Botany Bay) and is an artificial extension of the former Sheas Creek. The channel runs through the suburbs of St Peters and Mascot past Kingsford Smith Airport, the industrial areas of Tempe, Alexandra, Zetland and Sydney Park (the former brickpits).

The location of the subject works is within the predefined Archives Reach which runs between the Canal Road Bridge and the causeway which runs between 48A Burrows Road and 46 Burrows Road, Alexandria.

On the eastern side of the Canal the proposed bridges 8 and 9 will cut through the existing NSW Government records repository located near Gardeners Road. Bridge 10 runs between 34 Burrows Road, St Peters on the western side of the canal, to 16/67 Bourke Road, Alexandria on the eastern side. Both approaches will make use of existing open yards.

Surrounding Area

Alexandra Canal sweeps its way through primarily industrial land, flanked to the north and the south of the Canal by warehouses and industrial uses. At the junction with the Cooks River, Alexandra Canal is flanked by the Tempe Recreation Reserve and a freight intermodal to the north and the Kingsford Smith Airport to the south. The primary facilities for the airport along the boundary with the Canal appear to be fuel storage and maintenance, with service hardstands and equipment storage.

From the freight rail overbridge, the Canal extends to an end point adjacent to Huntley Street, St Peters. This section of the Canal is highly industrialised with warehouses and industrial buildings flanking the Canal on either side. Additional features include the Boral Concrete batching plant which is located to the north of the freight overbridge and the metal recycling yard which sits on the northern side of the Canal near Huntley Street.

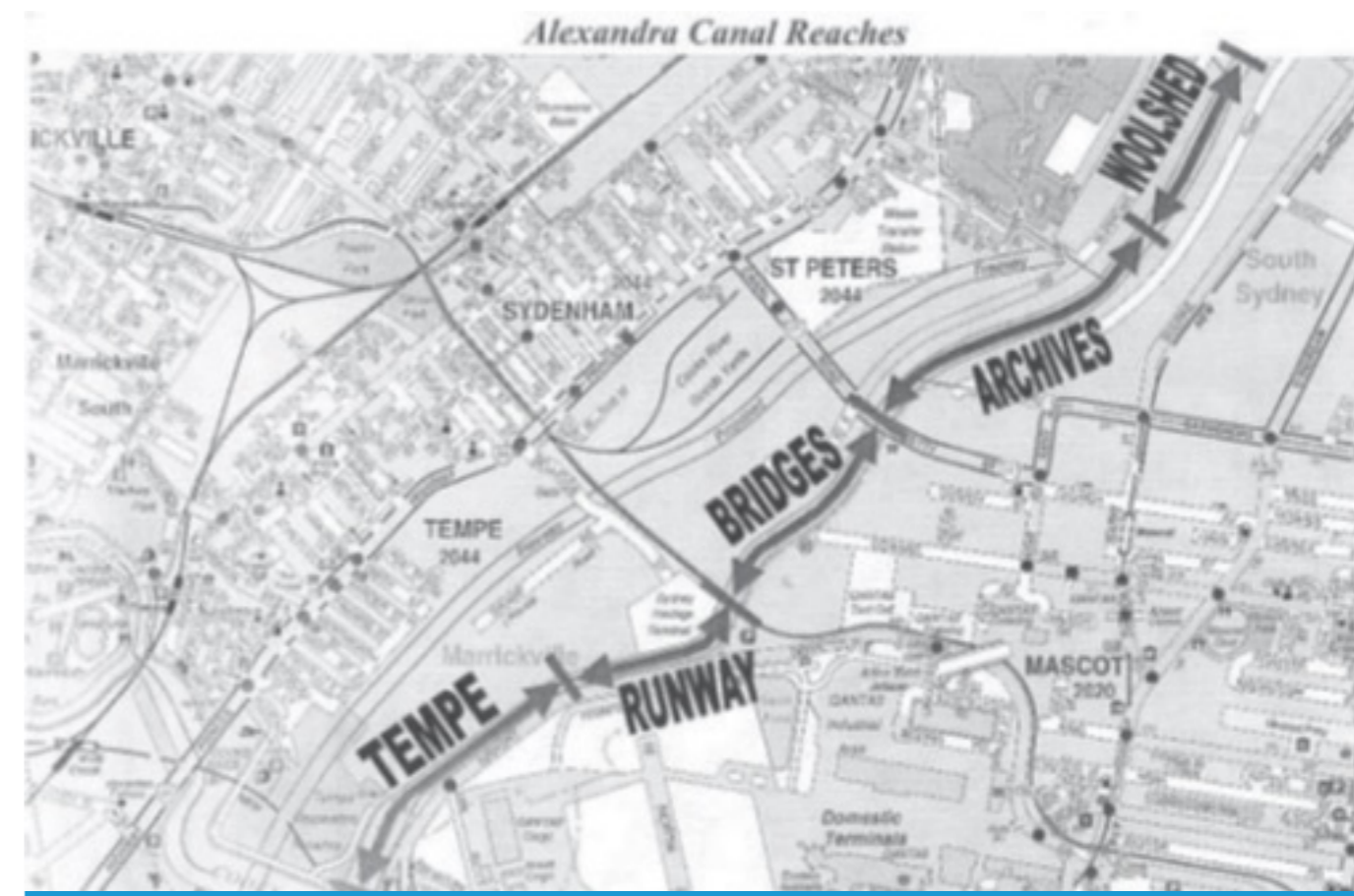


Figure E-1 - The Conservation Management Plan separates the Canal into a series of Reaches which have been used to define the various landscapes along the full length of the CMP. (Source: Alexandra Canal Conservation Management Plan 2004)

The Alexandra Canal is split into five predetermined reaches:

1. Tempe Reach;
2. Runway Reach;
3. Bridges Reach;
4. Archive Reach, and
5. Woolshed Reach.

Curtilage

The Conservation Management Plan prepared by the NSW Government Architect's Office defines a curtilage for the Alexandra Canal as being a "3m curtilage along the 3.9 km length of the Canal" and a "2m height curtilage above Spring Mean High Tide to protect the watercourse of the Canal".

E1.4 Terminology

The terminology in this Sub-Plan follows definitions presented in The Burra Charter. Article 1 provides the following definitions:

- Place means site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views
- Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations
- Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects
- Places may have a range of values for different individuals or groups
- Fabric means all the physical material of the place including components, fixtures, contents, and objects
- Conservation means all the processes of looking after a place so to retain its cultural significance.
- Maintenance means the continuous protective care of the fabric and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction
- Preservation means maintaining the fabric of a place in its existing state and retarding deterioration
- Restoration means returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material
- Reconstruction means returning the place to a known earlier state and is distinguished from restoration by the introduction of new material into the fabric
- Adaptation means modifying a place to suit the existing use or a proposed use
- Use means the functions of a place, as well as the activities and practices that may occur at the place
- Compatible use means a use that respects the cultural significance of a place. Such a use involves no, or minimal, impact on cultural significance
- Setting means the area around a place, which may include the visual catchment, and
- Related place means a place that contributes to the cultural significance of another place.

E2 Photographic Survey



Figure E-2 - The western approach of the Campbell Street/Road bridge. The building in the background is Rudders Bond, which has been approved for demolition as a part of the SSL. The approach to the bridge will make use of the open yard and the space provided through the demolition of Rudders Bond.



Figure E-3 - The western approach to the Gardeners Road bridge. The area is heavily developed in terms of industrial factories and warehouses. The approach makes use of existing open yards, but will require the demolition of factories and warehouses which are of little significance.



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Figure E-7 - The views in and around the canal benefit from the wide open space of the canal. Any proposed bridges need to respect this openness and seek to maintain the clear visual corridors along and across the canal.

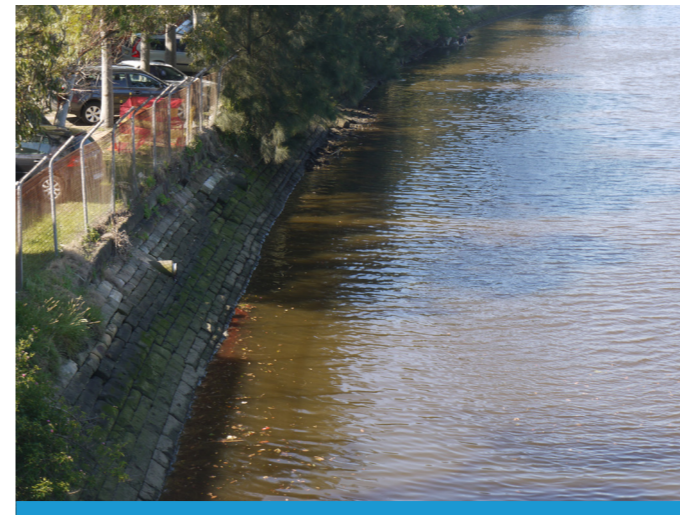


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E3 Statutory Context

Environment Protection and Biodiversity Conservation Act 1999

The site is not included on the National Heritage List under the Environmental Protection and Biodiversity Conservation Act 1999.

NSW Heritage Act 1977

The Alexandra Canal is listed on the NSW State Heritage Register (item 01621). The canal is also listed on the Sydney Water Section 170 Heritage and Conservation Register (item 4571712).

Local Environmental Plan

The Alexandra Canal is a locally listed heritage item under several local environmental plans, including:

- Sydney Local Environmental Plan 2012 (item I3)
- Botany Bay Local Environmental Plan 2013 (item I1)
- Marrickville Local Environmental Plan 2011 (item I270)

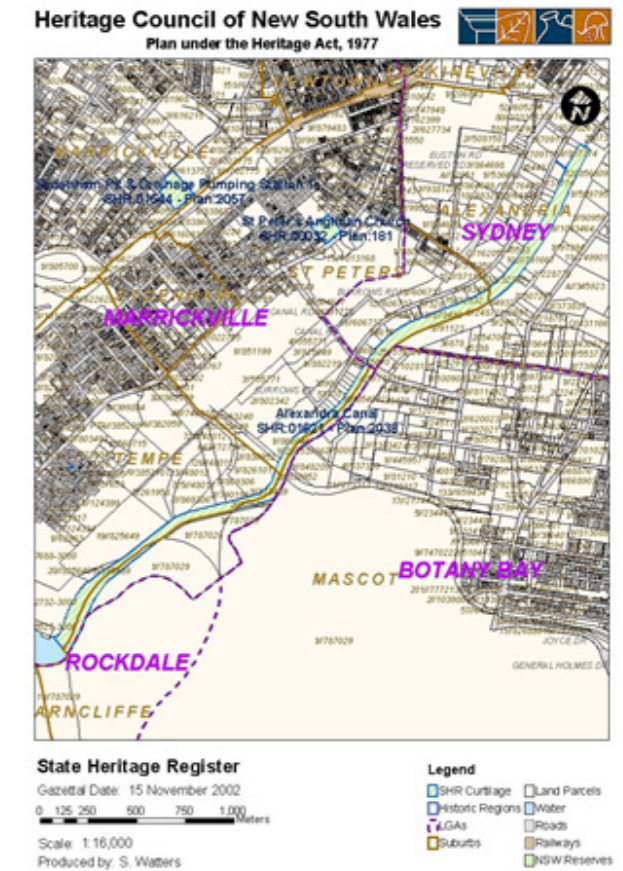


Figure E-22 - SHR curtilage map. Source: NSW OEH, SHR listing sheet for Alexandra Canal.

E4 Brief History

The following historical overview of Alexandra Canal has been adapted in part from the Alexandra Canal Conservation Management Plan 2004. It is not intended to be an exhaustive history, but rather, a brief overview to encapsulate the heritage significance of the site.

E4.1 History of Alexandra Canal

Alexandra Canal is an artificial waterway that follows the tributary off Cooks River, known as Shea's Creek. The landscape surrounding Shea's Creek was progressively and extensively altered by European settlement. The industrial development of land either side of Shea's Creek and Cooks River was a by-product of the Slaughter House Act of 1848, that required all noxious trades to operate more than one mile outside the city area.

Dredging for the construction of the canal began in 1887, with the government seeking to encourage industrial development by creating better shipping opportunities through a wider and deeper water course with wharves and embankments, providing better commercial access upstream. Furthermore, the proximity to the creek enabled local trades to extract water for industrial purposes and service dairy farms, brickworks, quarries, factories and residential properties nearby. As a result of the industrial wastes and by-products disposed into the Creek, amongst the sewage and storm water run offs, the Shea's Creek and Cooks River water suffered severe degradation and contamination.

The use of the canal as a commercial shipping route declined with the advent of commercial road and railway transport in the 1930's, and the wharves were eventually demolished in the 1940's. Further alterations to the canal were expressed at the junction of Cooks River during the airports three phases of expansion between 1940's and 1970's.

E4.2 Canal Construction

Prior to the construction of the canal, Shea's creek wound from Surry Hills, through swampy lands to reach the Cooks River one kilometre from the entrance at Botany Bay. The canal was built to reflect the original path of the creek, however where the creek meanders in the northern section, the canal provided a clear direct path with subtle curves. Early construction of the canal included sandstone walling with stone ballast at the footing, with the upper reaches featuring sandstone ashlar masonry.

The canal was progressively extended and excavated throughout 1890. By 1900 the canal was predominately complete. The main work conducted between 1900 and 1947 involved the dredging of silt built up, caused the canal to become shallow and narrow. During this time two new wharves were built and the timber 1897 Ricketty Street Bridge was rebuilt. In 1937 this bridge was replaced with reinforced concrete and by 1911 there were four wharves.

In 1922 the Sydenham to Botany railway line crossed the canal with the first ever constructed lifting span railway bridge in Australia. The construction of this type of bridge suggests the use of the canal was intended to continue, despite the increased use of rail and road to transport commercial goods. However, By the 1950's Alexandra Canal ceased to operate as viable commercial transport corridor.

Later alterations to the southern reaches of the Canal have been rebuilt in a variety of 20th century materials including concrete block, shotcrete over rubble and fabricon, dating to the airports expansion between 1947 and 1970. The canal now only operates as a stormwater channel.

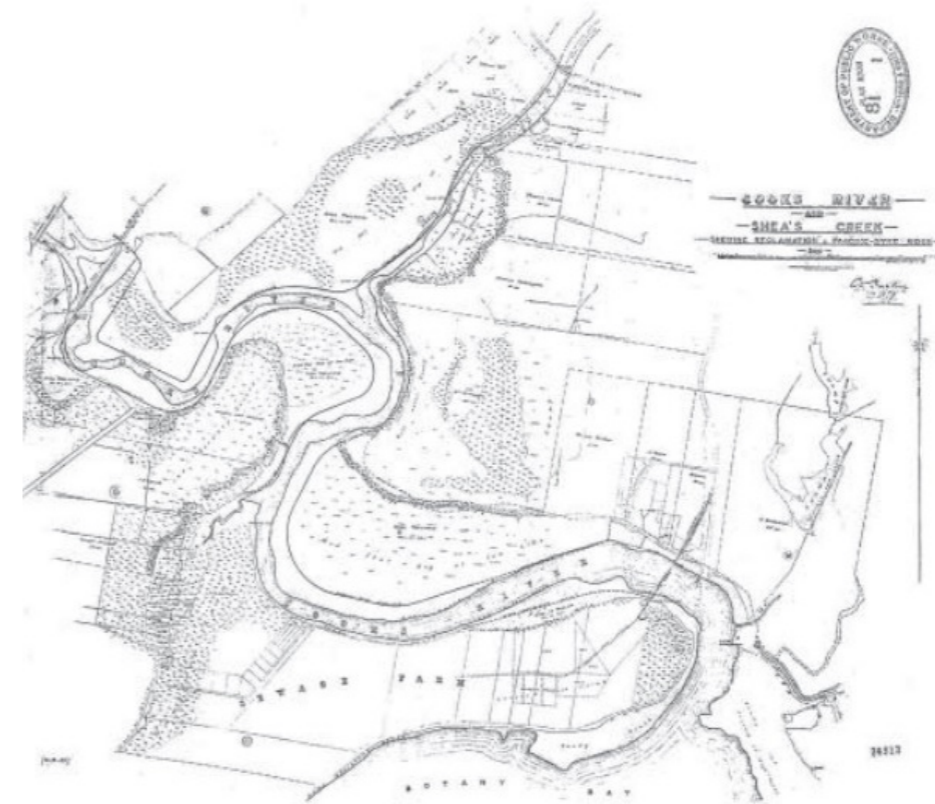


Figure E-23 - The plan for the development of the Canal was significantly influenced by the swampy winding nature of Shea's Creek. This plan shows the original Creek channel overlaid with plans for the Canal extending from the Confluence with the Cooks River to Ricketty Street. It can be seen how the line of the creek is much narrower than the Canal and that the northern end meanders considerably. The mud flats can also be seen at the southern end of the creek. Source: DPWS Plan Room Drg 34313



Figure E-24 - Discovery of the Dugong bones during construction of the Canal, 1894. Source: South Sydney Council State of the Environment Report 2000.



Figure E-25 - "Natives of Botany Bay" in Phillip, Arthur. The Voyage of Governor Phillip to Botany Bay. 2nd ed. (London, John Stockdale, 1790) Ferguson, 90.

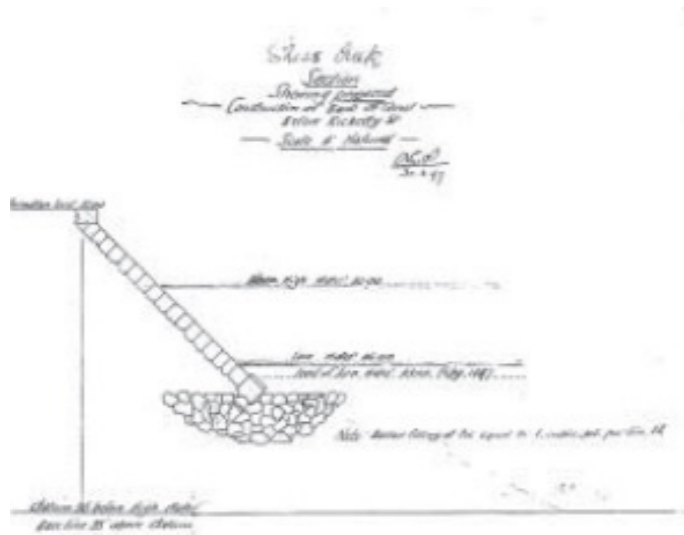


Figure E-26 - Early construction of the Canal (below Ricketty Street) included sandstone walling with stone ballast as the footing. Source: DPWS Plan Room Drg 32440.

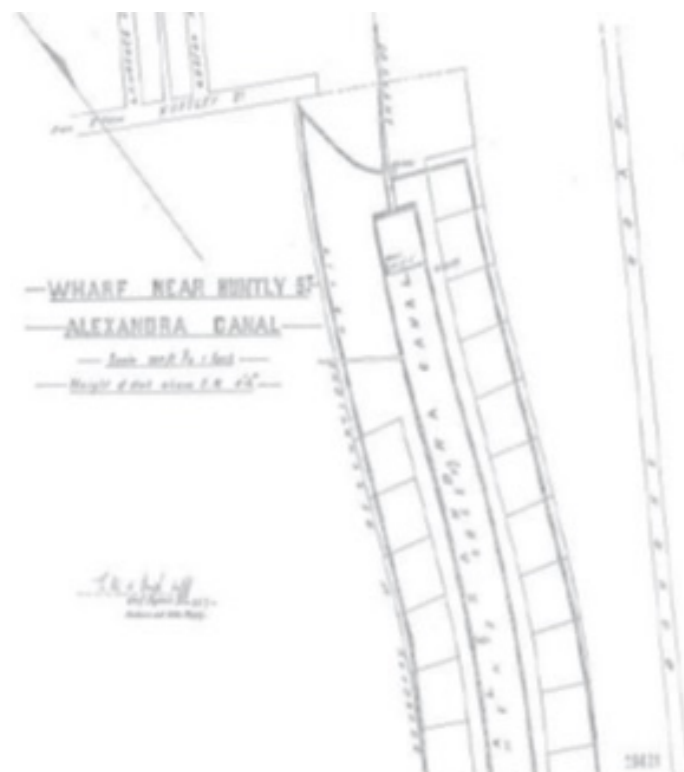


Figure E-27 - The 1911 plan of the Alexandra Canal shows the finished Canal and the locations of the Wharf/s and the lots for the Woolsheds in the Woolshed Reach section. Source: DPWS Plan Room Drg 29429.



Figure E-28 - An undated plan of the Alexandra Canal by 1889 showing the Canal and fascine dyke up to Ricketty Street completed and construction beyond Ricketty Street has commenced.



Figure E-29 - 1984 view of abandoned Wool Sheds along Alexandra Canal. Source: Graeme Andrews 'Working Harbour' Collection: 80134. GKA. City of Sydney Archives, file no. 080/080134

E5 Physical Description

The following physical analysis of the Alexandra Canal has been sourced from the Conservation Management Plan (CMP) prepared by the NSW Government Architects Office, dated 2004.

E5.1 Overview

The Alexandra Canal is a 60m wide tidal channel, which discharges into the Cooks River 2km upstream of the river mouth. The Canal is 3.9km long and was originally constructed as a navigable waterway along the meandering and tidal Shea's Creek. The Canal provided transport to industries located along the bank, which is one of the oldest industrial areas in Sydney. The area still supports industrial and commercial use today.

The canal not only provided an industrial waterway but also allowed for the reclamation of substantial areas of tidal land below Ricketty Road (Canal Road). The area above Canal Road was used by Chinese market gardeners on small plots leased from landlords. This section of Shea's Creek was above the tidal zone and would have supplied permanent fresh water to the gardens. Many of the garden plots straddled the creek indicating it was only a small stream. Further back from Shea's Creek a number of putrid industries were located using both the fresh water from Shea's Creek that supplied a reservoir (MacNamara's Reservoir DPWS 34306) via a race, disposing of the waste into the Creek. These industries included fellmongers, boiling down works, wool scours, soap factory, tanneries and a slaughter yard. The industries in the area changed over the years to become predominantly chemical, oil, transport and metal industries.

E5.2 Material Composition

Relevant materials to the 'Archive' Reach of the canal have been included below.

Sandstone

The sandstone embankment walls are laid in a Broken Range Bond Ashlar. This interrupted style of bond would have been extremely durable for the conditions placed on the embankment and made economical use of the material. The embankment wall has been capped with a sandstone block and all stone has a quarry face and dressed sides to form the bond. Drawings

indicate that a footing of the embankment wall was installed during construction consisting of rubble at the quantities of 1 cubic yard to the lineal foot. A rubble base was also laid behind the Ashlar as a substrate to the sandstone Ashlar.

Broken Range Bond Ashlar

The Broken Range Bond Ashlar is in exceptional condition where there has been a maintained bank. Most pipes that have been installed after construction have been poorly installed and have caused failure of the embankment wall and bank.

The Ashlar does not use a mortar joint and any repairs should follow this precedent. The purpose for this is that any back pressure can feed back into the canal leaving the stone intact. Where the joint has been pointed with a cement, mainly where pipes have been installed, there has been a failing of the wall and eventual collapse.

Pre-Cast Concrete Blocks

A pre-cast concrete block with cast joggle end joints has been used for the repair of the embankment wall on the East bank and possibly associated with the construction of the new rail bridge. The condition of the actual fabric has been good but the wall construction method has not stood up to the tidal and flow pressures placed upon it. As with the remnant sandstone wall the concrete blocks have been laid using a running bond which has not coped with the tidal and flow pressures. Inspections show that it has mainly been used as a repair material and the Broken Range Bond Ashlar is still in place at the lower courses. It can be expected that these sections of embankment wall will deteriorate further.

E6 Setting, Views and Curtilage.

E6.1 Landscape Setting

Alexandra Canal is set within a changing landscape with each reach presenting a different character. The Tempe and Runway Reaches are defined by their open natural and artificial landscapes. The airport to the south of the reaches provides

strong artificial landscape of runways, airport structures and hard stands, while the reserves and parkland to the north provide a natural contrast.

The nature and the landscape of the canal changes from the Bridges Reach through the Archives Reach and onto Woolshed, with the area becoming primarily industrial with factories and warehouses built within close proximity of the canal wall. The industrial nature of this area is an enclosed environment that retains elements of the industrial past of the area.

E6.2 Views

The primary view related to the canal is the view from the Ricketty Street bridge. Framed by the factories either side, the view encompasses the full stretch of the canal and is critical to understanding the setting.

Additional views are provided at each bridge, with cross views provided on either end of each bridge which enables people to see into the canal area, with particular attention to the visible areas of the canal wall and the factories either side.

E6.3 Curtilage of Alexandra Canal

The Conservation Management Plan prepared by the NSW Government Architect's Office defines a curtilage for the Alexandra Canal as being a "3m curtilage along the 3.9 km length of the Canal" and a "2m height curtilage above Spring Mean High Tide to protect the watercourse of the Canal". The justification provided for the initial curtilage along the length of the Canal is to protect the structural stability of the Canal, while the curtilage above Spring Mean High Tide is required to protect the future recreational use and to protect the visual amenity of the Canal. The following images identify the corridor along the Canal and the curtilage above the Spring Mean High Tide mark.

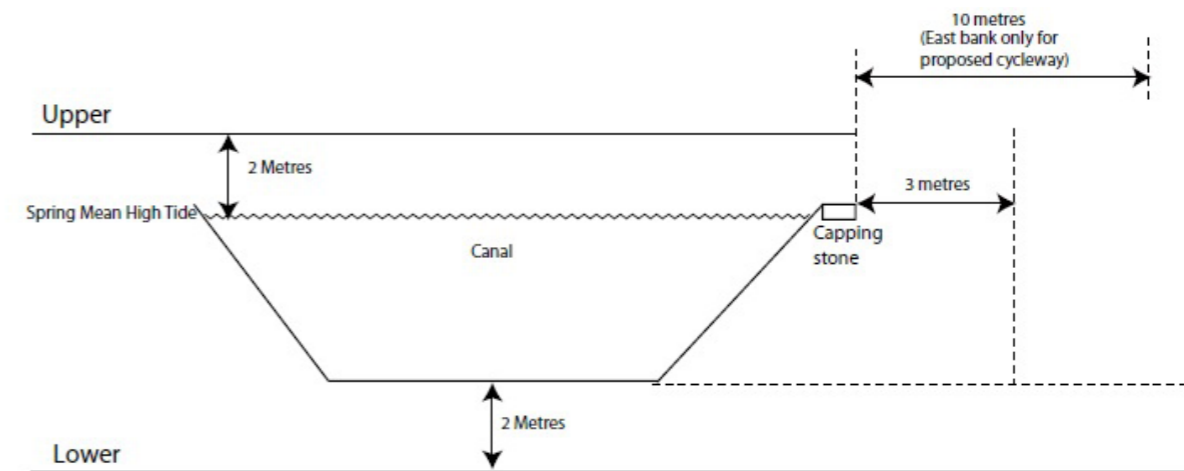


Figure E-30 - As well as a land based curtilage, there is an air space curtilage around the canal based on the image above. The Conservation Management Plan establishes a curtilage of around 2 metres above the high water mark and 2 metres below the base of the canal.

Curtilage of the Alexandra Canal includes, the area occupied by the Wool Sheds and the 10m set back from the Canal Wall for the pedestrian and cycle way.

Heritage Curtilage

- 1 Shea's Creek Woolsheds
- 2 Alexandra Canal
- 3 Cooks River
- 4 Sydney Airport



Figure E-31 - The curtilage of Alexandra Canal based on the Conservation Management Plan prepared by the Government Architects Office of NSW, establishes a minimum distance of 3 metres either side of the top of the canal wall. The curtilage is shown as an orange line on the adjacent image.

E7 Statement of Significance

The Alexandra Canal is of State Heritage Significance with historic, aesthetic technical and associative significance being one of only two navigable canals built in NSW and is characterised by its controlled route, defined edges and sandstone embankment walls. It is a visible example of nineteenth century engineering technology that has the ability to demonstrate construction techniques from that period. The design and concept of the various versions of the canal for water transport were perceived as important for the development of an industrial complex in Alexandria and Botany.

The Alexandra Canal route has been detrimental as it has determined the planning of the district including street layout and the positioning of industrial buildings along its route. The Canal is also associated with Shea's Creek Wool Sheds and bridges that cross it which provide a layering of images of an unusual industrial urban landscape.

The Canal has been rerouted due to the expansion of the Sydney airport however it maintains its distinction as a Canal as opposed to a natural estuary and in this way contrasts with the Cook's River in aesthetic treatment. The original sandstone material used for the stabilisation of the Canal's bank wall has been altered in various areas as a result of various developments and in this way has the ability to demonstrate the evolution of the demand for land. The new materials are identified in some reaches as intrusive to the aesthetic of the canal.

The canal's excavation provided a valuable contribution to the scientific understanding of the changing sea-levels along the eastern seaboard and the antiquity of the aboriginal presence in the area.

E8 Proposed Works

E8.1 Bridges 8 and 9

- Construction of a new road bridge from Gardeners Road to the proposed St Peters Interchange. Two bridge units will rise from Gardeners Road at 697 Gardeners Road over the eastern bank of Alexandra Canal, connecting to the western bank at 12-18 Burrows Road through to the St Peters Interchange where it divides into three separate routes.
- Partial deconstruction and reconstruction of the Canal wall (if required).
- On the eastern side of the Canal the proposed bridges 8 and 9 will cut through the existing NSW Government records repository located near Gardeners Road. The western approach will make use of an open yard with a minor impact upon adjacent industrial warehouses.

E8.2 Bridge 10

- Construction of a new road bridge between Burrows Road and Bourke Road, connecting the St Peters Interchange to the eastern bank of Alexandra Canal at 34 Burrows Road (along the alignment of Campbell Street/Road) to the western bank at 16/67 Bourke Road.
- Partial deconstruction and reconstruction of the canal wall (if required).
- Bridge to make use of existing open yards.

E8.3 Future Uses

Use of the eastern and western banks of Archive Reach as a shared path for pedestrians and cyclists. As quoted from the WestConnex New M5 Urban Design and Landscape Plan (Draft), the new use will consist of:

“Dedicated on / off road cycle paths along Campbell Street and Campbell Road continuing across Alexandria Canal and tying into existing cycle paths of Bourke Street and Bourke Road.” (p. 58)

This shared path is not included within the WestConnex New M5 project works.

E8.4 Rationale

The New M5 was proposed as an expansion to the existing M5 motorway with the intent on bypassing a number of identified choke points in the road network around the Arncliffe, St Peters and surrounding areas. The St Peters Interchange is proposed to be a major interchange between local roads, Stage 2 and the yet to be proposed and tendered Stage 3 which will connect to the M4. The interchange is a series of road decks at different heights which extend from Campbell Road to the east, Canal Road to the West and across Alexandra Canal to the south.

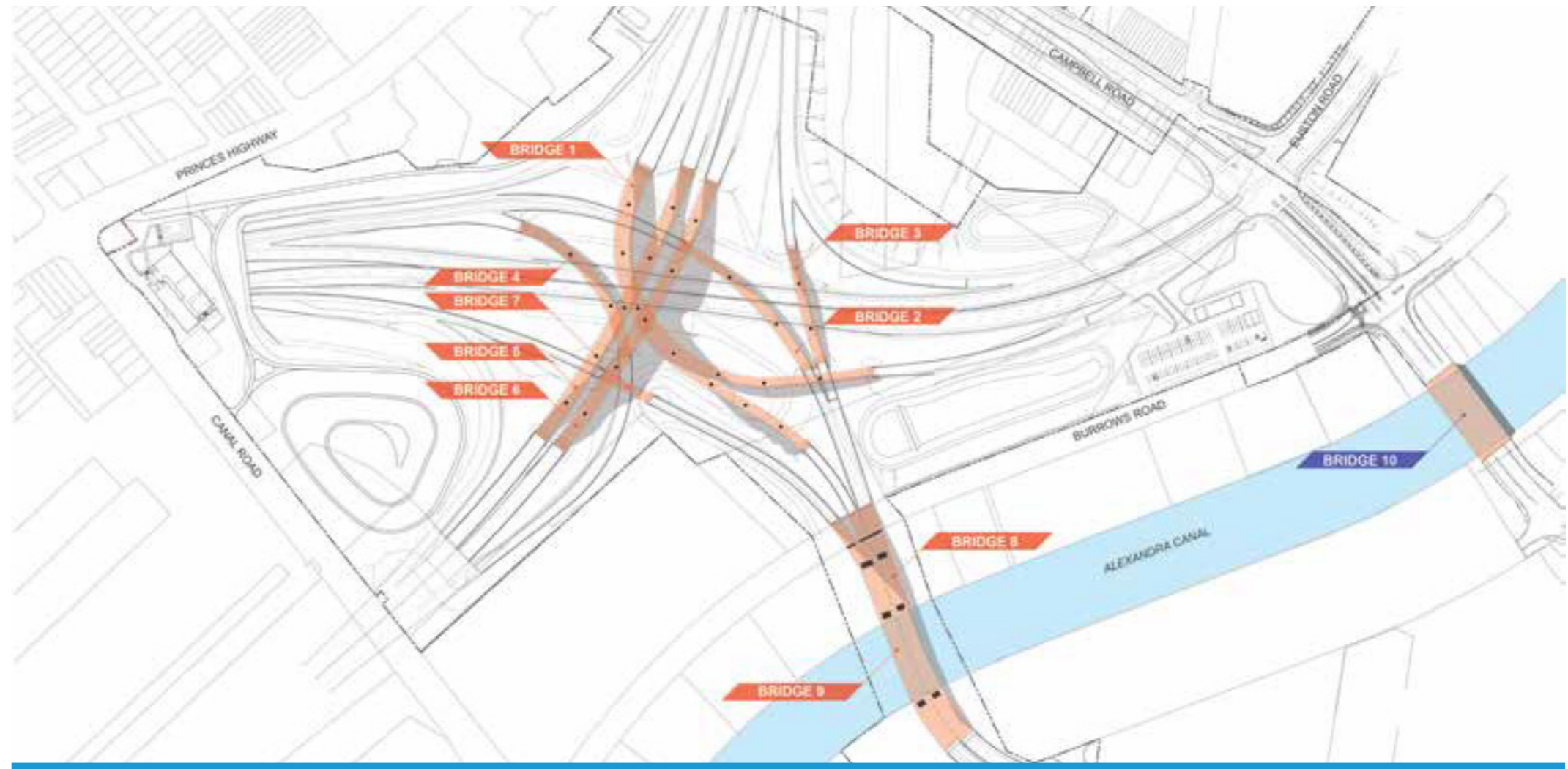


Figure E-32 - Site plan showing Bridges 8, 9 and 10 (Source: Urban and Landscape Plan, p. 257)

E9 Design

E9.1 Approach

The design approach to bridge modifications is in accordance with the RMS Bridge Aesthetics – Design guidelines to improve the appearance of bridges in NSW and the SWTC Appendix B.4 - Bridges and Other Structures, Section 1.2 Modifications to Existing Structures.

The design of bridges is characterised by the following:

- Structures should be simple, refined and elegant with minimal piers and abutments to maximise usability, permeability and visual transparency
- The design, form, materials and arrangement of all elements must be simple, elegant, refined and carefully integrated with adjoining elements
- Bridge widening should remain sensitive to the existing character of the structure and surrounds, designed to 'fit' with the existing structure
- Pedestrian bridges need to be generous in scale, well lit, provide clear sightlines and feel safe with there design welcoming and have architectural merit, appropriate to the context and setting.

E9.2 Bridges 8 and 9

Bridges 8 and 9 each comprise three spans of a continuous segmental box girder and two approach spans of Super-T girders over Burrows Road and Alexandra Canal. The span lengths of the box girders are 41.5m, 70m and 41.5m.

Abutments

- Abutment A is located behind an RSW include 1500mm high headstock beams supported on 700mm diameter columns. These columns are supported on 900mm diameter cast in-place bored piles.
- Abutments B is supported by six 900mm diameter piles.

Piers

- Piers 1 and 2 are wall type piers and supported by 1050mm and 900mm diameter cast in place bored piles, respectively.
- Piers 4 and 5 include thick blade walls and pile caps supported by six 900mm diameter piles

Parapets

Traffic barriers are medium performance level RMS type MAO, which comprise 650mm high truncated F-type concrete parapets with twin steel rails providing an overall height of 1300mm above the road surface level. The traffic barriers will be cast in-situ following the erection of the superstructure.

Safety (throw screens)

Not required.

Superstructure

The haunched concrete box girder superstructure of spans 3 to 5 achieves an attractive architectural outcome that is consistent with the other bridge in SPI. Due to the long span over the canal the box girder is haunched at Piers 3 and 4.

The 1000mm high Super T girders spanning over two approach spans 1 and 2 are an appropriate solution for the shorter spans and the reduced deck depth provides adequate vertical clearance over Burrows Road.

E9.2 Bridge 10

Bridge 10 is part of the Campbell Road upgrade taking traffic across Alexandra Canal to the intersection with Gardeners Road.

The bridge is a single span structure with an overall superstructure length of approximately 69.4m to clear the canal. The distance between the underside of the bridge deck and canal is 2m. The bridge carries two 3m wide traffic lanes southbound and three 3m wide traffic lanes northbound, separated by a median. A shared path is located on the upstream side and a foot path is located on the downstream side.

Back spans will be provided for a future shared path under the bridge on both the eastern and western sides. These paths will form part of the future on / off road cycle paths route. The shared path itself is not included within the WestConnex New M5 project works.

Abutments

The abutments comprise reinforced concrete headstock supported on two rows of 900mm diameter bored cast-in-place reinforced concrete piles socketed into bedrock. The wingwalls are cast in-situ and are designed to cantilever from the headstock and back curtain wall.

Piers

Not required.

Parapets

Traffic barriers are medium performance level RMS type MAO, which comprise 650mm high truncated F-type concrete parapets with twin steel rails providing an overall height of 1300mm above the road surface level.

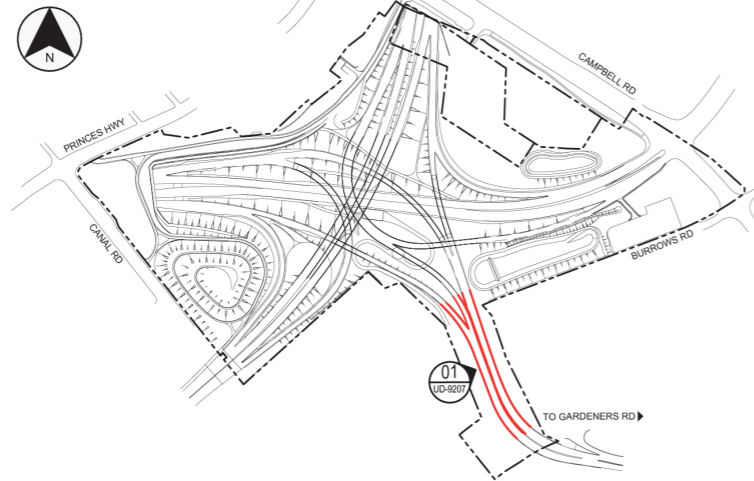
Safety (throw screens)

Not required.

Superstructure

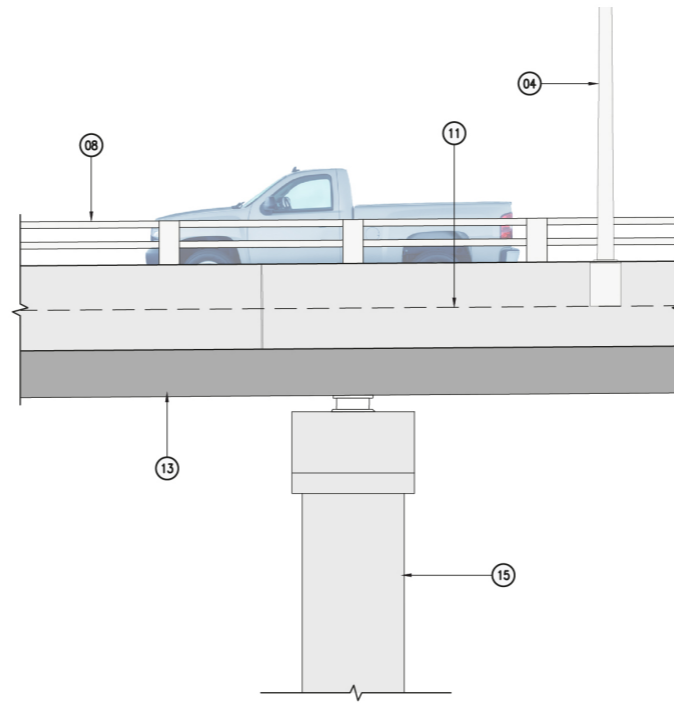
The superstructure comprises 2000mm to 2750mm variable depth steel trough girders acting compositely with a 250mm thick in-situ concrete deck. The maximum depth of 2750mm is at midspan with the soffit of the girders tapered linearly to a point 2m from the bearing centrelines. A 75mm asphaltic layer including waterproof membrane will be placed over the concrete surface.

LOCATION PLAN
1:10000

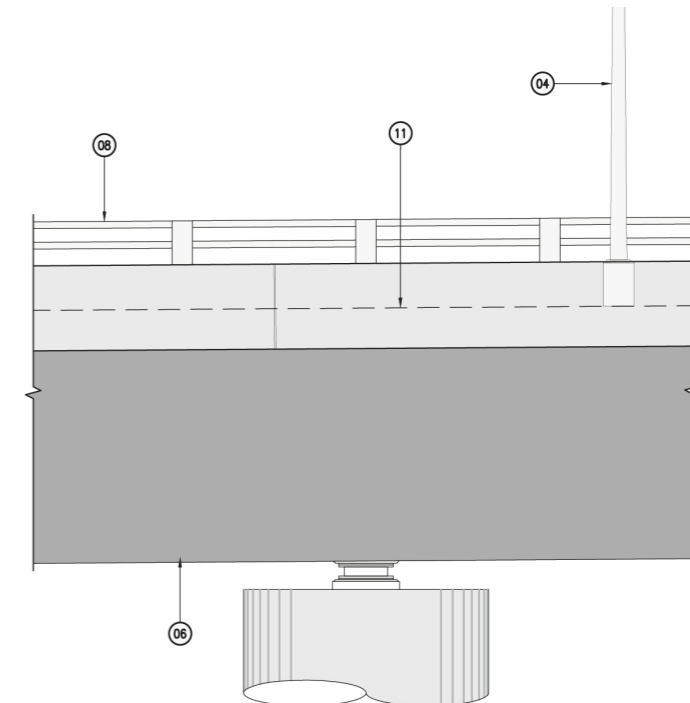


LEGEND

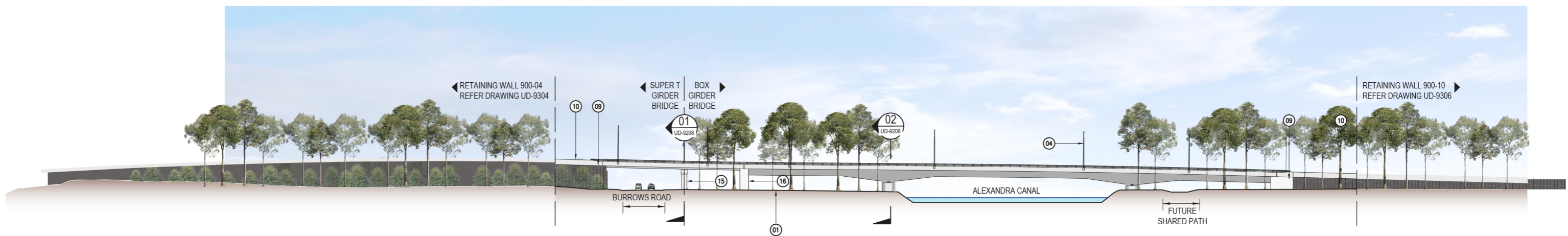
- | | |
|---|---|
| 01 GROUND LINE | 10 F TYPE BARRIER |
| 02 BRIDGE CAPITAL | 11 ASPHALTIC CONCRETE |
| 03 BRIDGE PIER | 12 SUPER-T GIRDER |
| 04 ROAD LIGHTING | 13 UPVC CONDUIT |
| 05 BEARINGS | 14 MODIFIED RMS RCO TRAFFIC BARRIER. HEIGHT TBC |
| 06 BOX GIRDER | 15 PIER WITH PILE CAP |
| 07 FRC DRAINAGE PIPE AND PIT. REFER PACKAGE M5N-AJV-DPK-900-400-DR-9020 | 16 TRANSITION PIER |
| 08 MEDIUM PERFORMACE TRAFFIC BARRIER WITH TWIN RAIL. 1300 HIGH | |
| 09 BRIDGE ABUTMENT | |



01 TYPICAL ELEVATION - SUPER T
1:100

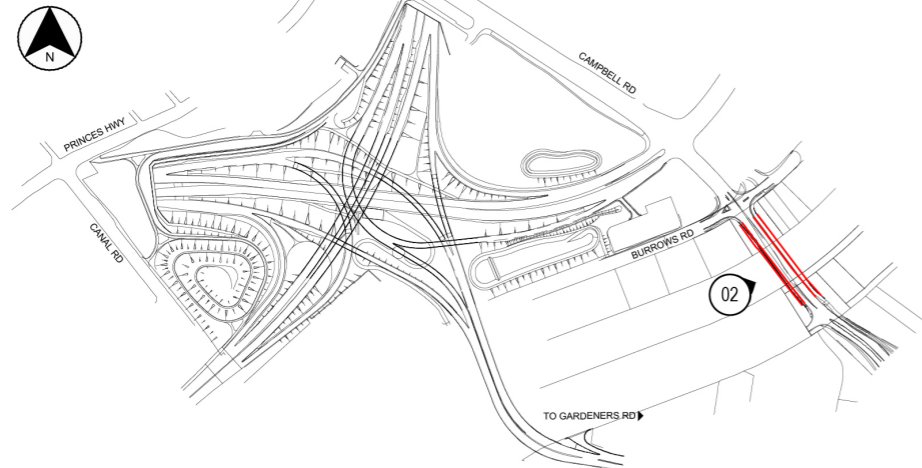


02 TYPICAL ELEVATION - BOX GIRDER
1:100



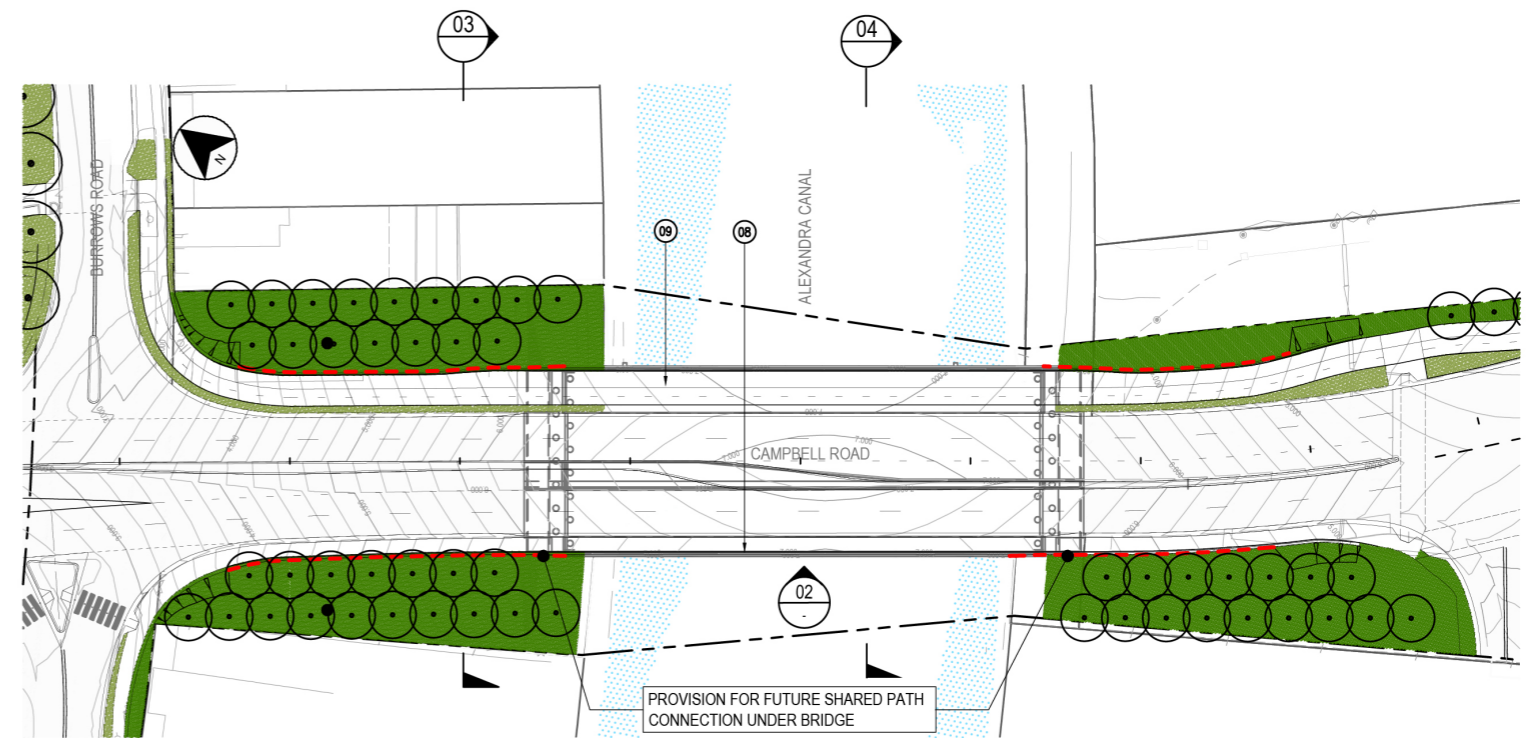
03 BRIDGE ELEVATION - BRIDGE 8 AND 9
1:1000

LOCATION PLAN
1:10000

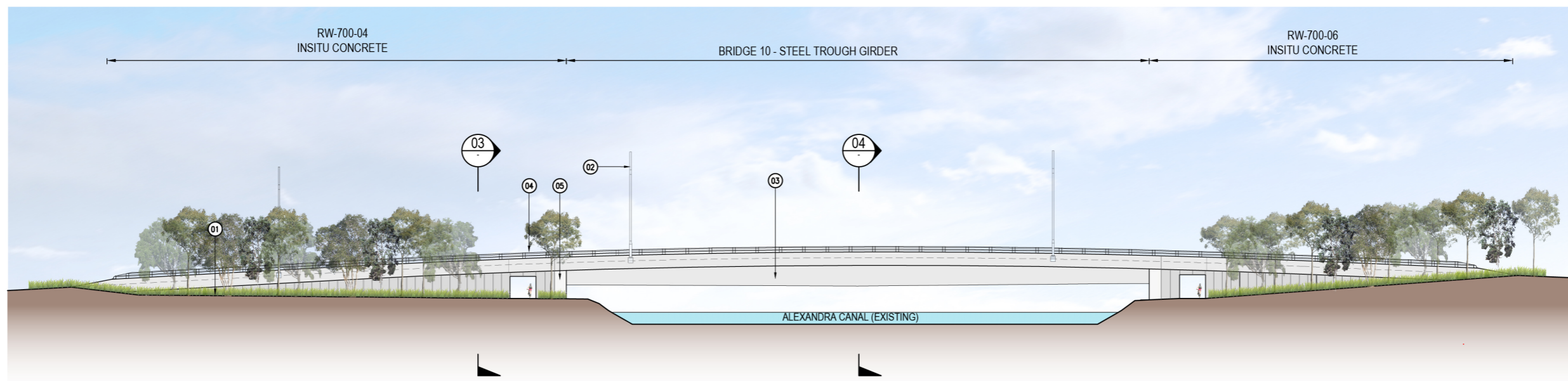


LEGEND

- 01 GROUND LINE
- 02 ROAD LIGHTING
- 03 STEEL TROUGH GIRDERS
- 04 MEDIUM PERFORMANCE TRAFFIC BARRIER WITH TWIN RAIL, 1300 HIGH
- 05 BRIDGE ABUTMENT
- 06 ROAD LEVEL
- 07 MEDIAN
- 08 FOOTPATH
- 09 SEPERATED CYCLE AND FOOTPATH
- 10 LANDSCAPED VERGE



01 PLAN
1:1000



02 BRIDGE ELEVATION
1:500

E10 Heritage Impact Assessment

E10.1 Built Heritage

Canal Fabric

The proposed bridge works are separate from the canal and do not involve direct physical impact to the canal fabric itself. Although, they are within the 3m curtilage of Alexandra Canal (as defined within the CMP).

The canal wall is not structural, designed as a stone lining anchored in a stone rubble foundation to the earthen embankment behind. This earthen embankment provides the main wall of the canal but it is also the area within which the proposed bridge works will be undertaken. The proposed concrete pads at the base of the abutments will be the nearest structures to the canal, situated within 1-1.5m from the top of the canal wall. As this is the structural earthen embankment and the compaction of the fill is unknown, works will need to be planned and carried out in a manner that considers the integrity of the wall so as to prevent any adverse impacts.

An inspection of the canal wall on 13th April 2017 by Senior Historical Archaeologist of Extent Heritage Pty Ltd shows that the sandstone blocks along the wall sections for Bridge 10 (north) are in relatively good condition, although there is some evidence of slumping to the western wall (see fig. 21). Due to dense vegetation screening the wall sections for Bridges 8 and 9 (south), the condition of the sandstone blocks is unknown in this location. Whilst this is the case, potential vibration impacts will be managed to prevent adverse impacts such as movement and cracking in the sandstone.

Whilst there is potential for the works to indirectly impact the canal fabric, the impacts are considered to be manageable, subject to a proper consideration of the construction methodology and mitigation measures relating to stabilisation and protection of the existing wall. This risk will be assessed by both structural and geotechnical engineers, with protective controls applied to the construction methodology and reviewed by a qualified heritage consultant. The Heritage Construction Management Plan (HCMP) will need to be updated to reflect the proposed works and appropriate construction methodologies will need to be prepared to manage risks.

As discussed in Section 10.1.2 below, the existing stone may be required to be deconstructed, stored and reconstructed on completion to prevent potential damage to the stone work. In addition, it is considered highly important that the stabilisation works, identified as required under the CMP, are undertaken to ensure the long-term sustainability of the wall. Stabilisation works should be implemented where recommended by a structural / geotechnical engineer, focusing on the construction areas.

Stone Removal and Reinstatement

There is no demolition directly proposed as a part of the bridge construction works. However, to ensure the canal wall remains undamaged, there may be the need to partially deconstruct and to reconstruct sections of the canal wall to provide access to the area behind the wall. It is also acknowledged that the deconstruction and reconstruction of the wall may be required as a part of stabilisation works which are required under the Conservation Management Plan (CMP) as the proposed bridge works are within 3m of the canal wall. As with the SSI approval for the stormwater work, the process of deconstruction would only occur once the wall has been photographed and documented with all stones numbered. This will ensure the wall can be reconstructed accurately.

Neighbouring Lots

On the eastern side of the canal the proposed bridges 8 and 9 will cut through the existing NSW Government records repository located near Gardeners Road. The building is a later structure of nil/low heritage significance. Therefore, partial demolition is considered to be acceptable. The western approach of bridges 8 and 9 will make use of an open yard with a minor impact upon adjacent industrial warehouses.

Bridge 10 runs between 34 Burrows Road, St Peters on the western side of the canal, to 16/67 Bourke Road, Alexandra on the eastern side. Both approaches will make use of existing open yards. The use of the land will require a minor modification to the alignment of Campbell Street and Campbell Road, to provide a connection to the eastern embankment.

Curtilage

The proposed works will see no changes to the canal's SHR curtilage. The works do not include subdivision.

E10.2 Views and Settings

Views

The proposed bridge works will not prevent views to the canal as a whole. The distance between the canal wall and the bridge abutments frames the canal but does not restrict views, enabling a clean visual corridor across the canal walls. Furthermore, the bridges will provide for additional views along the canal through enhanced public access.

The bridges have been designed so that the underside of the bridge is clear of the Mean High Water Mark by over 2m. This contributes to maintaining the visual corridor down the canal.

Consideration was given to the accumulative impact of the construction of Bridges 8, 9 and 10. There is sufficient spacing between the bridges to enable each bridge to be separately defined, which also allows for each bridge to be seen separately from the canal. The separation between the bridges is supported by each bridge maintaining a sufficient height above Mean High Water Mark (over 2m) which enables a clear visual corridor along the canal and prevents the enclosure of the canal from the surrounding environment.

Settings

The setting of the canal is primarily industrial land with little in terms of a natural landscape. The Archive Reach of the canal is highly developed with a mix of concrete and other hard surfaces throughout the factories and associated hard stands. The proposed bridges will be consistent with the existing urbanised and industrial landscape, compatible with the mix of existing hard surfaces and structures.

E10.3 Future Uses

Taking into account future and current accessibility plans, the proposed pedestrian and cyclist pathway will have a positive impact on the canal overall. The use will allow for increased public engagement with a State heritage item which is currently largely inaccessible. Specifically, the works will provide shared pedestrian paths under Bridges 8, 9 & 10, as well as access from Bourke Road and Venice Street.

Provided the construction methodology considers the structural integrity and significance of the canal wall, future uses will have no impact on canal fabric.

Note: This shared path is not included within the WestConnex New M5 project works.

E10.4 Heritage In The Vicinity

The proposal will have a minor and inconsequential impact on views from the Ricketty Street bridge. The Rudders Bond Store is currently under demolition and has therefore been excluded from this assessment.

E10.5 Local Planning Controls

Clause 115ZF of the Environmental Planning and Assessment Act 1979 states that Environmental Planning Instruments (EPIs) do not apply to development declared State Significant Infrastructure under the Act. Local planning and heritage controls under EPIs provide a good benchmark in determining the impact of development on the local context. As such, a non-binding assessment was undertaken of the proposal, considering the local controls for heritage conservation.

The significance of Alexandria Canal is embodied in its rarity, being one of two navigable canals built in NSW, its representativeness as a visible example of a nineteenth century engineering marvel, its historical significance to the growth and development of industry within the area and its aesthetic nature, being made from sandstone with defined edges. The canal also possesses significance in its contribution to the understanding of changing sea-levels on the eastern seaboard.

The proposed bridges will not result in the permanent removal or modification of the canal and, subject to the proposed mitigation measures, should not impact on the structural stability and longer term survivability of the canal wall. There is the possibility of the need for partial deconstruction and reconstruction in the areas around the new bridges but, subject to recording prior to deconstruction and reconstructing in accordance with the recording, the impact will be minimised.

Visually, the bridge works will enable views down, along and across the canal in accordance with the CMP. The underside of the deck will be a minimum 7m above the high water line and the abutments will be setback between 1-1.5 m from the top of canal wall. This will enable clear views along the full length of the canal and an appreciation of the separate views either side of the canal and from the bridges themselves. Therefore, it is considered that the proposed works comply with the aims and objectives of the heritage and planning policies for Inner West Council (fmr Marrickville), Bayside Council (fmr Botany Bay) and the City of Sydney.

E11 Statutory Controls

Heritage Act 1977

Alexandra Canal is an item of heritage significance listed on the State Heritage Register. A Section 60 Approval is required for works in relation to a State Heritage Listed item, however, the proposed works relate to a declared State Significant Infrastructure project and, as such, these provisions do not apply to the proposed work.

Environmental Planning and Assessment Act 1979

In accordance with the Environmental Planning and Assessment Act 1979, the subject works are a part of a declared State Significant Infrastructure development under Part 5.1 and, as a result, the approval and authority requirements of the Heritage Act 1977 and National Parks and Wildlife Act 1979 do not apply.

Regardless, the approved Ministerial conditions require the assessment of heritage impacts of the proposal, with consideration given to the policies of the conservation management plan and standard heritage management protocols.

State Environmental Planning Policy (State and Regional Development) 2011

In accordance with this SEPP, the subject development is a component of a declared State Significant Infrastructure project and, as a result, the approval requirements under the Heritage Act 1977 do not apply. Development can be undertaken as a part of a State Significant Infrastructure project subject to the consideration of the heritage impacts. E12 Non-Statutory Controls

E12 Non-Statutory Controls

E12.1 Alexandra Canal Conservation Management Plan 2004

The following section addresses specific policies of the CMP which relate to the proposed bridge works and the section of the canal.

Policy 4

Ensure all proposed works, including new works or works to retained items, are undertaken in a manner which recognises the cultural significance of the site and the NSW Government Heritage Asset Management Guidelines as part of the Total Asset Management Guidelines.

The proposed construction methodology for the abutments, pad and piles for the bridges are currently unknown, especially in relation to excavation and shoring. A review of the existing Heritage Construction Management Plan identifies measures to manage the vibration and construction associated with the stormwater work at the Alexandra Canal but no detail in terms of managing the proposed bridge works.

The nature of the works raises the potential for impacts on the canal in terms of vibration and its structural integrity, as the canal wall is not structural, there is little between the wall and the abutment location to stabilise the wall during the proposed works.

It is therefore recommended that:

1. The Construction Heritage Sub-Plan be revised to provide management and mitigation measures for protecting the structural integrity of the wall.
2. A construction methodology for the abutments, pads and piles be devised in consultation with structural and geotechnical engineers, and reviewed by a qualified heritage consultant.

Policy 13

Prepare appropriate archival records of the site prior to any major alterations or demolitions. This should include photographic and/or measured drawing recording of buildings, landscaping and site features.

As part of the SSI approval, any areas of the canal and its surrounds which will be impacted by the works will be archivally recorded.

Policy 16

Any development within the curtilage of the Alexandra Canal should form partnerships to fund conservation works of the Canal and any other conservation works, within the curtilage, deemed appropriate to the Canal's significance.

The proposed works are within the 3m curtilage of the canal as defined by the CMP. As a result, the CMP requires the proponent in conjunction with Sydney Water to undertake stabilisation and conservation works to the canal within the area affected.

A stabilisation program will be implemented where recommended by a structural / geotechnical engineer. Sydney Water has been consulted with.

Policy 19

Any development within the defined curtilage of the Canal should accordingly take responsibility for the conservation of the listed heritage items within that curtilage. Stabilisation of the Canal walls should be conducted ahead of any construction or redevelopment within the curtilage area. Responsibility for any conservation/ stabilisation work should fall equally with the SWC and the development proponent.

Refer to Policy 16.

Policy 28

Any development proposal within the site curtilage of the Alexandra Canal must also plan for the conservation of the Canal. This includes programming restoration works with the development, stabilisation of the Canal walls, reversal of intrusive fabric in the Canal and responsibility for water treatment and water disposal in the Canal.

Refer to Policy 16.

Policy 29

Ensure that all proposed work to this site is assessed for heritage impacts against the policies of the CMP.

This Statement of Heritage Impact has been prepared to assess the impacts of all elements of the proposed Alexandra Canal works on the cultural heritage significance of the item and the relevant policies of the CMP.

Policy 30

Where heritage impacts fall outside the scope of policies in the CMP or the 'standard exemptions', ensure that all appropriate statutory processes are followed to obtain approval for proposed works. This includes applications under Section 57 of the Heritage Act and applications under local planning controls.

The subject works are related to a State Significant Infrastructure approval under the Environmental Planning and Assessment Act 1979, which in accordance with this Act, the provisions and requirements of the Heritage Act 1977 do not apply.

Policy 32

The Alexandra Canal curtilage is defined as the Canal itself from Shea's Creek to the Cooks River. The curtilage includes a 3 m setback from the edge of the Canal on each side of the Canal and incorporates a 2 m height curtilage above Mean High Spring Tide. The Shea's Creek Wool Sheds and Ricketty Street Bridge are within the site curtilage and associated heritage items with the Alexandra Canal.

Noted. The proposed works are within the 3m curtilage of the Canal and the impact of such has been addressed in this report.

Policy 34

Any new developments within the curtilage of the site should prepare a statement of heritage impact and outline all positive and negative impacts on the significance of the Alexandra Canal and any of the heritage items within the curtilage area associated with the Canal. It

must outline a strategy that protects the stability of the embankment walls.

Noted. This Statement of Heritage Impact has addressed the requirements of this policy.

Policy 36

Any new development should be of a small enough scale so as to not overwhelm the existing landscape, in terms of form, scale or height.

The scale of development within the local area is consistent with the industrial nature of the land uses, both current and historic. The canal is a key component of the industrial landscape and the length, width and mass of the artificial banks is an example of this. The proposed work is consistent with the scale of existing buildings within the area and the industrial nature of the precinct.

The concrete and steel visual character of the surrounding landscape provides a form to which a concrete bridge as proposed should be comfortable within. The proposed bridges, while extending over the canal in two locations, will not detract from the canal in its entirety. They a present scale and form which is compatible with the man-made form of the canal.

Policy 37

The open air space over the Canal should be retained as far as possible and bridges over the Canal should be restricted.

The proposed bridges have been designed to be a minimum 2m above the high water level of the canal. This will provide for sufficient views under the bridges and down the canal.

The majority of the canal will remain open to the air which will enable the appreciation of the openness of the canal at various other points along the full stretch.

Policy 38

Before any new crossings or bridges are

undertaken, existing crossings should be considered to see if they can have a dual function. Any new crossings should be designed to have a multi purpose function such as a pipe/ pedestrian bridge if possible.

The proposed bridge crossings were approved as a part of the SSI application for WestConnex Stage 2. Existing crossings were considered, however, they were not at the appropriate alignment to enable the construction of the interchange and to provide a separation between local roads and the proposed motorway.

It is unknown as to any other requirements for crossings, however, it will be recommended in this report that all pipe work and associated infrastructure, crossing, should be placed under the bridges or attached to the side of the bridges.

Policy 39

Any new and replacement crossings or bridges must maintain a minimum 2 metre freeboard height above Mean High Water Spring Tide to allow the Canal to remain navigable to small craft.

The proposed crossings have a minimum 2m height above the Mean High Water mark.

Policy 40

Any new and replacement crossings or bridges must maintain pedestrian access along the banks and be set back off the significant sandstone embankment walls as set down in the engineering report Appendix A to protect the stability of the walls.

The two sections of the canal under consideration are currently not publicly accessible due to ownership. The proposed works will enhance access. Future use of the canal banks for pedestrian and cycling paths will have a positive impact with regards to pedestrian access.

E13 Conclusion

The proposed works on the Alexandra Canal has been assessed in accordance with the requirements of Condition B62 of the SSI approval which states:

The Urban Design and Landscape Plan must include the following sub-plans:

(e) an Alexandra Canal Sub-plan which details the design and integration of the bridges over the Alexandra Canal, including a Heritage Impact Assessment addressing any heritage impacts to the Canal and its setting taking into account future and current accessibility plans for the Canal and the heritage sensitivity of the setting as set out in the Alexandra Canal Heritage Conservation Plan.

Condition B62 relates to the provision of an Urban Design and Landscape Plan, in accordance with condition B61.

Alexandra Canal is a significant piece of industrial heritage within NSW, built with the intention of improving transportation between Port Jackson and Botany Bay and supporting the growth of industry within the Sydney basin. The canal is an example of Australian engineering and one of only two man-made canals within New South Wales.

The proposed bridge works for WestConnex Stage 2 will provide connections between the local road network and the new M5 motorway. The interchange at St Peters will provide connections between local roads, the New M5 and the connector tunnel between the M5 and the M4, known as stage 3.

This proposal has been assessed in accordance with the Heritage Council of NSW guidelines for Statements of Heritage Impact, the Australian ICOMOS The Burra Charter (2013 edition) and the policies set out in the current Conservation Management Plan.

Impacts have been identified in relation to the views, the setting and the structural stability of the canal wall. All things considered, the bridges are unlikely to have a substantive adverse impact on the visual setting of the canal, due to the

retention of the industrial nature of the area, which is critical to the understanding of the historical significance of the canal.

Future uses may improve public interaction with the State listed canal with the opening of once private land to pedestrians and cyclists.

There is potential that the proposed works will impact the stability of the canal wall and the underlying structure. Piling in close proximity to the base and rear of the wall could result in damage caused by vibration and movement. As a result, the construction works will be planned to ensure that the proposed works do not undermine the substructure of the canal. In addition, the construction methodology will be planned to ensure the stability of the embankment, and subsequently the canal wall is maintained, and where needed, improved.