INFRASTRUCTURE PORTFOLIO SUPPORT OFFICE

ESTIMATE CONCURRENCE REPORT

Roads & Maritime

PROJECT: Windsor Bridge replacement over Hawkesbury River

ROAD: Macquarie St to Wilberforce Rd **PROJECT No:** A/66737

LOCATION: Windsor, Hawkesbury **PROJECT MANAGER**: Gurjit Singh

REGION/ OFFICE: Greater Sydney PO **ESTIMATE STATUS:** Detail

ESTIMATE OF P90 COST: $97M ($ March 2017) **DATE:** 18/05/2017

ESTIMATE OF P90 $OT COST: $104M (construction June 2018 to March 2021)

Background

The project is located at Windsor in the Hawkesbury local government area about 57 kilometres north- west of Sydney. Windsor is a major historic town, with European settlement dating back to the late 1700s. Today it is predominantly rural, although there is extensive and expanding urban development to the south and west of the town. The existing Windsor Bridge was opened in 1874 and is the oldest existing bridge across the Hawkesbury River. It provides an important local link for communities on each side of the river, as well as an important regional link between western Sydney, the Blue Mountains and the Hunter region. Around 19,000 vehicles use the bridge each day, with around seven per cent of these being heavy vehicles.

Parts of the existing bridge are over 140 years old and are deteriorating as a result of age and heavy use. Elements of the bridge have deteriorated substantially and it is not practical to replace or repair these elements. The existing bridge and adjacent intersections no longer meet the demands of current peak hour traffic volumes or current road standards. The level of maintenance required to maintain adequate road safety is no longer cost effective and it is therefore regarded that the bridge has reached the end of its economic life.

In June 2008, in recognition of the condition of the existing bridge and the volume of traffic it carried, the New South Wales (NSW) Government announced funding for its replacement. Preliminary investigations of potential bridge replacement options along with stakeholder consultations were completed in 2012, followed by completion and public display of the Environmental Impact Statement (EIS) exhibition. The Infrastructure Approval was provided by the NSW Minister for Planning in December 2013 but was then appealed at the NSW Land and Environmental Court on the grounds that it would impact on Thompson Square. This appeal was led by the Community Action Group for Windsor Bridge. However, in 2015 the appeal was denied and the court allowed the project to proceed.

Status/Program

Milestone	Target Date
Complete Concept Design	Completed
REF Display	Completed
REF Determination	Completed
Complete Detail Design	June 2017
Invite Tenders	August 2017
Commence Construction	June 2018
Complete Construction	March 2021
Handing over	April 2022

Scope

The project includes:

- A 2,445 m^2 new bridge 35 metres downstream of the existing Windsor Bridge
- New approach roads and intersections to connect the new bridge to the existing road network
- New traffic lights with pedestrian facilities at the intersection of Bridge Street and George Street
- A new dual lane roundabout at the intersection of Wilberforce Street and Freemans Reach Road
- Modifications to local roads and access arrangements, including changes to the Macquarie Park access road and reconnection of The Terrace
- Pedestrian and cyclist facilities, including a shared path connecting to and across the new bridge
- Removal and backfill of the existing bridge approach roads
- Removal of the existing bridge once the new bridge is operational
- Landscaping and urban design work, including within the Thompson Square parkland area and adjacent to the northern intersection of Wilberforce Road, Freemans Reach Road and the Macquarie Park access road.

Review Methodology

1. Arithmetic checks were carried out on the estimate spreadsheets.
2. Cursory checks were carried out on some items for appropriateness of the quantities and/or rates.
3. Reality check calculations were reviewed.
4. Overall rates for pareto items were verified and compared with the rates achieved on similar projects and reasons provided for deviations from typical values where applicable.
5. The estimate was discussed with the project manager and relevant adjustments were made.
6. Contingency was calculated from Monte Carlo simulation and deterministic approach was used for assigning contingency for each estimate component.
7. Estimate compared to previous estimate and variances were analysed.

Key Assumptions

- Project duration is 156 weeks
- Relocation of 33kV line has been excluded since it had been undertaken by Endeavour Energy in 2014, also excluded is the relocation of a 33kV pole on the southern side.
- Council communications uses optic fibre
- Provisional allowance for 200m of asbestos conduits to be disposed of
- Heritage building condition inspections for the buildings in the vicinity of Thompson square to be classed as heritage
- Allowance made for disposal of all excavated material in Northern Bank as General Solid Waste due to presence of sulfate soil
- No allowance made for works on existing abutments to be retained

For further assumptions please refer to Appendix 5.

Assessment of Key Components

1. Development

The Initiation, Strategic and Concept Development have been completed with actual expenditure to date of $10.5million (excluding project management costs). This is 23% of the total construction cost (approximately $45million) which is significantly above the achieved range of 3-5% with a construction cost between $10million and $50million.

The higher incurred expenditure has largely been due to heritage investigation works undertaken for the EIS, further investigations in multiple options (i.e. bypass and maintaining existing bridge options) and to comply with the particularly onerous conditions of approval that were placed on the project which increased both scope and complexity of the development phases.

2. Investigation, Detail Design and Documentation

For Investigation, Detail Design and Documentation, a base allowance of $14.8million plus 6% contingency (excluding project management costs) has been allowed in the estimate. This represents 33% of the total construction cost (approximately $45million) and is significantly higher the achieved range of 4-8% for projects with a construction cost between $10million and $50million.

Prior to receiving the Infrastructure Approval, an alliance was formed to take the project from concept to completion of construction. As part of their work the design progressed past concept into detailed design.

The subsequent Infrastructure Approval included a condition that the southern bridge approach was to be lowered by one metre, which then required substantial redesign. Additional other conditions, in particular those associated with archaeological studies have also necessitated redesign work and increased the scope.

Further cost increases have occurred during this phase due to changes to the scope of works on the archaeological investigations that were previously unforeseen.

As detailed design is close to completion, the base allowance and contingency is considered appropriate.

3. Property Acquisition

The property acquisition along the project corridor has been completed with an actual expenditure to date of $0.36million.

4. Utility Adjustment

A base allowance of $4.2million plus 30% contingency has been allocated for works associated with utilities. The utility adjustment works include electricity mains, water mains and telecommunications and the allowance is based on experience from the past projects, and therefore considered acceptable.

5. Infrastructure Construction

(a) Earthworks

The overall earthworks base rate is $45/m^3$ (for 9,650m^3 of earthwork quantity). This rate is within the achieved rate in the Sydney Region which varies between $23/m^3$ and $53/m^3$ for small quantities. Due to extensive heritage investigations, standard production rates have been assumed, as such the estimated rate is considered acceptable.

(b) Pavement

A base rate of $130/m^2$ is allowed for the new pavement (10,960m^2) in the main carriageways, which consists of the main pavement (~80%) and mill and re-sheet (~20%). The main pavement comprises of 220mm heavily bound subbase, 150mm of AC20 intermediate layer followed by 50mm of AC14 wearing course. The base rate is comparable with similar pavement in the achieved range in the Sydney region of $130/m^2$ to $150/ m^2$ and is considered acceptable.

(c) Structures

Description	**Area (m^2)**	**Base Rate/m^2**	**Achieved rate/m^2 for similar structures***
Five Span (31.3m), 157m long, 14.5m wide, 1850mm deep incrementally launched double T-girder bridge	2,445m^2	$7,871/$m^2$	$7,000/$m^2$ - $7,900/$m^2$

*BW004 bridge at Hunter Expressway and Cliff Bridge rates escalated to current dollars

The base rate for the bridge is comparable to that of similarly completed incrementally launched bridges. Therefore, the estimated rate is acceptable.

6. Project Management

The overall base Project Management cost is $9.1million which is 11.4% of the total project cost. A typical Project Management range for a development project of this size (project cost between $50M and $100M) would be between 5.5%-7.5% depending on the complexity, nature and location of the works. The above project management percentage is higher than the achieved range and given the prolonged project period, and the additional work and complexity associated with the archaeological investigations, the rate is justifiable and therefore considered acceptable.

7. Reality Checks/Project Cost Summary

Item	Unit	Base $	PMO Recommended Rates
1. Project Cost/km	km	$81.2M	
2. Project Cost/Lane-km	Lane-km	$40.6M	
3. Infrastructure Cost/Lane-km (excl. Bridge/Structures)	Lane-km	$8.4M	$2.9M-$4.2M

The Infrastructure construction cost of the main carriageway per lane-km rate (excluding bridge/structures/utilities) is $8.4M. This is higher than the recommended Infrastructure Cost/lane-km rate of $2.9M to $4.2M due to the short length and fragmented construction causing low production rates, the allowed rate is considered acceptable.

Conclusions and Recommendation

The rates and contingencies listed are considered to be appropriate for this stage of development.

It is recommended that concurrence now be given to the P50 Project cost of $93M ($ March 2017) with an outturn cost of $101M and P90 Detail Estimate Cost of $97M ($ March 2017) with an outturn cost of $104M, assuming that the construction commences in June 2018 with completion being achieved in March 2021 and an escalation rate of 5% for the Windsor Bridge replacement over Hawkesbury River.

Sissy Chu
A/Project Officer, Project Estimating
Project Services
Date: 18/05/2017

Concurrence

On the basis of the information provided, concurrence is given to the P50 Project cost of $93M ($ March 2017) with an outturn cost of $101M and P90 Detail Estimate Cost of $97M ($ March 2017) with an outturn cost of $104M, assuming that the construction commences in June 2018 with completion being achieved in March 2021 and an escalation rate of 5% for the Windsor Bridge replacement over Hawkesbury River.

This concurrence is not an approval to the estimate. Approval must be obtained from the appropriate person in accordance with the Delegated Authorities.

Nages Nageswaran
Engineering Estimating Manager
Project Services
Technical and Project Services
Date: 19.05.17

Appendix I

Location Map

LOCATION MAP: Windsor Bridge Replacement

From Macquarie Street to Wilberforce Road

Appendix 2

Estimate

- Project Cost Summary
- Deterministic/Empirical Estimate
- Probabilistic Estimate
- Outturn Calculation
- Probabilistic Outturn Calculation

Appendix 3

Risk Register

Appendix 4

Drawings

Transport Roads & Maritime Services

NSW GOVERNMENT

HAWKESBURY CITY COUNCIL AREA

MR182 - BRIDGE STREET, WINDSOR

WINDSOR BRIDGE REPLACEMENT

FROM MACQUARIE STREET TO WILBERFORCE ROAD

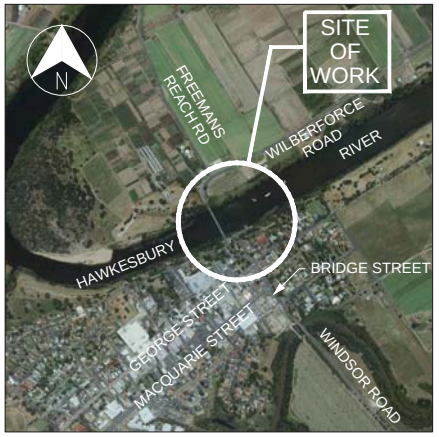
DETAILED DESIGN

VOLUME 01

GENERAL

DRAWING DOCUMENTATION

VOLUME	DISCIPLINE DESCRIPTION
01	GENERAL
02	ROADWORKS
03	DRAINAGE & WATER QUALITY
04	UTILITIES
05	PAVEMENT & KERBS
06	PAVEMENT MARKING, SIGNS & BARRIERS
07	PROPERTY WORKS
08	GEOTECHNICAL
09	SCOUR PROTECTION
10	MINOR STRUCTURES
11	MAJOR STRUCTURES
12	URBAN DESIGN AND LANDSCAPING
13	SUPPLEMENTARY DRAWINGS



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NOT TO SCALE

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1	26.03.13	ISSUED FOR 80% DETAILED DESIGN	CG	BDP	MF
0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	07.10.16
DRAFTING CHECK	SH	07.10.16
DESIGNER	DH	07.10.16
DESIGN CHECK	BDP	07.10.16
PROJECT MANAGER	TR	07.10.16

ORIGINAL DRAWING AT A3 SIZE

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY

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CLIENT

Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
GENERAL
COVER SHEET

STATUS
NOT FOR CONSTRUCTION

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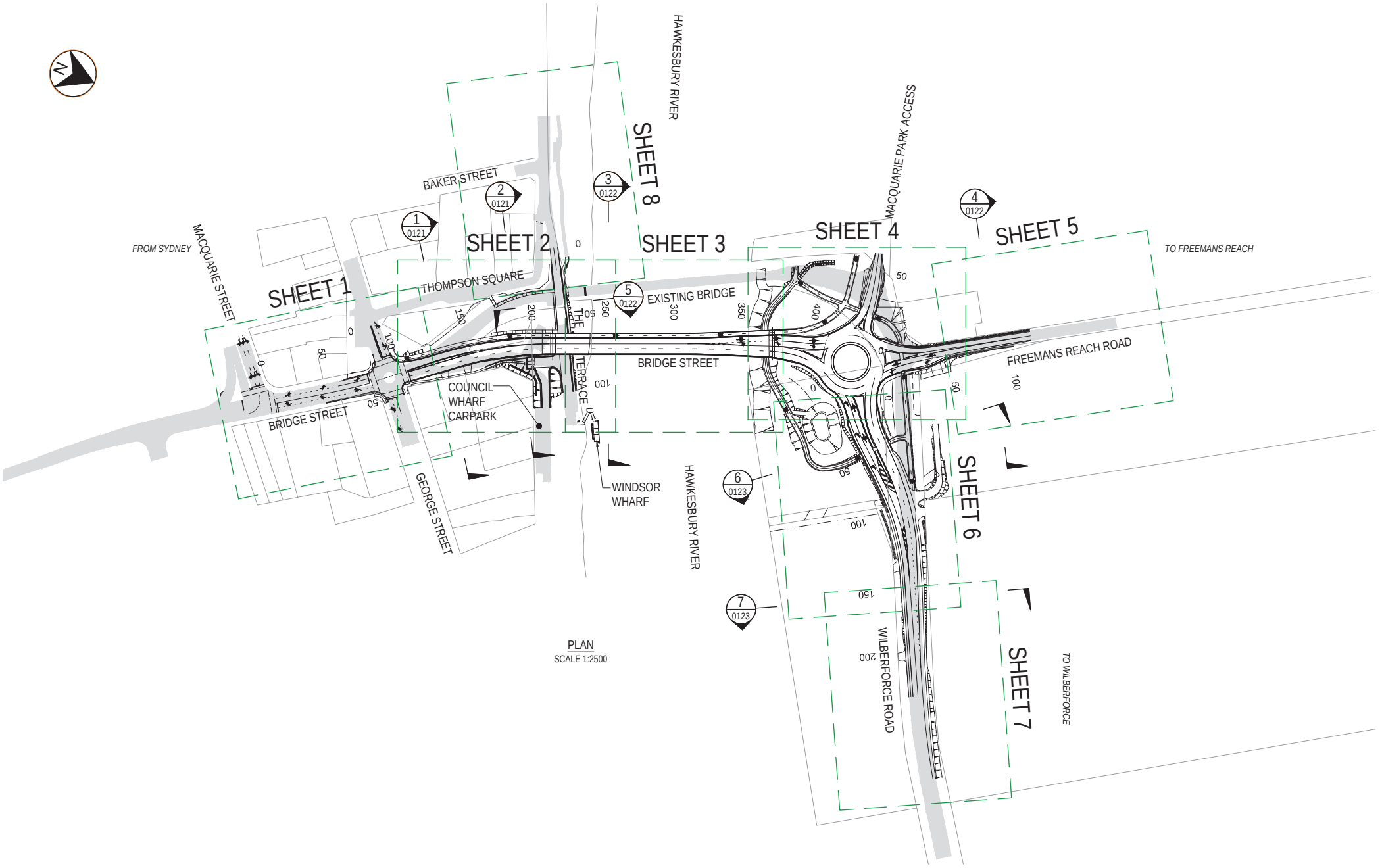

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ORIGINAL DRAWING AT A3 SIZE
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CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

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PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
GENERAL
ALIGNMENT KEY PLAN

STATUS
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Transport Roads & Maritime Services

NSW GOVERNMENT

HAWKESBURY CITY COUNCIL AREA

MR182 - BRIDGE STREET, WINDSOR

WINDSOR BRIDGE REPLACEMENT

FROM MACQUARIE STREET TO WILBERFORCE ROAD

DETAILED DESIGN

VOLUME 05

PAVEMENT & KERBS

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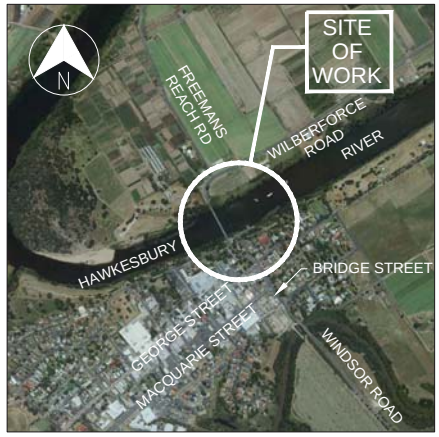

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PROJECT MANAGER	TR	20.10.16

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COVER SHEET

STATUS: **NOT FOR CONSTRUCTION**

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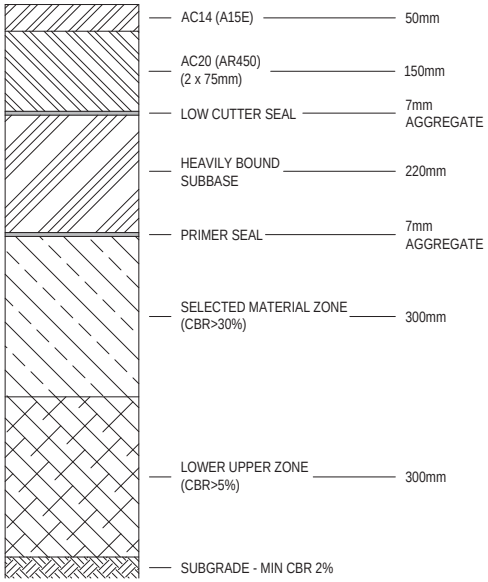

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MAIN CARRIAGEWAY - HEAVILY BOUND PAVEMENT
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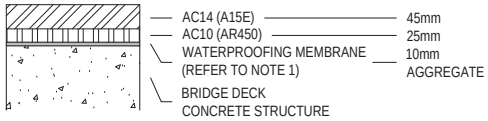

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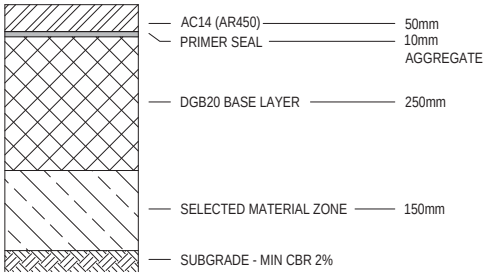

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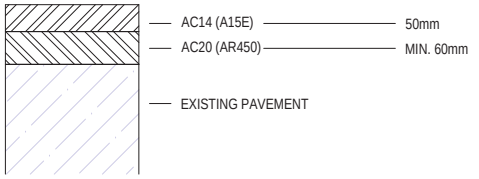

PAVEMENT TYPE 4
ASPHALT OVERLAY
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PAVEMENT TYPE 5
MILL AND RE-SHEET - MAIN CARRIAGEWAY
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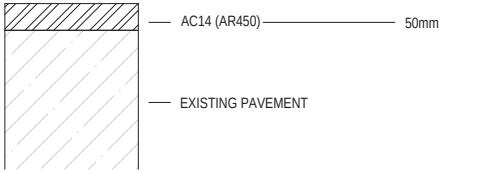

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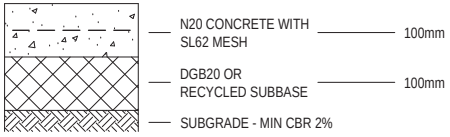

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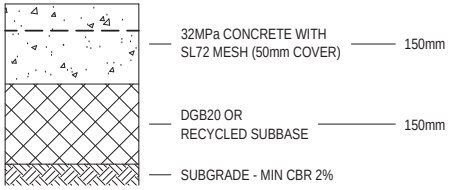

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SHARED PATH / ACCESS DRIVEWAY
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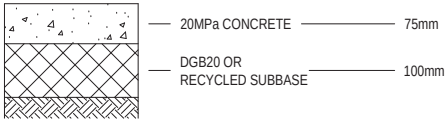

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FOOTPATH
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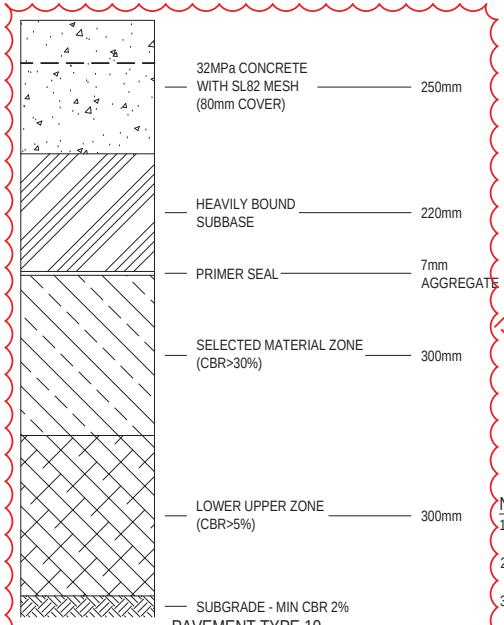

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PAVEMENT TYPE 10
ROUNDABOUT APRON
SCALE 1:10

NOTES
1. THE WATERPROOFING MEMBRANE SHALL BE IN ACCORDANCE WITH RMS SPECIFICATION B344.
2. PAVEMENT TYPES 5 AND 6: MILL 50mm OF EXISTING SURFACE AND RESHEET TO DESIGN SURFACE LEVEL.
3. FOR PAVEMENT TYPE 9 JOINTING DETAILS REFER TO MODEL DRAWING DS2012/000293.

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DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

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CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

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PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PROFILES

STATUS
NOT FOR CONSTRUCTION

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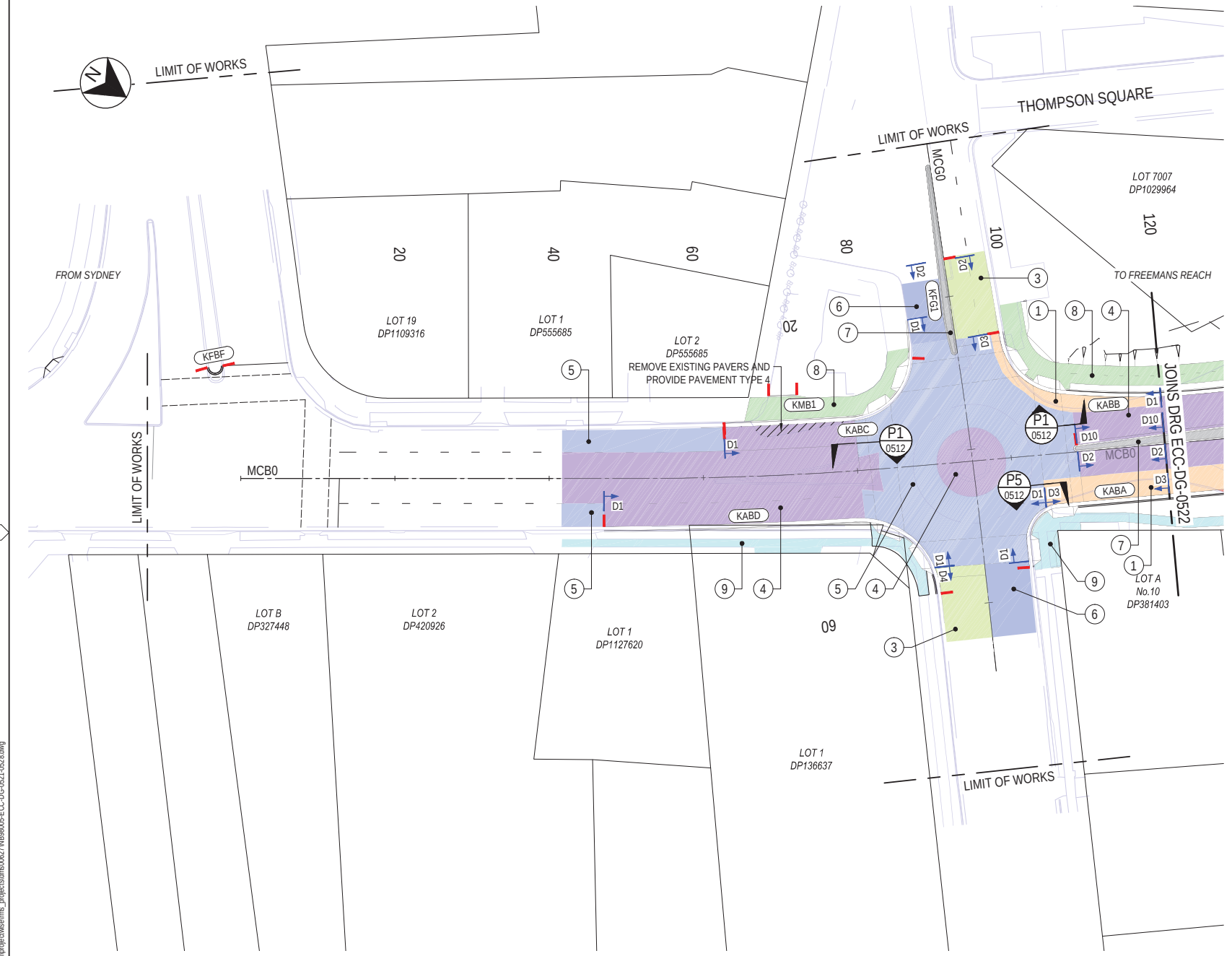


LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
- PAVEMENT TYPE 2 - BRIDGE DECK
- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
- PAVEMENT TYPE 6 - MILL & RESHEET (LOCAL ROADS)
- PAVEMENT TYPE 7 - CONCRETE MEDIAN
- PAVEMENT TYPE 8 - SHARED PATH & ACCESS DRIVEWAY
- PAVEMENT TYPE 9 - FOOTPATH
- PAVEMENT TYPE 10 - ROUNDABOUT
- PAVEMENT TYPE 11 - SHARED PATH ON BRIDGE DECK (REFER VOLUME 11 - MAJOR STRUCTURES)
- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING

(X) PAVEMENT TYPE LABEL

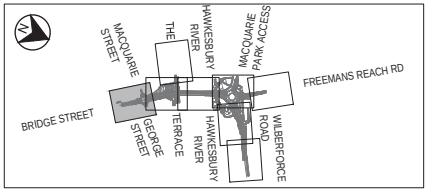
KXXX KERB / GUTTER TAG

KERB / GUTTER STRING START/END

Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
4. EXISTING PAVEMENT AFFECTED BY NEW PAVEMENT WORKS (OTHER THAN PAVEMENT TYPES 6 AND 7) TO BE REMOVED.



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	20.10.16	ISSUED FOR 100% DETAILED DESIGN	SH	BDP	TR
3	-	NOT USED	-	-	-
2	12.08.13	ISSUED FOR 100% DETAILED DESIGN	CG	DD	BDP
1	22.05.13	ISSUED FOR 80% DETAILED DESIGN	LB	BDP	MF
0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 5 0 5 10 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY

JACOBS

177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax (02) 9928 2500
Web: www.jacobs.com

CLIENT

Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

STATUS
NOT FOR CONSTRUCTION

VOLUME	RMS REGISTRATION No	
05	DS2012/000289	
PHASE	DRAWING No	REV
100%	NB98005-ECC-DG-0521	4

DATE: 20/10/2016 11:611 PM LOGIN NAME: HAIL, SCOTT
LOCATION: C:\Users\shail\AppData\Local\Temp\acwise\rms_projects\dms00627\NB98005-ECC-DG-0521-0528.dwg

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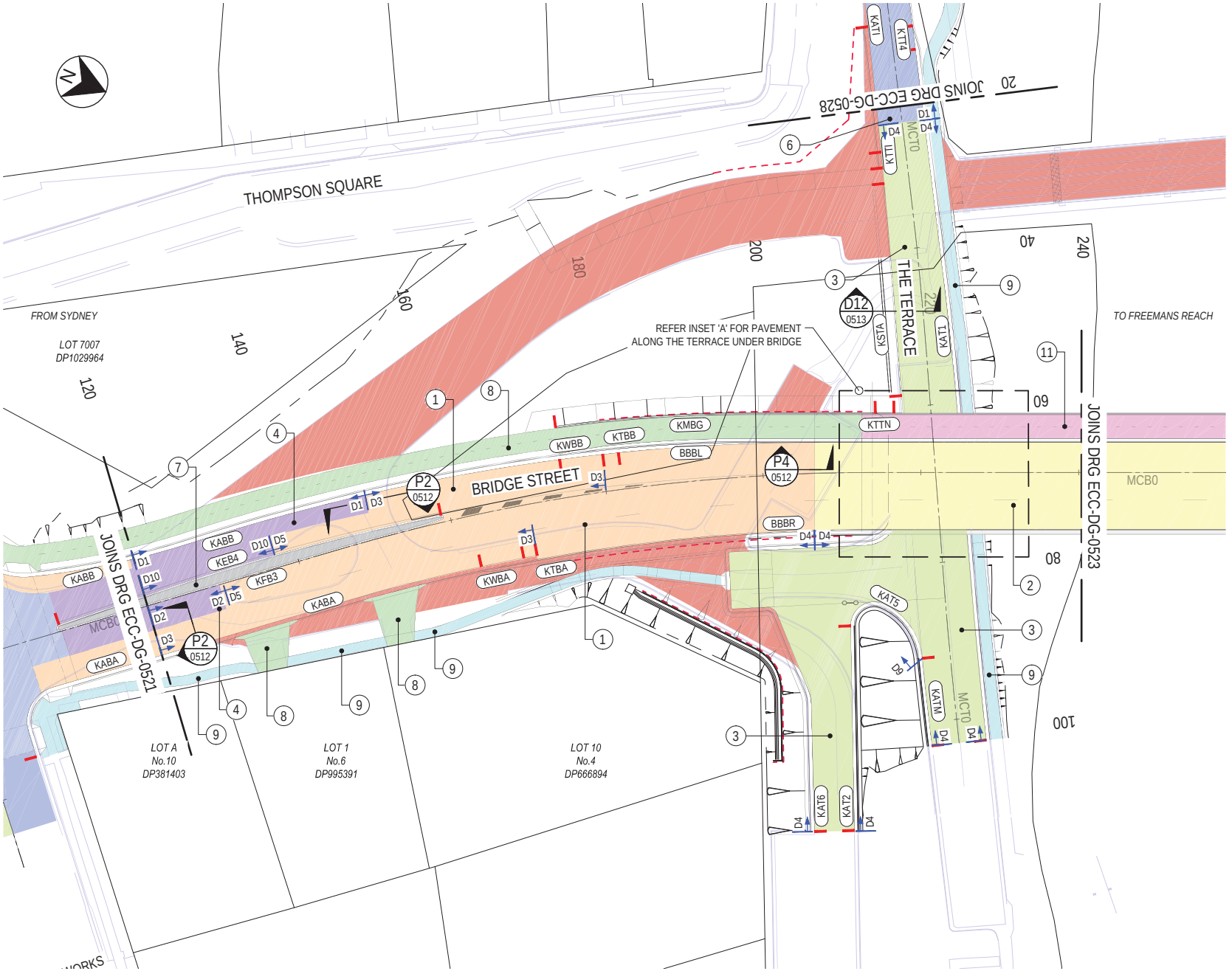


LEGEND

FOR REFERENCE

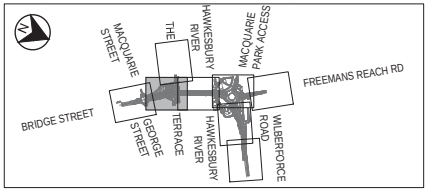
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

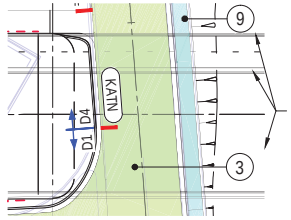
- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
- PAVEMENT TYPE 2 - BRIDGE DECK
- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
- PAVEMENT TYPE 6 - MILL & RESHEET (LOCAL ROADS)
- PAVEMENT TYPE 7 - CONCRETE MEDIAN
- PAVEMENT TYPE 8 - SHARED PATH & ACCESS DRIVEWAY
- PAVEMENT TYPE 9 - FOOTPATH
- PAVEMENT TYPE 10 - ROUNDABOUT
- PAVEMENT TYPE 11 - SHARED PATH ON BRIDGE DECK (REFER VOLUME 11 - MAJOR STRUCTURES)
- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING
- (X) PAVEMENT TYPE LABEL
- (KXXX) KERB / GUTTER TAG
- KERB / GUTTER STRING START/END
- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
4. EXISTING PAVEMENT AFFECTED BY NEW PAVEMENT WORKS (OTHER THAN PAVEMENT TYPES 6 AND 7) TO BE REMOVED.



KEY PLAN



INSET 'A'
FOR PAVEMENT ALONG THE TERRACE UNDER BRIDGE

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	20.10.16	ISSUED FOR 100% DETAILED DESIGN	SH	BDP	TR
3	-	NOT USED	-	-	-
2	12.08.13	ISSUED FOR 100% DETAILED DESIGN	CG	DD	BDP
1	22.05.13	ISSUED FOR 80% DETAILED DESIGN	LB	BDP	MF
0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 (5 0 5 10)
AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY
JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
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CLIENT
NSW GOVERNMENT Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 2

STATUS
NOT FOR CONSTRUCTION

VOLUME	RMS REGISTRATION No	
05	DS2012/000289	
PHASE	DRAWING No	REV
100%	NB98005-ECC-DG-0522	4

DATE: 20/10/2016 1:16:16 PM LOGIN NAME: HAIL, SCOTT
LOCATION: C:\Users\shail\AppData\Local\Temp\acwise\rms_projects\dms00627\NB98005-ECC-DG-0521-0528.dwg

0 5 10 15 20 25 mm ON A3 ORIGINAL

LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
- PAVEMENT TYPE 2 - BRIDGE DECK
- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
- PAVEMENT TYPE 6 - MILL & RESHEET (LOCAL ROADS)
- PAVEMENT TYPE 7 - CONCRETE MEDIAN
- PAVEMENT TYPE 8 - SHARED PATH & ACCESS DRIVEWAY
- PAVEMENT TYPE 9 - FOOTPATH
- PAVEMENT TYPE 10 - ROUNDABOUT
- PAVEMENT TYPE 11 - SHARED PATH ON BRIDGE DECK (REFER VOLUME 11 - MAJOR STRUCTURES)
- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING
- (X) PAVEMENT TYPE LABEL
- (KXXX) KERB / GUTTER TAG
- KERB / GUTTER STRING START/END
- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
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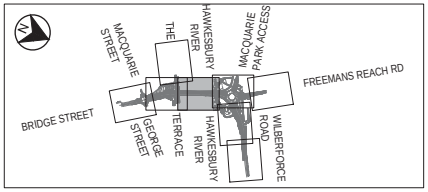

KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
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3	-	NOT USED	-	-	-
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TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500
5 0 5 10
AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY
JACOBS
177 Pacific Highway
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CLIENT
NSW GOVERNMENT Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 3

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

STATUS
NOT FOR CONSTRUCTION

VOLUME	RMS REGISTRATION No	
05	DS2012/000289	
PHASE	DRAWING No	REV
100%	NB98005-ECC-DG-0523	4

DATE: 20/10/2016 11:6:20 PM LOGIN NAME: HAIL, SCOTT
LOCATION: C:\Users\shail\AppData\Local\Temp\acwise\rms_projects\dms00627\NB98005-ECC-DG-0521-0528.dwg

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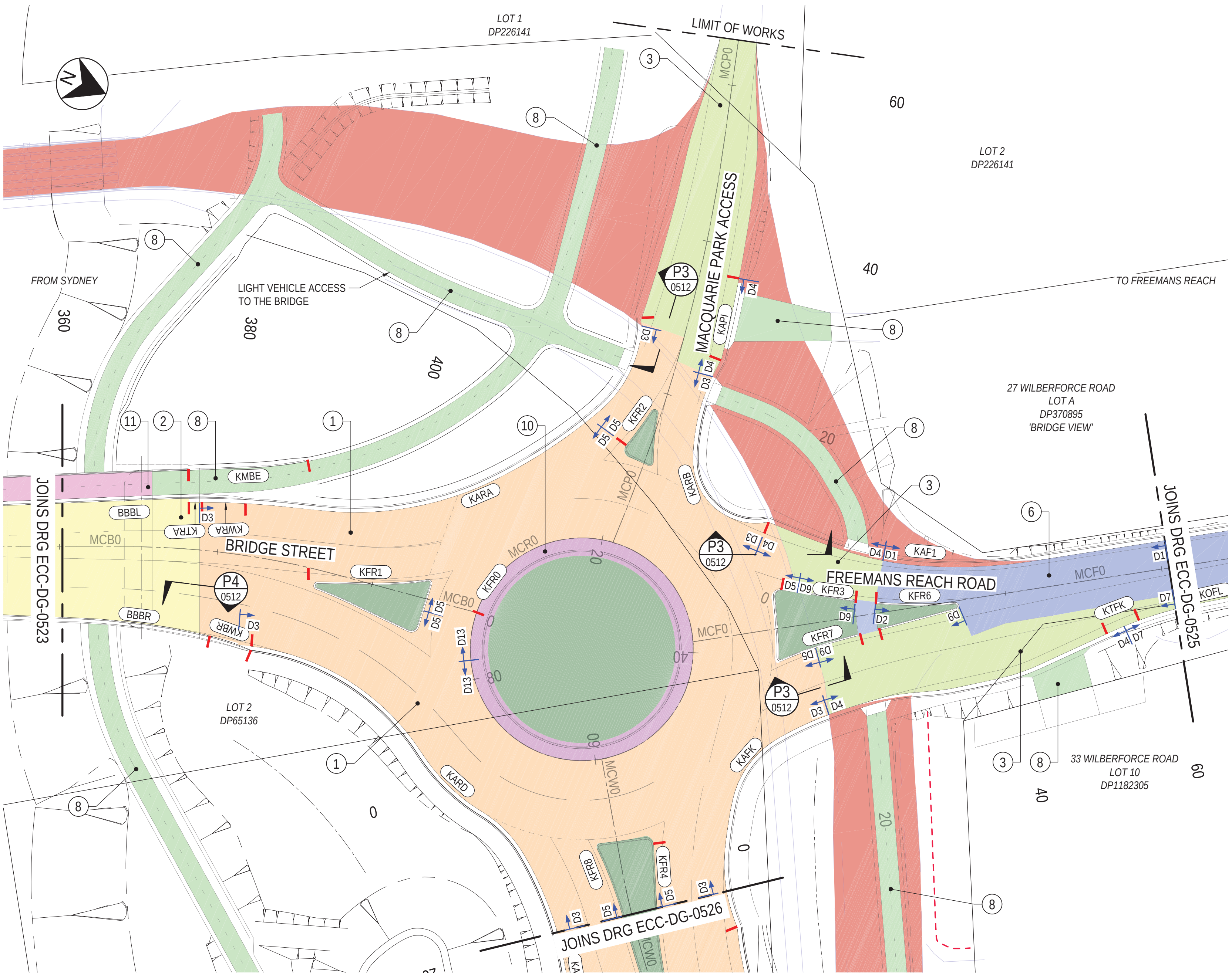

LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
- PAVEMENT TYPE 2 - BRIDGE DECK
- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
- PAVEMENT TYPE 6 - MILL & RESHEET (LOCAL ROADS)
- PAVEMENT TYPE 7 - CONCRETE MEDIAN
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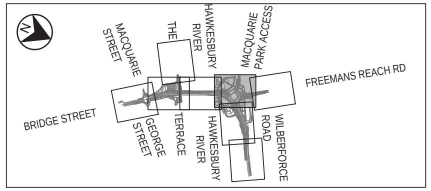
- PAVEMENT TYPE 9 - FOOTPATH
- PAVEMENT TYPE 10 - ROUNDABOUT
- PAVEMENT TYPE 11 - SHARED PATH ON BRIDGE DECK (REFER VOLUME 11 - MAJOR STRUCTURES)
- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING
- (X) PAVEMENT TYPE LABEL
- (KXXX) KERB / GUTTER TAG
- KERB / GUTTER STRING START/END
- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
4. EXISTING PAVEMENT AFFECTED BY NEW PAVEMENT WORKS (OTHER THAN PAVEMENT TYPES 6 AND 7) TO BE REMOVED.



KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
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3	-	NOT USED	-	-	-
2	12.08.13	ISSUED FOR 100% DETAILED DESIGN	CG	DD	BDP
1	22.05.13	ISSUED FOR 80% DETAILED DESIGN	LB	BDP	MF
0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY
JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax (02) 9928 2500
Web: www.jacobs.com

CLIENT
NSW GOVERNMENT Transport Roads & Maritime Services
PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

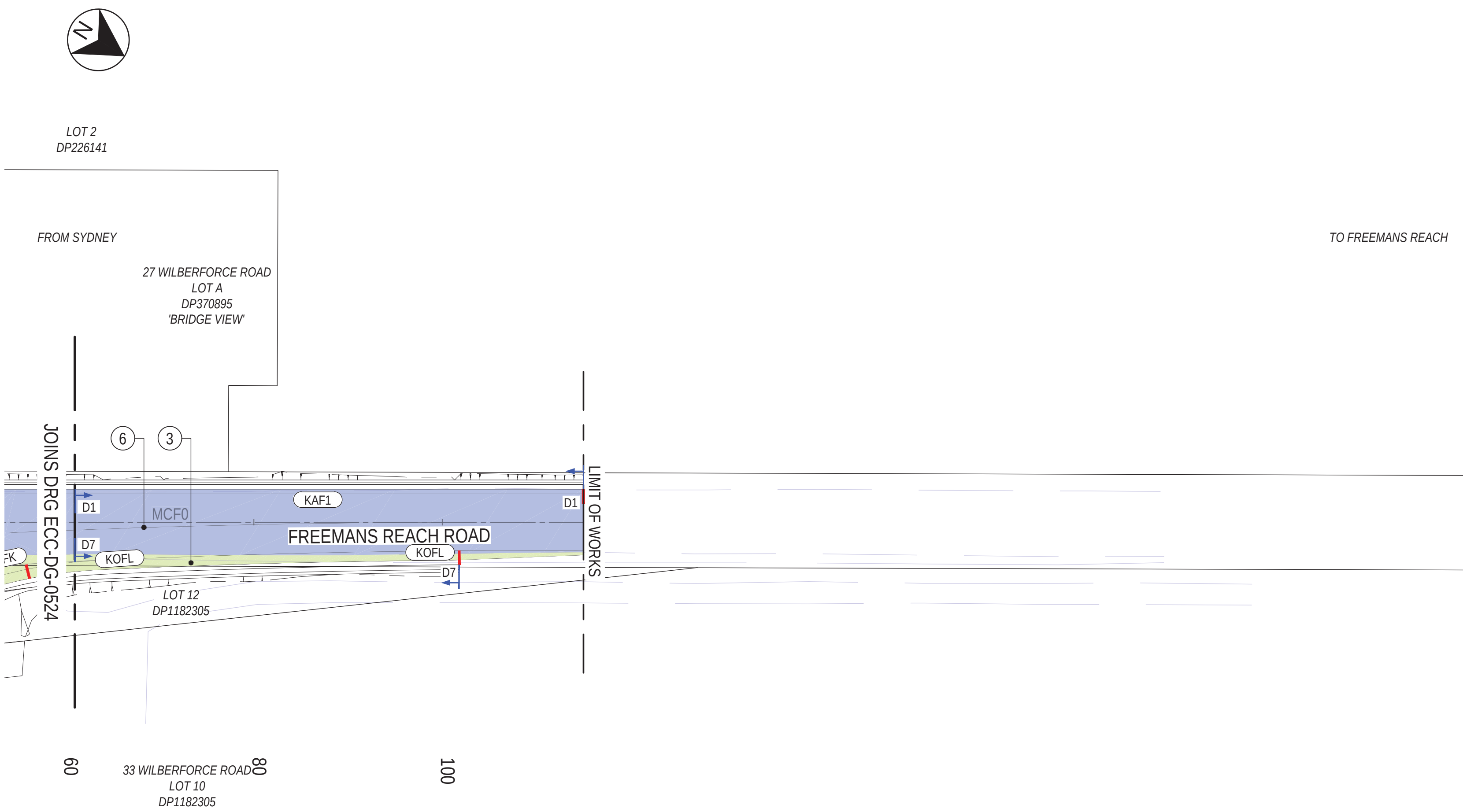
PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 4

STATUS
NOT FOR CONSTRUCTION

VOLUME 05
RMS REGISTRATION No DS2012/000289
PHASE 100%
DRAWING No NB98005-ECC-DG-0524
REV 4

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL   This Drawing may have been prepared using colour and may be incomplete if copied

DATE: 20/10/2016 1:16:25 PM LOGIN NAME: HAIL, SCOTT
LOCATION: C:\Users\shail\AppData\Local\projectwise\rms_projects\dms00627\NB98005-ECC-DG-0521-0528.dwg



LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
- PAVEMENT TYPE 2 - BRIDGE DECK
- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
- PAVEMENT TYPE 6 - MILL & RESHEET (LOCAL ROADS)
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- PAVEMENT TYPE 11 - SHARED PATH ON BRIDGE DECK (REFER VOLUME 11 - MAJOR STRUCTURES)
- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING
- (X) PAVEMENT TYPE LABEL
- (KXXX) KERB / GUTTER TAG
- KERB / GUTTER STRING START/END
- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
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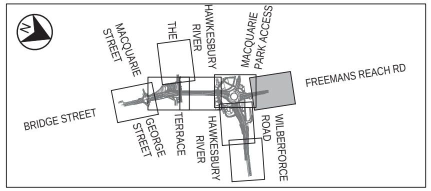

KEY PLAN

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REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
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3	-	NOT USED	-	-	-
2	12.08.13	ISSUED FOR 100% DETAILED DESIGN	CG	DD	BDP
1	22.05.13	ISSUED FOR 80% DETAILED DESIGN	LB	BDP	MF
0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY
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CLIENT
NSW GOVERNMENT Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 5

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

STATUS
NOT FOR CONSTRUCTION

VOLUME: 05
RMS REGISTRATION No: DS2012/000289
PHASE: 100%
DRAWING No: NB98005-ECC-DG-0525
REV: 4

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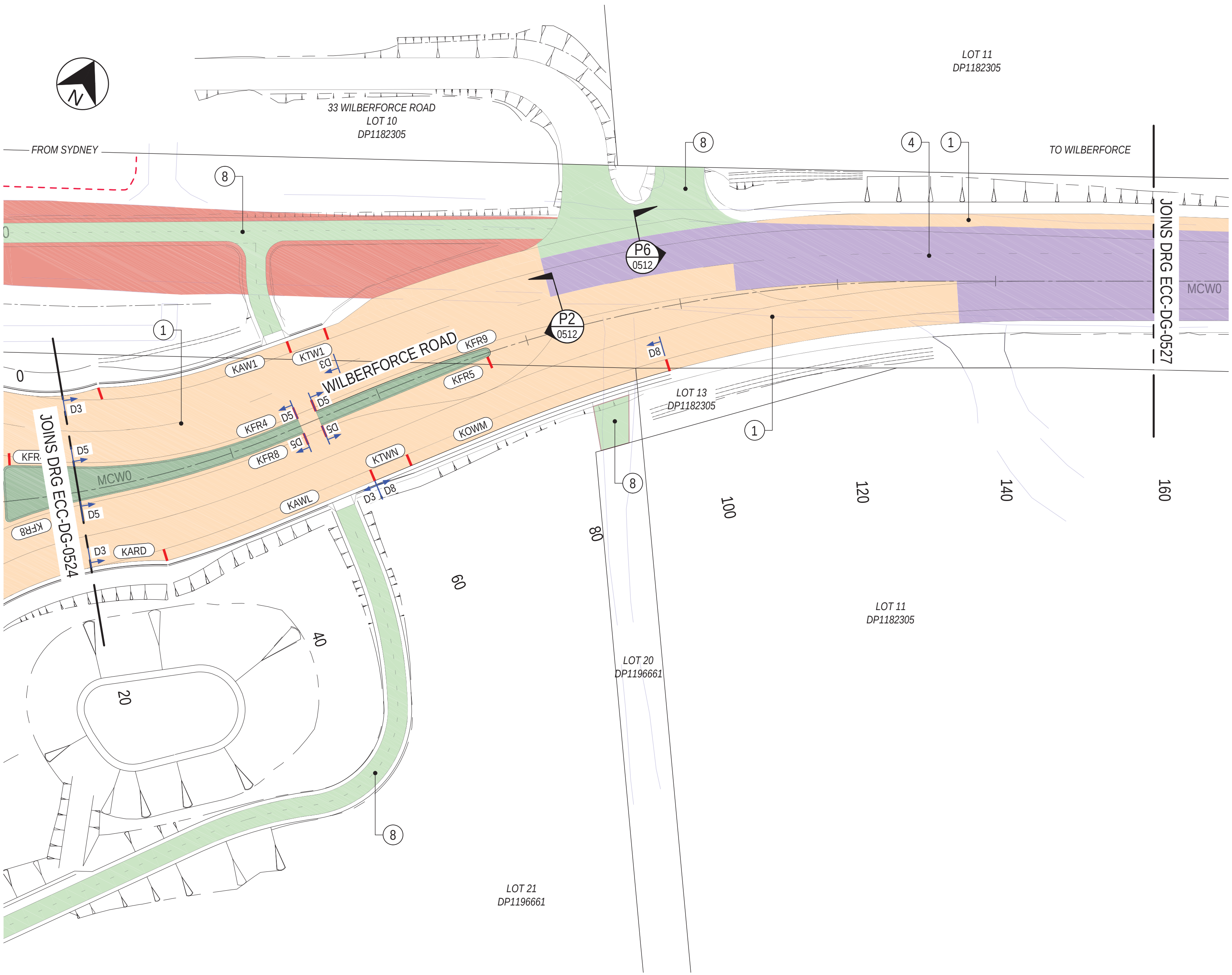

LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
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- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
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- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING
- (X) PAVEMENT TYPE LABEL
- (KXXX) KERB / GUTTER TAG
- KERB / GUTTER STRING START/END
- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
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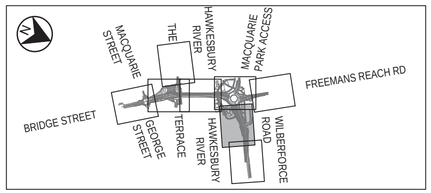

KEY PLAN

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	20.10.16	ISSUED FOR 100% DETAILED DESIGN	SH	BDP	TR
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TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500 — 5 0 5 10 AT A3
CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL — This Drawing may have been prepared using colour and may be incomplete if copied

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PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 6

STATUS
NOT FOR CONSTRUCTION

VOLUME: 05
RMS REGISTRATION No: DS2012/000289
PHASE: 100%
DRAWING No: NB98005-ECC-DG-0526
REV: 4

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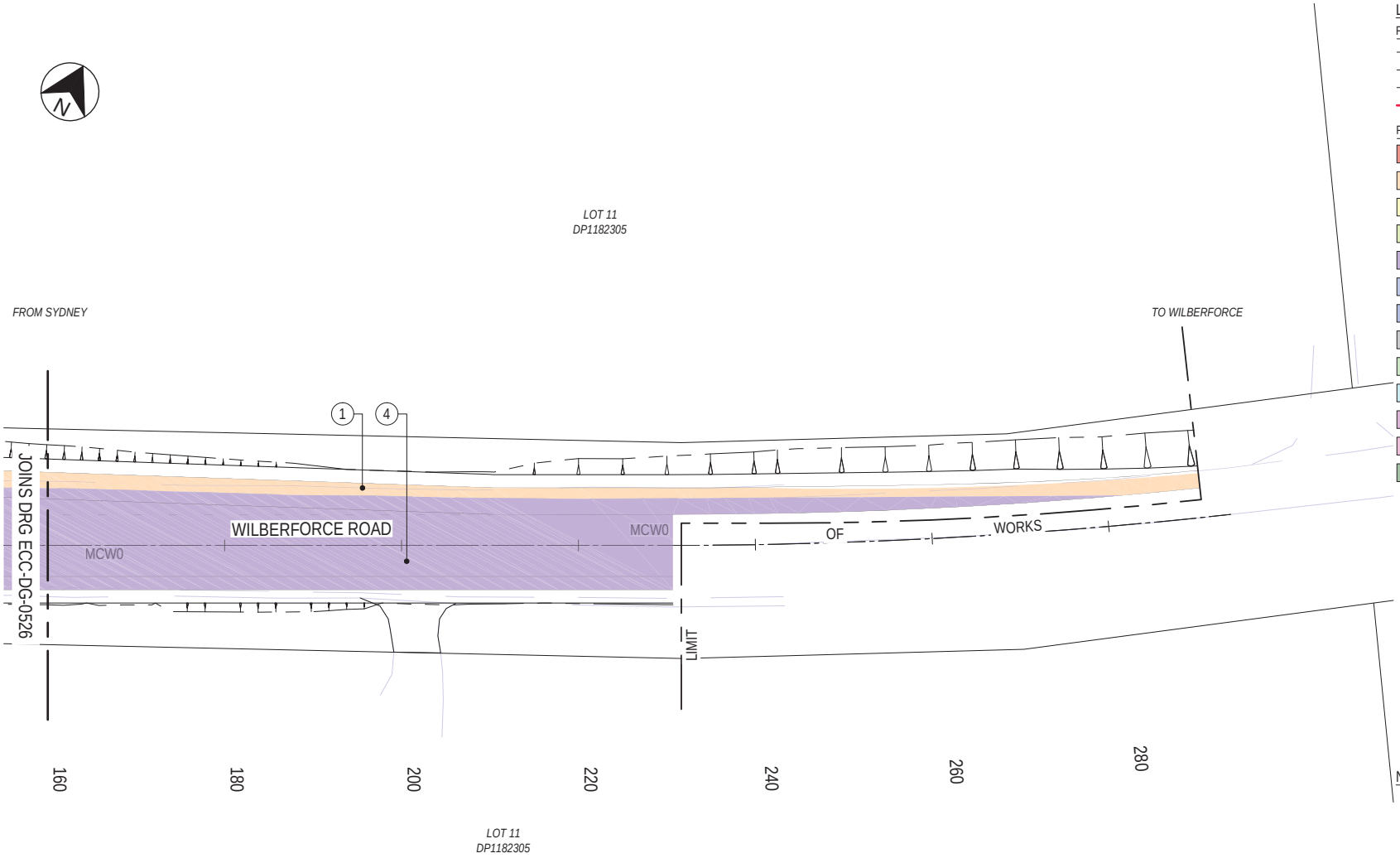


LEGEND

FOR REFERENCE

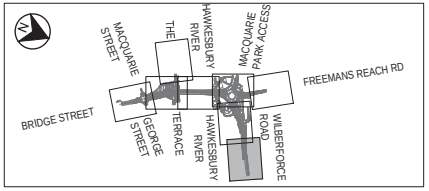
- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

PAVEMENT & KERBS

- EXISTING PAVEMENT TO BE REMOVED
- PAVEMENT TYPE 1 - MAIN CARRIAGEWAY
- PAVEMENT TYPE 2 - BRIDGE DECK
- PAVEMENT TYPE 3 - LOCAL ROAD
- PAVEMENT TYPE 4 - ASPHALT OVERLAY
- PAVEMENT TYPE 5 - MILL & RESHEET (MAIN CARRIAGEWAY)
- PAVEMENT TYPE 6 - MILL & RESHEET (LOCAL ROADS)
- PAVEMENT TYPE 7 - CONCRETE MEDIAN
- PAVEMENT TYPE 8 - SHARED PATH & ACCESS DRIVEWAY
- PAVEMENT TYPE 9 - FOOTPATH
- PAVEMENT TYPE 10 - ROUNDABOUT
- PAVEMENT TYPE 11 - SHARED PATH ON BRIDGE DECK (REFER VOLUME 11 - MAJOR STRUCTURES)
- LANDSCAPED MEDIAN REFER TO DRAWING VOLUME 12 - URBAN DESIGN & LANDSCAPING
- (X) PAVEMENT TYPE LABEL
- (KXXX) KERB / GUTTER TAG
- KERB / GUTTER STRING START/END
- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

1. FOR GENERAL NOTES REFER DRAWING NB98005-ECC-DG-0503.
2. FOR KERB AND GUTTER TAG DESCRIPTION, REFER DRAWING NB98005-ECC-DG-0514.
3. FOR KERB & GUTTER SCHEDULE REFER NB98005-ECC-DG-0514.
4. EXISTING PAVEMENT AFFECTED BY NEW PAVEMENT WORKS (OTHER THAN PAVEMENT TYPES 6 AND 7) TO BE REMOVED.



KEY PLAN

REV	DATE	DESCRIPTION	DRAWN	REVIEWED	APPROVAL
4	20.10.16	ISSUED FOR 100% DETAILED DESIGN	SH	BDP	TR
3	-	NOT USED	-	-	-
2	12.08.13	ISSUED FOR 100% DETAILED DESIGN	CG	DD	BDP
1	22.05.13	ISSUED FOR 80% DETAILED DESIGN	LB	BDP	MF
0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
DRAFTSPERSON	JP	20.10.16
DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE
SCALE 1:500
5 0 5 10
AT A3
CO-ORDINATE SYSTEM: MGA Zone 56
HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY
JACOBS
177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax (02) 9928 2500
Web: www.jacobs.com

CLIENT
NSW GOVERNMENT Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT
HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 7

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

STATUS
NOT FOR CONSTRUCTION

VOLUME	RMS REGISTRATION No	
05	DS2012/000289	
PHASE	DRAWING No	REV
100%	NB98005-ECC-DG-0527	4

DATE: 20/10/2016 11:6:38 PM LOGIN NAME: HAIL, SCOTT
LOCATION: C:\Users\shail\AppData\Local\Temp\acwise\rms_projects\dms00627\NB98005-ECC-DG-0521-0528.dwg

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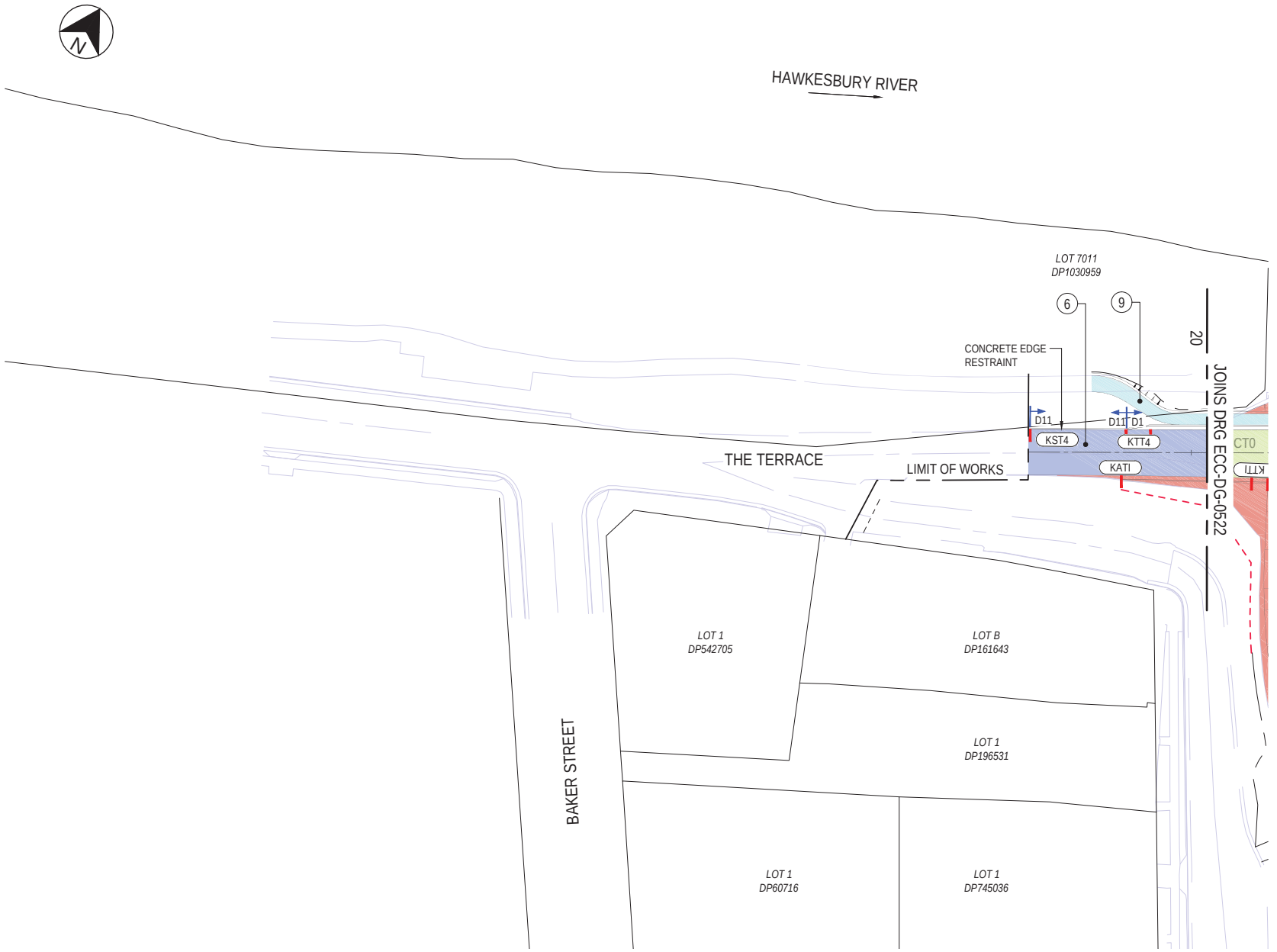

LEGEND

FOR REFERENCE

- EXISTING PROPERTY BOUNDARY
- CONTROL LINE
- PEDESTRIAN SAFETY FENCE
- RETAINING WALL

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- Dx | Dx PAVEMENT EDGE DETAIL START/END (REFER DRAWING NB98005-ECC-DG-0512-0513)

NOTES

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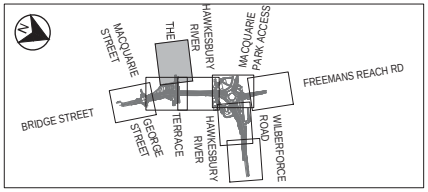

KEY PLAN

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0	21.12.12	ISSUED FOR 20% DETAILED DESIGN	CG	BDP	MF

TITLE	INITIAL	DATE
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DRAFTING CHECK	SH	20.10.16
DESIGNER	BC	20.10.16
DESIGN CHECK	BDP	20.10.16
PROJECT MANAGER	TR	20.10.16

ORIGINAL DRAWING AT A3 SIZE

SCALE 1:500 5 0 5 10 AT A3

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: A.H.D.

DRAWINGS / DESIGN PREPARED BY

JACOBS

177 Pacific Highway
North Sydney, SYDNEY, NSW 2060
AUSTRALIA
Tel: (02) 9928 2100 Fax (02) 9928 2500
Web: www.jacobs.com

CLIENT

NSW GOVERNMENT Transport Roads & Maritime Services

PREPARED FOR
DIVISION: INFRASTRUCTURE DEVELOPMENT
BRANCH: GREATER SYDNEY PROGRAM OFFICE
DEPARTMENT: PROJECT DELIVERY PROGRAM 1

PROJECT

HAWKESBURY CITY COUNCIL AREA
MR182 - BRIDGE STREET, WINDSOR
WINDSOR BRIDGE REPLACEMENT
PAVEMENT & KERBS
PLAN
SHEET 8

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
DS2012-000289-DES-WINDSOR-161007

STATUS
NOT FOR CONSTRUCTION

VOLUME	RMS REGISTRATION No	
05	DS2012/000289	
PHASE	DRAWING No	REV
100%	NB98005-ECC-DG-0528	4

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LOCATION: C:\Users\shail\AppData\Local\Temp\acwise\rms_projects\dms00627\NB98005-ECC-DG-0521-0528.dwg

0 5 10 15 20 25 mm ON A3 ORIGINAL

Transport Roads & Maritime Services

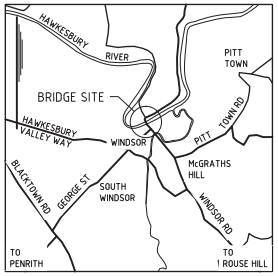
NSW GOVERNMENT

MAIN ROAD No 182

HAWKESBURY CITY COUNCIL

BRIDGE OVER HAWKESBURY RIVER

AT WINDSOR



LOCALITY PLAN
NOT TO SCALE
THE BRIDGE SITE IS APPROXIMATELY
56km BY ROAD FROM SYDNEY.

BEARING REPLACEMENT

MAXIMUM CALCULATED JACKING LOAD: 1650kN SLS (200T JACK)
DESIGN JACKING LOAD IS BASED ON SM1600 TRAFFIC LOAD LOCATED WITHIN CENTRAL 2 TRAFFIC LANES.
A DYNAMIC LOAD ALLOWANCE OF 0.1 AND AN ULTIMATE LIMIT STATE FACTOR OF 1.8 HAVE BEEN CONSIDERED IN DESIGN.
AN ULTIMATE LOAD FACTOR OF 1.2 HAS BEEN APPLIED TO PERMANENT AND SUPERIMPOSED DEAD LOADS.
DESIGN TRAFFIC SPEED RESTRICTED TO 40km/h.
HLP400 LOADING SHALL NOT BE PERMITTED ON THE BRIDGE DURING BEARING REPLACEMENT.
ALL JACKS AT EACH CROSS GIRDER AND PIER SHALL BE HYDRAULICALLY LINKED AND HAVE A CONTROL MECHANISM TO ENSURE THAT THE SAME VERTICAL DISPLACEMENTS OCCUR AT EACH JACKING POINT AT ALL TIMES DURING JACKING UP OPERATIONS.
STEEL PLATES SHALL BE PLACED BETWEEN CONCRETE BEARING SURFACE AND HYDRAULIC JACK.
MAXIMUM ALLOWABLE CONTACT PRESSURE BETWEEN CONCRETE SURFACE AND STEEL PLATE SHALL BE 18MPa.

NEW BRIDGE - 2016

BRIDGE No. 11386
DESIGN FILE : 5M4408
DESIGN STANDARD : AS 5100 - BRIDGE DESIGN

TRAFFIC LOADING :
SM1600 - 3 DESIGN LANES
HLP400 LOCATED WITHIN THE CENTRAL 15.6m OF ROADWAY
NUMBER OF HEAVY VEHICLES PER LANE PER DAY: 708
ROUTE FACTOR : 0.5

DESIGN TRAFFIC SPEED : 50 km PER HOUR
TRAFFIC BARRIER PERFORMANCE LEVEL : REGULAR

EARTHQUAKE LOADING :
BRIDGE CLASSIFICATION - TYPE II
IMPORTANCE FACTOR : 1.25
ACCELERATION COEFFICIENT : 0.08
SITE FACTOR : 1.0
DESIGN CATEGORY : BEDC-1
STRUCTURAL RESPONSE FACTOR : 2

WIND LOADING :
WIND TERRAIN CATEGORY : 2
AVERAGE RECURRENCE INTERVAL ULS = 48 m/s
AVERAGE RECURRENCE INTERVAL SLS = 37m/s
NET PRESSURE COEFFICIENTS IN ACCORDANCE WITH D2 OF AS 1170.2

VESSEL IMPACT LOAD
60T VESSEL TRAVELLING AT 2.1 m/s (4 KNOTS)

FLOOD DATA :
100 YEAR FLOW VELOCITY : 3.0 m/s
2000 YEAR FLOW VELOCITY : 2.5 m/s
100 YEAR FLOOD LEVEL : RL 17.77
2000 YEAR FLOOD LEVEL : RL 23.19
DESIGN SCOUR 6.1m ULS

NOT FOR CONSTRUCTION

JACOBS

Rev.	Date	Description	By	Ch'd	App'd
5	21.10.16	RE-ISSUED FOR 100% DESIGN REVIEW	J.G.	S.F.	J.S.
4	-	NOT ISSUED	-	-	-
3	25.07.13	ISSUED FOR 100% DESIGN REVIEW	D.W.	A.M.	J.S.
2	03.05.13	ISSUED FOR 80% DESIGN REVIEW	I.W.	H.N.	J.S.
5	26.04.13	ISSUED FOR 80% DESIGN REVIEW	I.C.	H.N.	J.S.

WINDSOR DOCUMENT CONTROL No NB98005-ECP-DG-0002

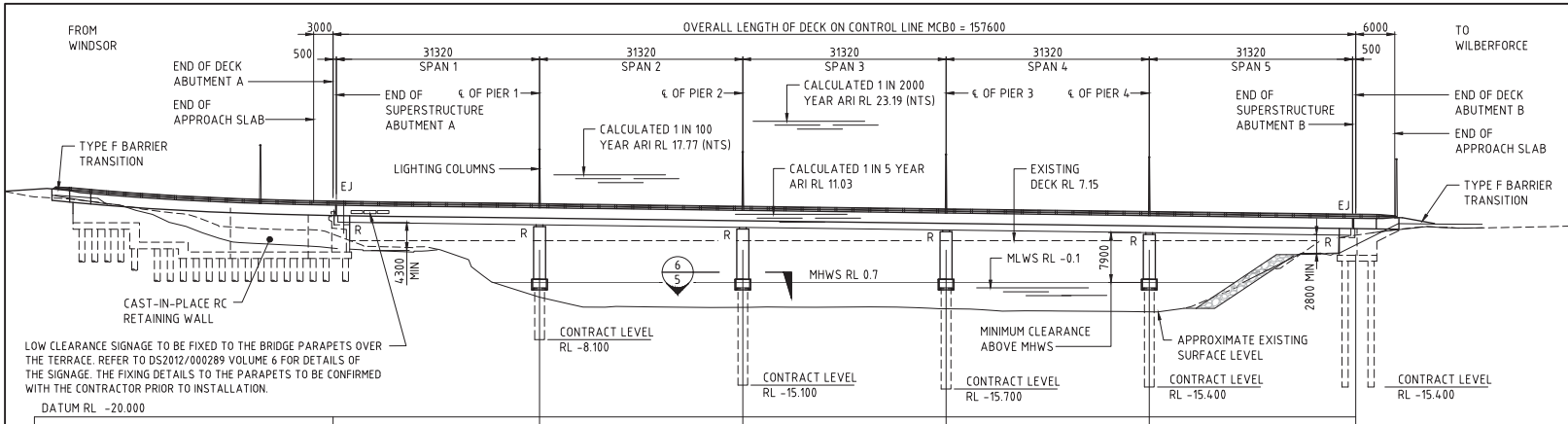
REGN. No. OF PLANS

DS2012/000155

BRIDGE NUMBER 11386

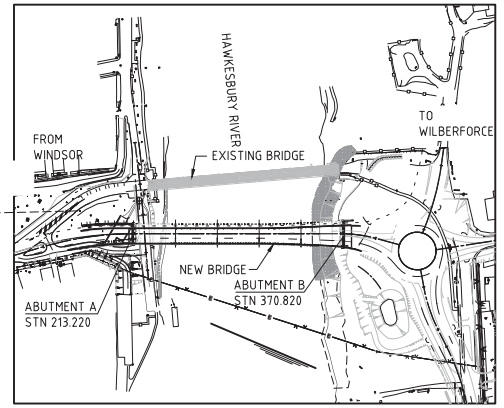
ISSUE STATUS:100% DESIGN

SHEET No 1 No OF SHEETS 140 ISSUE 5

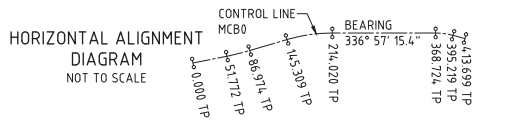


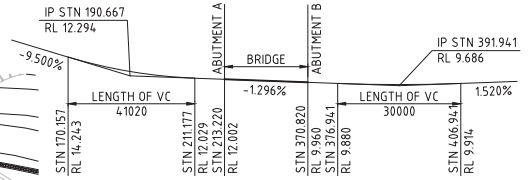
DESIGN SURFACE LEVEL ON CONTROL LINE MCB0, RL	12.002	11.590	11.184	10.778	10.372	9.960
EXISTING SURFACE LEVEL ON CONTROL LINE MCB0, RL	7.7	-1.6	-3.0	-3.3	-3.8	7.9
STATION ON CONTROL LINE MCB0	213.220	245.040	276.360	307.680	339.000	370.820

ELEVATION



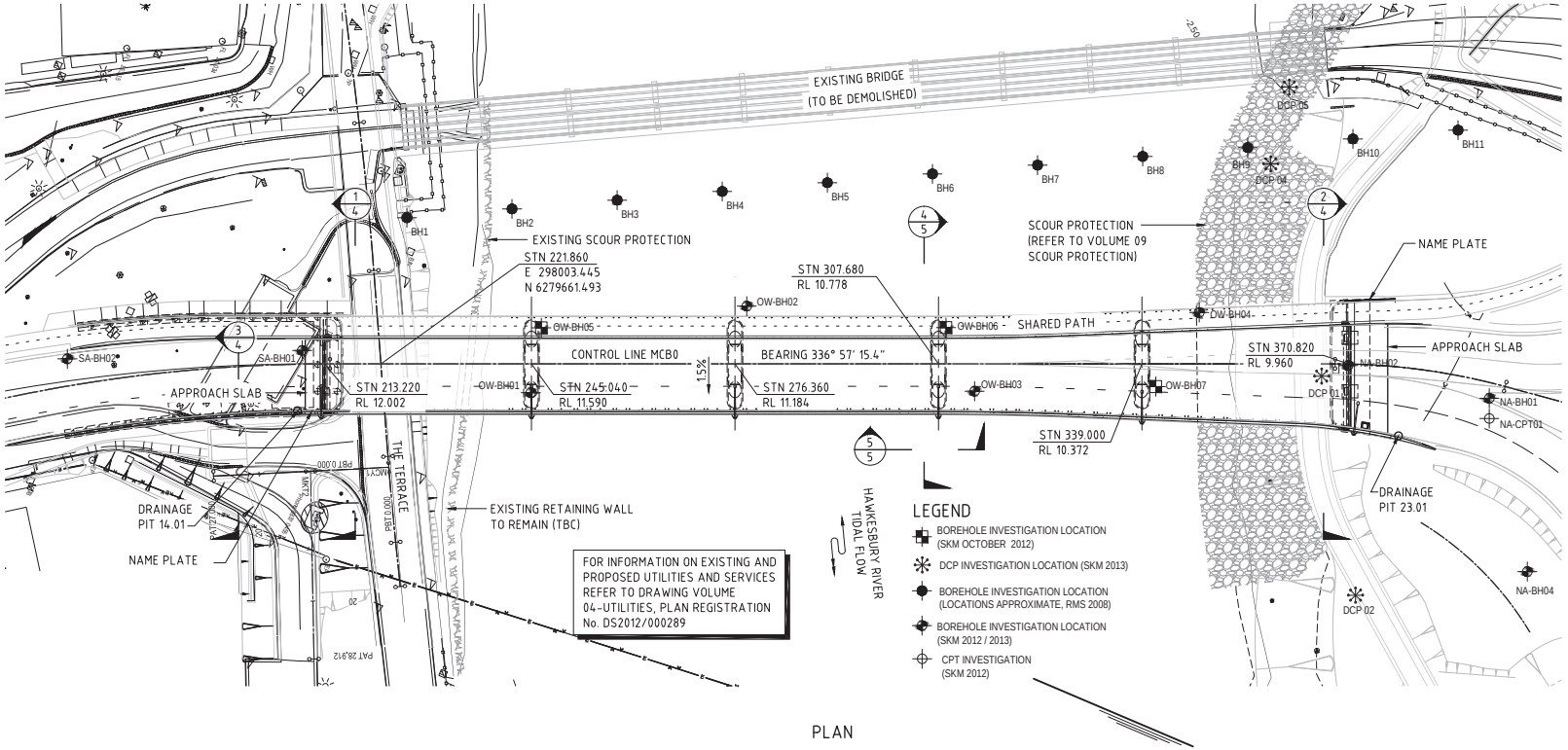
NOTE:
FOR SETOUT OF BRIDGE PIERS AND ABUTMENTS REFER TO SHEET No. 8





VERTICAL ALIGNMENT DIAGRAM
NOT TO SCALE

NOT FOR CONSTRUCTION



LEGEND
- BOREHOLE INVESTIGATION LOCATION (SKM OCTOBER 2012)
- DCP INVESTIGATION LOCATION (SKM 2013)
- BOREHOLE INVESTIGATION LOCATION (LOCATIONS APPROXIMATE, RMS 2008)
- BOREHOLE INVESTIGATION LOCATION (SKM 2012 / 2013)
- CPT INVESTIGATION (SKM 2012)

PLAN

GENERAL NOTES
NOT TO SCALE

SCALE 0 5 10 15 20 25m OR AS SHOWN
DIMENSIONS ARE IN MILLIMETRES.
STATIONS AND REDUCED LEVELS ARE IN METRES.
REDUCED LEVELS ARE TO AUSTRALIAN HEIGHT DATUM.
EJ DENOTES EXPANSION JOINT
R DENOTES RESTRAINED BEARING.
TBC DENOTES TO BE CONFIRMED.
FOR UTILITIES SEE SHEET No. 6
FIXING DETAILS FOR WATERMAIN AND DRAINAGE PIPE WILL BE ADDED AT THE 100% REVIEW ISSUE

Rev.	Date	Description	By	Ch'd	App'd
5	21.10.16	RE-ISSUED FOR 100% DESIGN REVIEW	J. G.	S.F.	J.S.
4	25.07.13	ISSUED FOR 100% DESIGN REVIEW	D.W.	A.M.	J.S.
3	03.05.13	ISSUED FOR 80% DESIGN REVIEW	I.W.	H.N.	J.S.
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1	21.12.12	ISSUED FOR 20% DESIGN REVIEW	I.C.	H.N.	J.S.

MAIN ROAD No 182 — HAWKESBURY CITY COUNCIL

BRIDGE OVER HAWKESBURY RIVER
AT WINDSOR
GENERAL ARRANGEMENT - SHEET A

JACOBS
NB98005-DG-BR
ROADS AND MARITIME SERVICES
SYDNEY REGION OFFICE
27 ARGYLE ST. PARRAMATTA
PO BOX 3035 PARRAMATTA
NSW 2124
PHONE 02 8849 2069
FACSIMILE 02 8849 2818

PREPARED		CHECKED	
DESIGN	H.N.		A.M.
DRAWING	I.C.		I.T.

APPROVED DESIGN QA RECORDS
DIRECTOR

REGISTRATION No. OF PLANS DS2012/000155
BRIDGE NUMBER 11386
ISSUE STATUS: 100% DESIGN
SHEET No. 3 ISSUE 5

Plot Date: 21 Oct 2016 - 14:37:23
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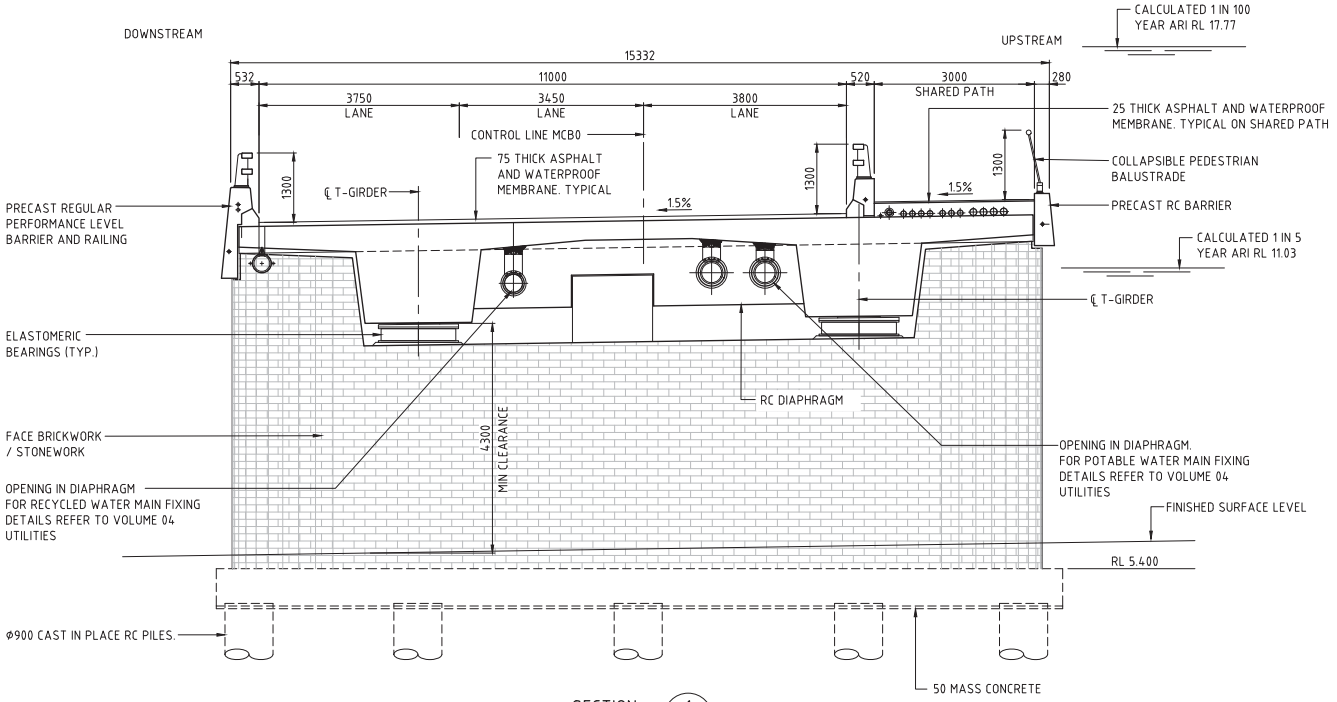
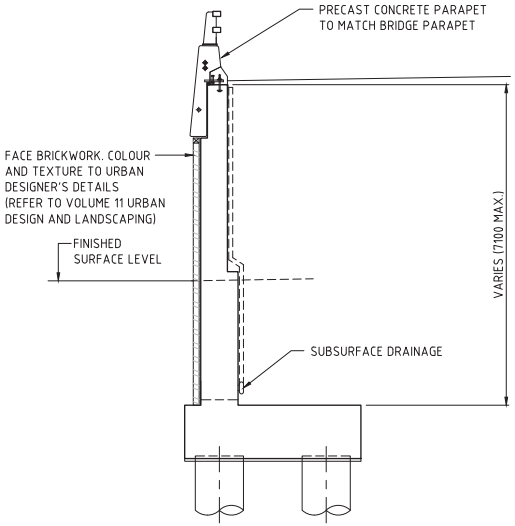


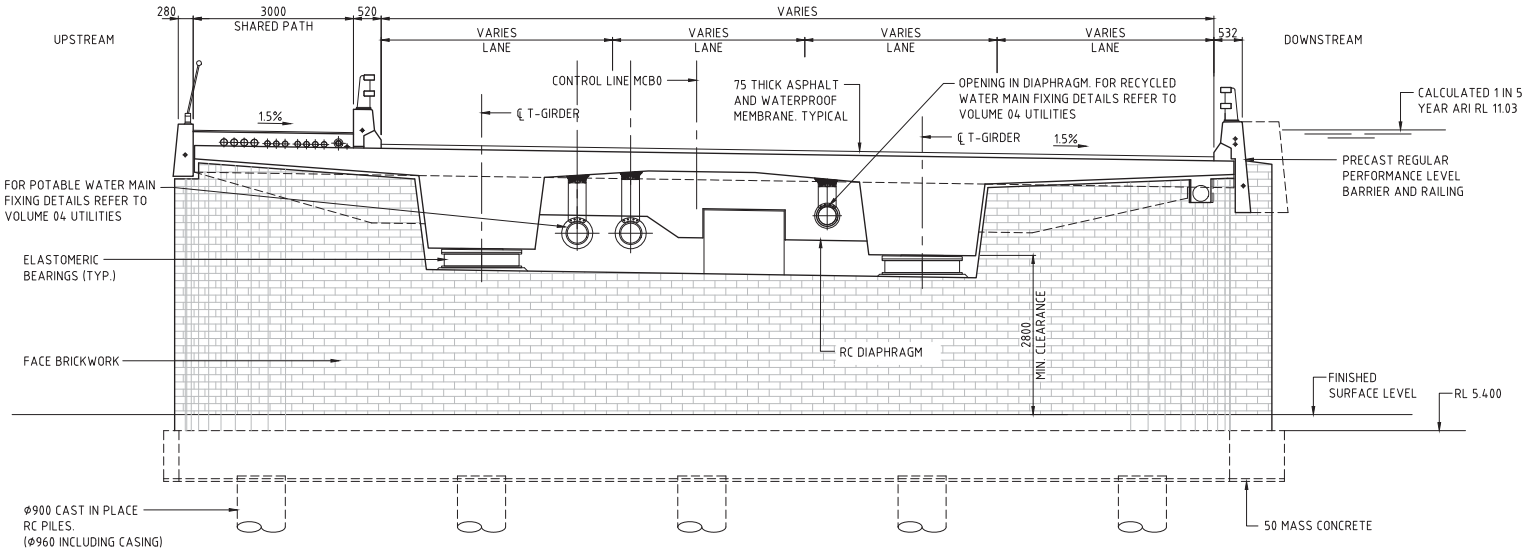
SECTION 1/3

ABUTMENT A



SECTION 3/3

SOUTHERN APPROACH EMBANKMENT RETAINING WALL



SECTION 2/3

ABUTMENT B

NOT FOR CONSTRUCTION

GENERAL NOTES

SCALE 0 0.5 1 2 3m OR AS SHOWN.

FOR GENERAL NOTES SEE SHEET No 3.

Rev.	Date	Description	By	Ch'd	App'd
5	21.10.16	RE-ISSUED FOR 100% DESIGN REVIEW	J.G.	S.F.	J.S.
4	25.07.13	ISSUED FOR 100% DESIGN REVIEW	D.W.	A.M.	J.S.
3	03.05.13	ISSUED FOR 80% DESIGN REVIEW	I.W.	H.N.	J.S.
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1	21.12.12	ISSUED FOR 20% DESIGN REVIEW	I.C.	H.N.	J.S.

MAIN ROAD No 182 — HAWKESBURY CITY COUNCIL

BRIDGE OVER HAWKESBURY RIVER

AT WINDSOR

GENERAL ARRANGEMENT - SHEET C

JACOBS

NB98005-ECP-DG-0005

ROADS AND MARITIME SERVICES
SYDNEY REGION OFFICE
27 ARGYLE ST. PARRAMATTA
PO BOX 3035 PARRAMATTA
NSW 2124
PHONE 02 8849 2069
FACSIMILE 02 8849 2818

	PREPARED	CHECKED
DESIGN	H.N.	A.M.
DRAWING	I.C.	I.T.

APPROVED DESIGN QA RECORDS

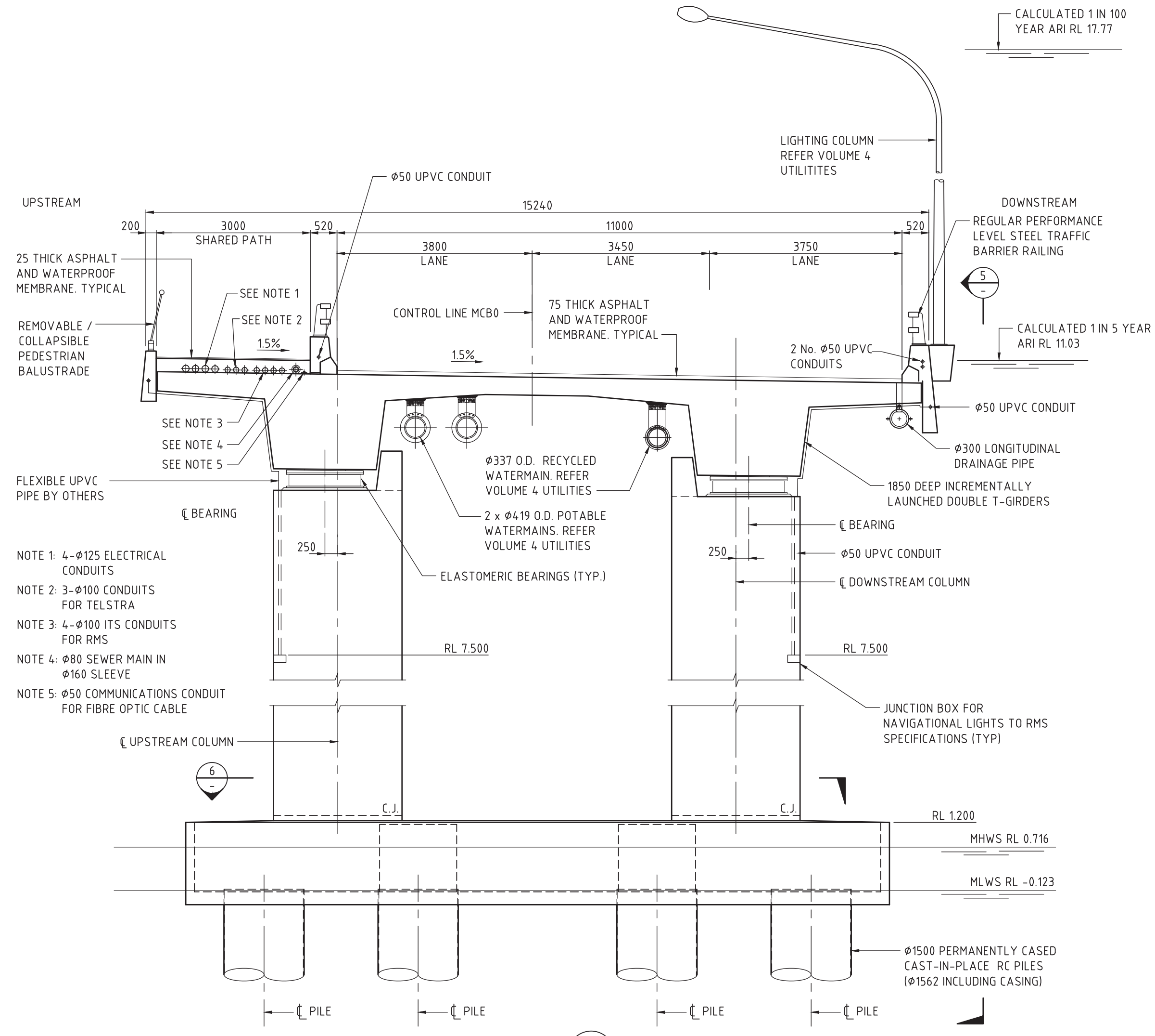
DIRECTOR

REGISTRATION No. OF PLANS DS2012/000155

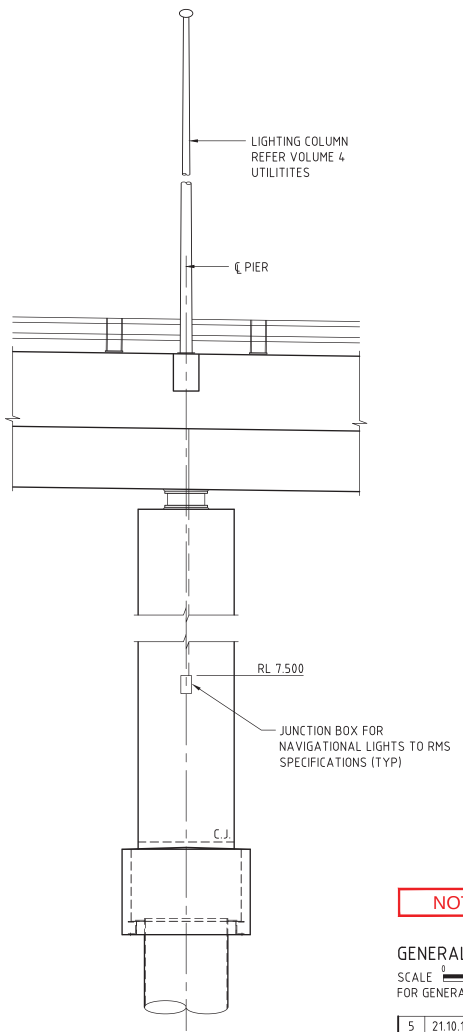
BRIDGE NUMBER 11386

ISSUE STATUS: 100% DESIGN

SHEET No. 4 ISSUE 5



SECTION 4/3



VIEW 5/-

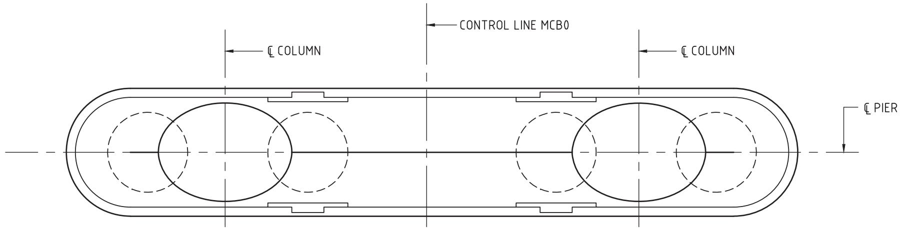
NOTE 1: 4-Ø125 ELECTRICAL CONDUITS

NOTE 2: 3-Ø100 CONDUITS FOR TELSTRA

NOTE 3: 4-Ø100 ITS CONDUITS FOR RMS

NOTE 4: Ø80 SEWER MAIN IN Ø160 SLEEVE

NOTE 5: Ø50 COMMUNICATIONS CONDUIT FOR FIBRE OPTIC CABLE



SECTION 6/-

NOT FOR CONSTRUCTION

GENERAL NOTES

SCALE 0 0.5 1 2 3m OR AS SHOWN.

FOR GENERAL NOTES SEE SHEET No 3.

Rev.	Date	Description	By	Ch'd	App'd
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1	21.12.12	ISSUED FOR 20% DESIGN REVIEW	I.C.	H.N.	J.S.

MAIN ROAD No 182 HAWKESBURY CITY COUNCIL

BRIDGE OVER HAWKESBURY RIVER

AT WINDSOR

GENERAL ARRANGEMENT - SHEET C

JACOBS

NB98005-DG-BR-0005

ROADS AND MARITIME SERVICES
SYDNEY REGION OFFICE
27 ARGYLE ST. PARRAMATTA
PO BOX 3035 PARRAMATTA
NSW 2124
PHONE 02 8849 2069
FACSIMILE 02 8849 2818

	PREPARED	CHECKED
DESIGN	H.N.	A.M.
DRAWING	I.C.	I.T.

APPROVED DESIGN QA RECORDS

DIRECTOR

REGISTRATION No. OF PLANS: DS2012/000155

BRIDGE NUMBER: 11386

ISSUE STATUS: 100% DESIGN

SHEET No. 5 ISSUE 5

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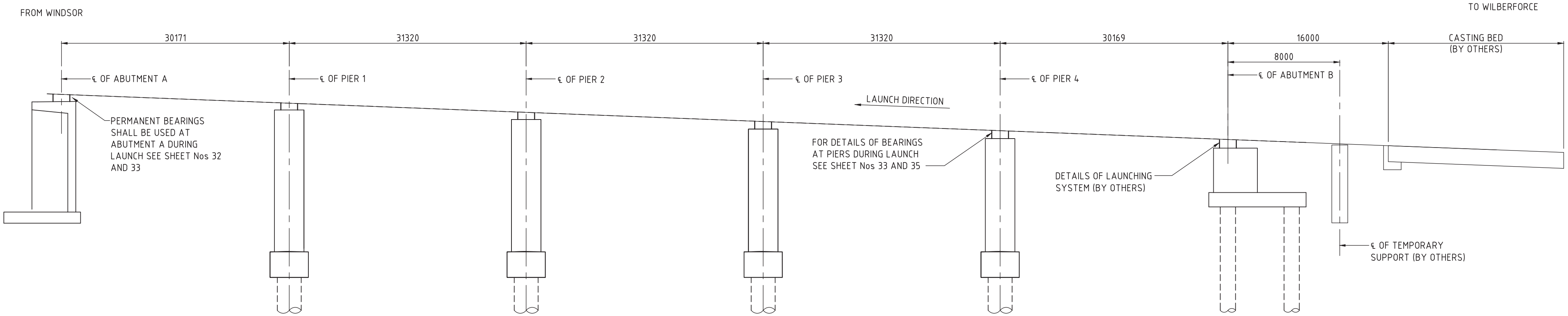

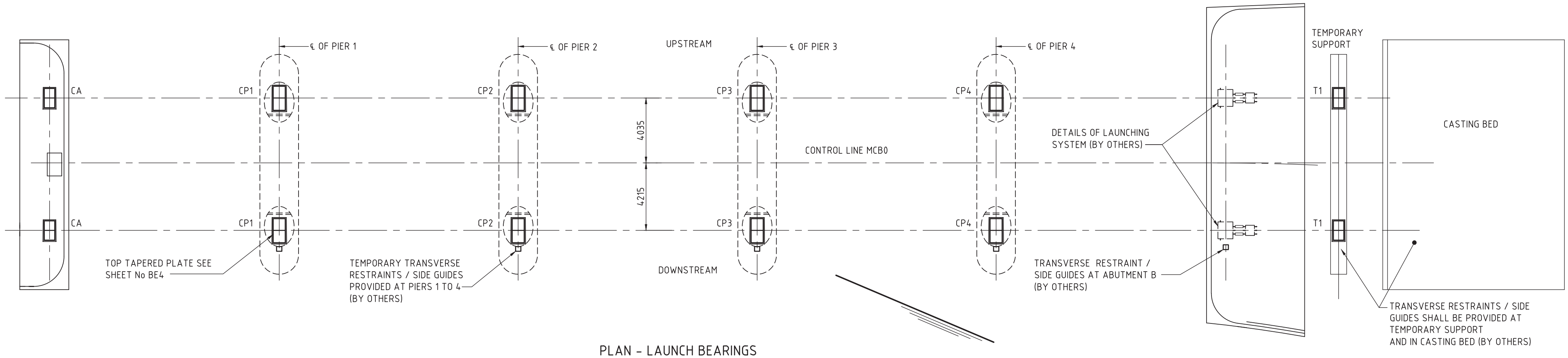

PLAN - LAUNCH BEARINGS
NOT TO SCALE

TABLE 2 - LONGITUDINAL DEFLECTIONS DURING LAUNCH

BEARING LOCATION	MAX VERTICAL REACTION DURING LAUNCH	LONGITUDINAL SLOPE	MINIMUM (μ=0) LONGITUDINAL FORCE	MINIMUM (μ=0) COLUMN/ABUTMENT DEFLECTION	MINIMUM (μ=0) BEARING DEFLECTION	MINIMUM (μ=0) TOTAL DEFLECTION	MAXIMUM (μ=0.05) LONGITUDINAL FORCE	MAXIMUM (μ=0.05) COLUMN/ABUTMENT DEFLECTION	MAXIMUM (μ=0.05) BEARING DEFLECTION	MAXIMUM (μ=0.05) TOTAL DEFLECTION
	(kN)	%	(kN)	(mm)	(mm)	(mm)	(kN)	(mm)	(mm)	(mm)
ABUTMENT A	5750	1.283	110		30	30	397		107	
PIER 1	7000	1.283	133		26	26	483		95	
PIER 2	7000	1.283	133		21	21	483		74	
PIER 3	7000	1.283	133	25	21	46	483	89	74	
PIER 4	7000	1.283	133	17	26	43	483	61	95	
ABUTMENT B	5750	1.283	990	-11	30	19	1800	-30	107	

GENERAL NOTES

SCALE AS SHOWN.
THE PERMANENT BOTTOM ATTACHMENT PLATES, LAMINATED ELASTOMERIC BEARINGS AND TAPERED TOP PLATES SHALL BE INSTALLED BEFORE LAUNCHING TAKES PLACE EXCEPT AT ABUTMENT B WHERE TEMPORARY LAUNCHING BEARINGS ARE INSTALLED.
AFTER LAUNCHING, THE BEARINGS AT ABUTMENT A AND PIERS SHALL BE ADJUSTED TO THEIR FINAL CONFIGURATION AND THE PERMANENT BEARINGS AT ABUTMENT B INSTALLED.
FOR OTHER GENERAL NOTES RELATING TO THIS SHEET, SEE SHEET Nos 30 AND 32 .
MAX VERTICAL DEFLECTIONS DURING LAUNCHING:
AT ABUTMENT B - 5mm
AT PIERS 1 TO 4 - 10mm
THESE DEFLECTIONS TO BE MONITORED AFTER EACH LAUNCH

- LONGITUDINAL FRICTION EFFICIENT TO BE MONITORED BY CONTRACTOR.
- FRICTION NOT TO EXCEED 5% (μ = 0.05)

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Ch'd	App'd
5	21.10.16	RE-ISSUED FOR 100% DESIGN REVIEW	J.G.	S.F.	J.S.
4	-	NOT ISSUED	-	-	-
3	-	NOT ISSUED	-	-	-
2	25.07.13	ISSUED FOR 100% DESIGN REVIEW	D.W.	A.M.	J.S.
1	26.04.13	ISSUED FOR 80% DESIGN REVIEW	J.G.	H.N.	J.S.

MAIN ROAD No 182 HAWKESBURY CITY COUNCIL

BRIDGE OVER HAWKESBURY RIVER
AT WINDSOR

BEARINGS - SHEET E

JACOBS
NB98005-DG-BR-0075

ROADS AND MARITIME SERVICES
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	PREPARED	CHECKED
DESIGN	H.N.	A.M.
DRAWING	D.G.	I.T.

APPROVED DESIGN QA RECORDS
DIRECTOR

REGISTRATION No. OF PLANS: DS2012/000155
BRIDGE NUMBER: 11386
ISSUE STATUS: 100% DESIGN
SHEET No. 34 ISSUE 5

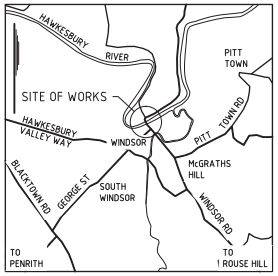
Transport Roads & Maritime Services

NSW GOVERNMENT

CITY OF HAWKESBURY

RETAINING WALL MWT6

AT COUNCIL WHARF CARPARK, THE TERRACE, WINDSOR



LOCALITY PLAN
NOT TO SCALE
THE BRIDGE SITE IS APPROXIMATELY
56km BY ROAD FROM SYDNEY.

1. COVER SHEET
2. GENERAL ARRANGEMENT
3. PILE LAYOUT
4. PILE DETAILS
5. RETAINING WALL CONCRETE DETAILS - SHEET A
6. RETAINING WALL CONCRETE DETAILS - SHEET B
7. CAPPING BEAM REINFORCEMENT - SHEET A
8. CAPPING BEAM REINFORCEMENT - SHEET B
9. INSITU FACING WALL REINFORCEMENT
10. BAR SHAPES DIAGRAM

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Ch'd	App'd
1	25.10.16	ISSUED FOR 100% DESIGN REVIEW	I.M.	S.F.	J.S.

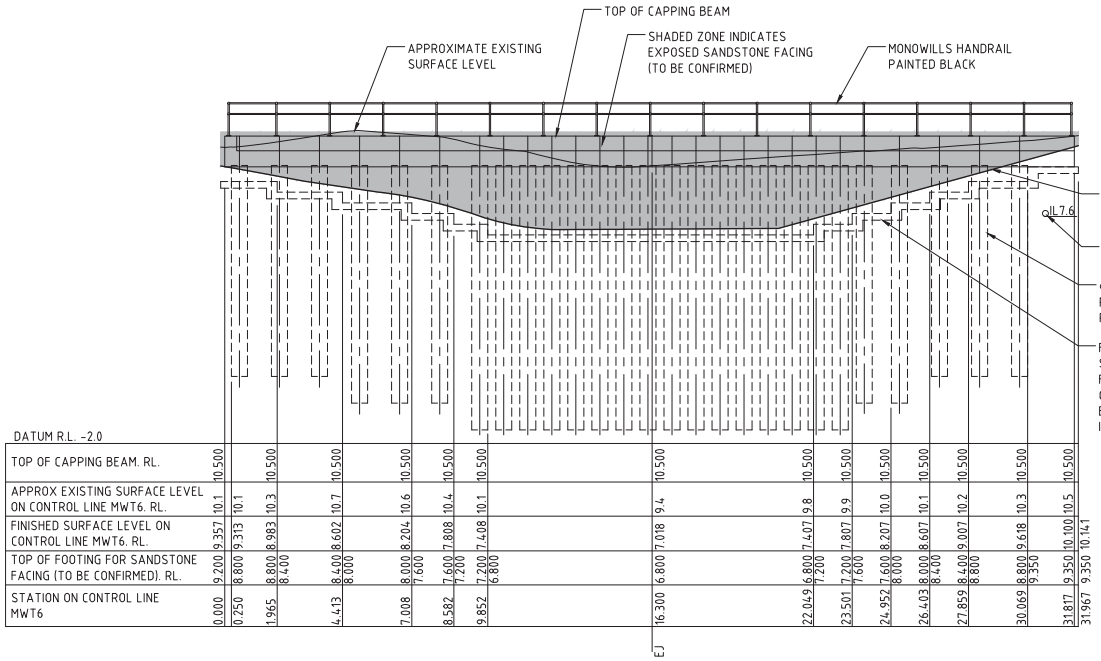
WINDSOR DOCUMENT CONTROL No NB98005-ECP-DG-0200

REGN. No. OF PLANS

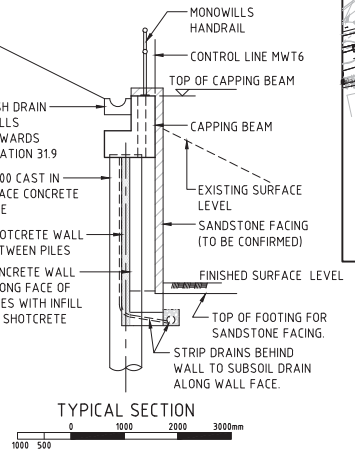
BRIDGE NUMBER

ISSUE STATUS:100% DESIGN

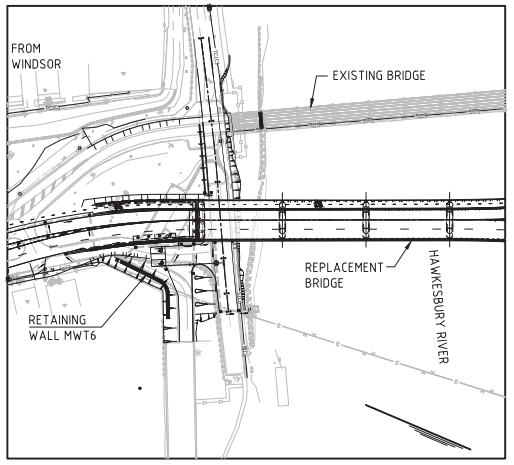
SHEET No1 No OF SHEETS 10 ISSUE 1



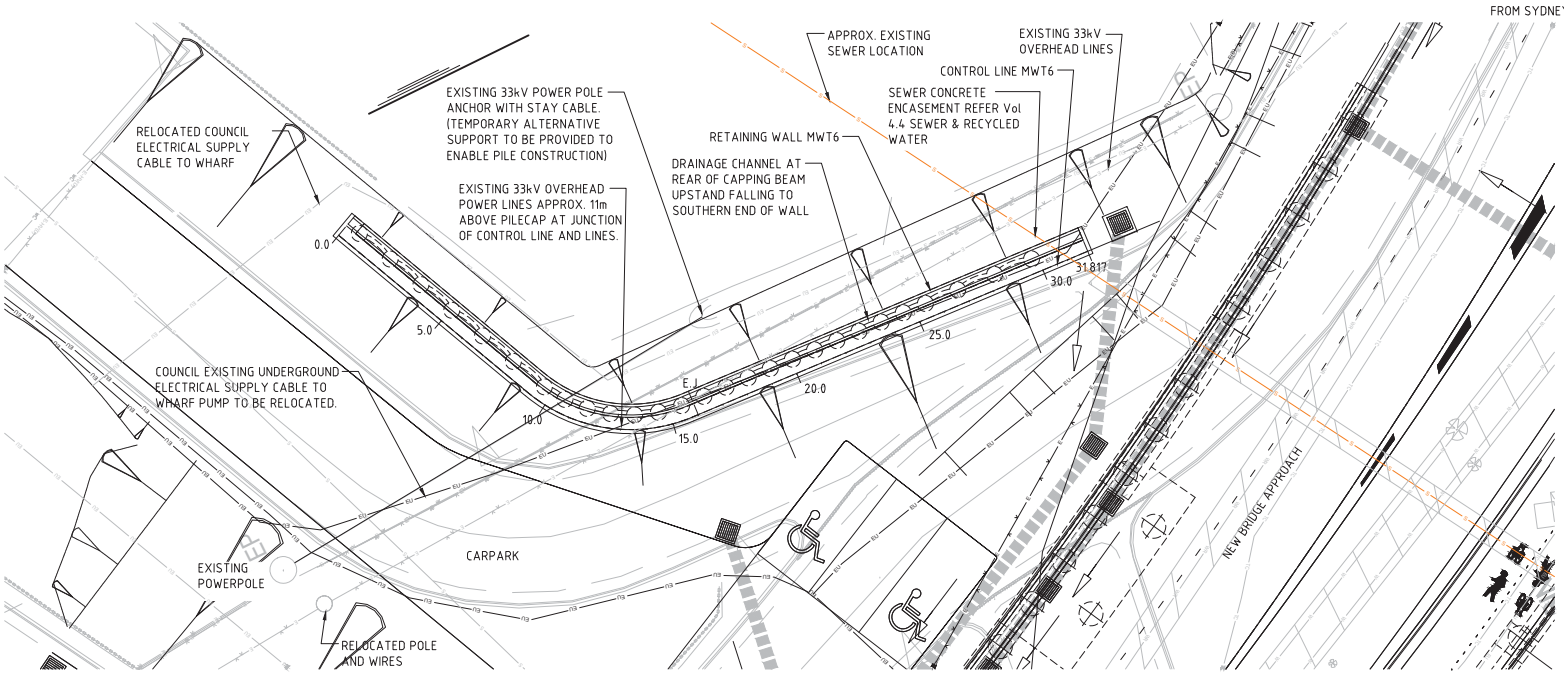
ELEVATION ON RETAINING WALL MWT6



TYPICAL SECTION



SITE PLAN



PLAN ON RETAINING WALL MWT6

GENERAL NOTES

SCALE 0 2000 4000 6000mm
2000 1000
OR AS SHOWN
DIMENSIONS ARE IN MILLIMETRES.
STATIONS AND REDUCED LEVELS ARE IN METRES.
REDUCED LEVELS ARE TO AUSTRALIAN HEIGHT DATUM.

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Ch'd	App'd
1	25.10.16	ISSUED FOR 100% DESIGN REVIEW	I.M.	S.F.	J.S.

MAIN ROAD No 182 — HAWKESBURY CITY COUNCIL

RETAINING WALL MWT6

AT WINDSOR

GENERAL ARRANGEMENT

JACOBS

NB98005-ECP-DG

ROADS AND MARITIME SERVICES
SYDNEY REGION OFFICE
27 ARGYLE ST. PARRAMATTA
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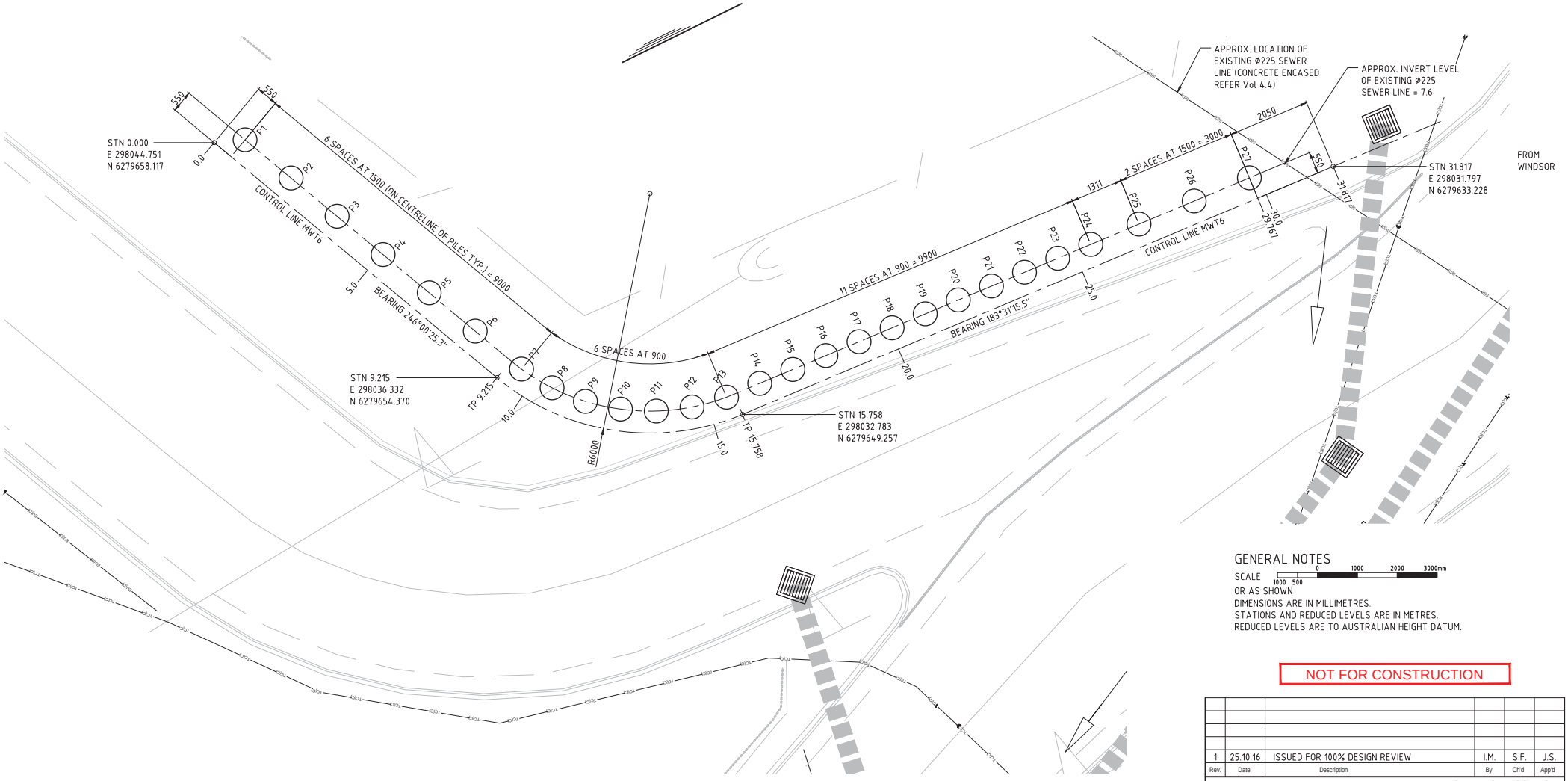
NSW 2124
PHONE 02 8849 2069
FACSIMILE 02 8849 2818

PREPARED	CHECKED	REGISTRATION No. OF PLANS
DESIGN S.F.	J.A.S.	
DRAWING I.M.	A.S.	BRIDGE NUMBER
APPROVED DESIGN QA RECORDS		ISSUE STATUS: 100% DESIGN
DIRECTOR		SHEET No. 2 — ISSUE 1



PLAN

GENERAL NOTES

SCALE 1000 500 0 1000 2000 3000mm
OR AS SHOWN
DIMENSIONS ARE IN MILLIMETRES.
STATIONS AND REDUCED LEVELS ARE IN METRES.
REDUCED LEVELS ARE TO AUSTRALIAN HEIGHT DATUM.

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Ch'd	App'd
1	25.10.16	ISSUED FOR 100% DESIGN REVIEW	I.M.	S.F.	J.S.

HAWKESBURY CITY COUNCIL

RETAINING WALL MWT6

AT WINDSOR

PILE LAYOUT

JACOBS

NB98005-ECP-DG

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SYDNEY REGION OFFICE
27 ARGYLE ST. PARRAMATTA
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NSW 2124
PHONE 02 8849 2069
FACSIMILE 02 8849 2818

PREPARED		CHECKED	
DESIGN	S.F.	J.A.S.	
DRAWING	I.M.	A.S.	

APPROVED DESIGN QA RECORDS

DIRECTOR

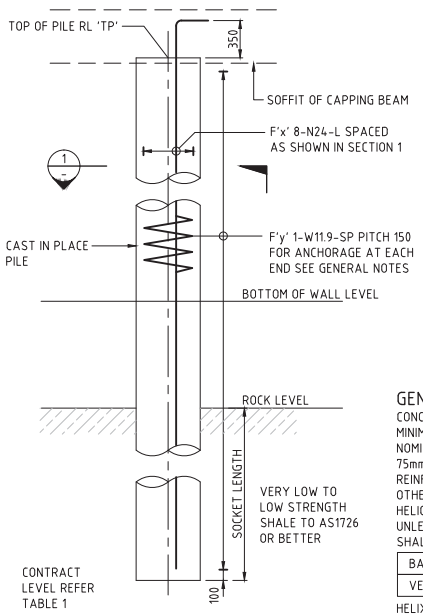
REGISTRATION No. OF PLANS

BRIDGE NUMBER

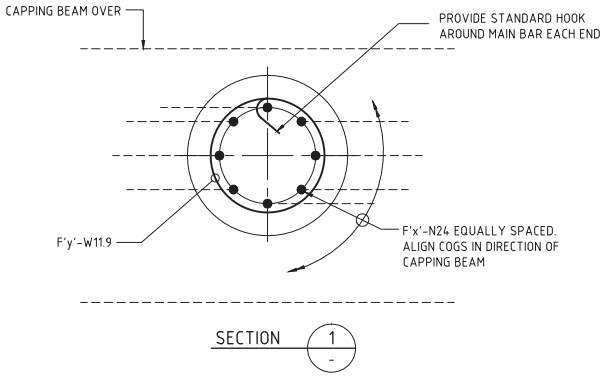
ISSUE STATUS: 100% DESIGN

SHEET No. 3 ISSUE 1

TABLE 1 – CAST-IN-PLACE PILES						
PILE No	MIN ROCK SOCKET LENGTH 'SL'	CONTRACT LEVEL	TOP OF PILE RL 'TP'	OVERALL LENGTH OF PILE 'L'	BAR MARK F'x'	BAR MARK F'y'
P1	1000	RL +1.500	RL 9.450	7950	F1 8-N24-L	F29 1-W11.9-SP
P2	1000	RL +1.500	RL 9.450	7950	F2 8-N24-L	F30 1-W11.9-SP
P3	1000	RL +1.500	RL 9.450	7950	F3 8-N24-L	F31 1-W11.9-SP
P4	2000	RL +0.500	RL 9.450	8950	F4 8-N24-L	F32 1-W11.9-SP
P5	2000	RL +0.500	RL 9.450	8950	F5 8-N24-L	F33 1-W11.9-SP
P6	2000	RL +0.500	RL 9.450	8950	F6 8-N24-L	F34 1-W11.9-SP
P7	3000	RL -0.500	RL 9.450	9950	F7 8-N24-L	F35 1-W11.9-SP
P8	3000	RL -0.500	RL 9.450	9950	F8 8-N24-L	F36 1-W11.9-SP
P9	3000	RL -0.500	RL 9.450	9950	F9 8-N24-L	F37 1-W11.9-SP
P10	3000	RL -0.500	RL 9.450	9950	F10 8-N24-L	F38 1-W11.9-SP
P11	3000	RL -0.500	RL 9.450	9950	F11 8-N24-L	F39 1-W11.9-SP
P12	3000	RL -0.500	RL 9.450	9950	F12 8-N24-L	F40 1-W11.9-SP
P13	3000	RL -0.500	RL 9.450	9950	F13 8-N24-L	F41 1-W11.9-SP
P14	3000	RL -0.500	RL 9.450	9950	F14 8-N24-L	F42 1-W11.9-SP
P15	3000	RL -0.500	RL 9.450	9950	F15 8-N24-L	F43 1-W11.9-SP
P16	3000	RL -0.500	RL 9.450	9950	F16 8-N24-L	F44 1-W11.9-SP
P17	3000	RL -0.500	RL 9.450	9950	F17 8-N24-L	F45 1-W11.9-SP
P18	3000	RL -0.500	RL 9.450	9950	F18 8-N24-L	F46 1-W11.9-SP
P19	3000	RL -0.500	RL 9.450	9950	F19 8-N24-L	F47 1-W11.9-SP
P20	3000	RL -0.500	RL 9.450	9950	F20 8-N24-L	F48 1-W11.9-SP
P21	3000	RL -0.500	RL 9.450	9950	F21 8-N24-L	F49 1-W11.9-SP
P22	3000	RL -0.500	RL 9.450	9950	F22 8-N24-L	F50 1-W11.9-SP
P23	2000	RL +0.500	RL 9.450	8950	F23 8-N24-L	F51 1-W11.9-SP
P24	2000	RL +0.500	RL 9.450	8950	F24 8-N24-L	F52 1-W11.9-SP
P25	2000	RL +0.500	RL 9.450	8950	F25 8-N24-L	F53 1-W11.9-SP
P26	1000	RL +1.500	RL 9.450	7950	F26 8-N24-L	F54 1-W11.9-SP
P27	1000	RL +1.500	RL 9.450	7950	F27 8-N24-L	F55 1-W11.9-SP



TYPICAL PILE ELEVATION



SECTION 1

GENERAL NOTES

CONCRETE EXPOSURE CLASSIFICATION: B1.
MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 40MPa.
NOMINAL COVER TO REINFORCEMENT NEAREST TO THE CONCRETE SURFACE SHALL BE 75mm UNLESS SPECIFIED OTHERWISE.
REINFORCING BARS SHALL BE GRADE D500N TO AS/NZS.4671 UNLESS NOTED OTHERWISE.
HELICES SHALL BE GRADE D500L.
UNLESS SPECIFIED OTHERWISE, THE MINIMUM DEVELOPMENT LENGTHS AND LAP SPLICES SHALL BE AS FOLLOWS:

BAR SIZE	N12	N16	N20	N24	N28	N32	N36
VERTICAL BARS	350	550	750	1000	1250	1525	1825

HELIX SHALL BE ANCHORED AT EACH END WITH 1.5 TURNS ADJUSTED TO ZERO PITCH AND ANCHORED BY A STANDARD HOOK AROUND A MAIN BAR. SPLICES WITHIN ITS LENGTH SHALL BE EITHER BY WELDING OR BY MECHANICAL COUPLERS.
MAXIMUM DESIGN CAST-IN-PLACE PILE LOADS :

	DESIGN AXIAL COMPRESSION	DESIGN MOMENT	DESIGN LATERAL FORCE
	ULTIMATE	ULTIMATE	ULTIMATE
P1 TO P28	260kN	250kNm	120kN

THE AXIAL LOADS AND MOMENTS TABULATED ARE NOT CONCURRENT, BUT ARE MAXIMUM VALUES IN EACH CASE, FOR THE PARTICULAR PILE
A GEOTECHNICAL REDUCTION FACTOR ϕ_g OF 0.40 HAS BEEN APPLIED TO THE ULTIMATE END BEARING AND ULTIMATE SHAFT ADHESIONS TO OBTAIN THE VALUES TABULATED BELOW WHICH HAVE BEEN USED TO DETERMINE THE DESIGN GEOTECHNICAL STRENGTH ($\phi Rd,g$)

ROCK STRENGTH CLASSIFICATION	FACTORED ULS END BEARING CAPACITY	FACTORED LATERAL BEARING CAPACITY
VERY LOW TO LOW STRENGTH SHALE TO AS1726 OR BETTER	1200	600kPa

ROCK STRENGTH CLASSIFICATION TO AS1726
ROCK SOCKET DESIGNS ARE BASED ON THE ABOVE TABULATED ULTIMATE GEOTECHNICAL STRENGTH PARAMETERS ADOPTED FOR ULTIMATE LOADING.
CONTRIBUTION FROM SHAFT FRICTION RESISTANCE COMPONENT SHALL BE ASSUMED INEFFECTIVE FOR THE TOP 1.5xPILE DIAMETER OF THE PILE .
PRIOR TO CONSTRUCTION OF THE PILES, IT IS MANDATORY THAT THE PILE EXCAVATION BE INSPECTED BY GEOTECHNICAL ENGINEER
IN ORDER TO VALIDATE THE ASSUMED GROUND CONDITIONS, EFFECTIVENESS OF THE PILE TOE/SOCKET CLEANING METHODS AND CONFIRM THAT THE MINIMUM ROCK SOCKET LENGTH HAS BEEN ACHIEVED.
CONTRACT LEVELS SHOWN IN TABLE 1 ARE BASED ON INTERPRETATION OF AVAILABLE BORE DATA.
THE PROCEDURE FOR LOWERING THE CONTRACT LEVEL IS SPECIFIED IN RMS B59
THE PILE PARAMETERS ASSUME ROCK SOCKETS BASE AND SIDES WILL BE CLEANED UP BY MECHANICAL AND/OR AIR LIFT CLEAN UP TECHNIQUES.
REDUCTIONS IN THESE PARAMETERS AND A REVIEW OF THE ROCK SOCKET LENGTH BY THE PRINCIPAL MAY BE REQUIRED IF CLEANING TECHNIQUES ARE NOT EFFECTIVE AS DETERMINED ON SITE BY THE GEOTECHNICAL ENGINEER.

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Ch'd	App'd
1	25.10.16	ISSUED FOR 100% DESIGN REVIEW	I.M.	S.F.	J.S.

HAWKESBURY CITY COUNCIL

RETAINING WALL MWT6

AT WINDSOR

PILE DETAILS

JACOBS

NB98005-ECP-DG

ROADS AND MARITIME SERVICES
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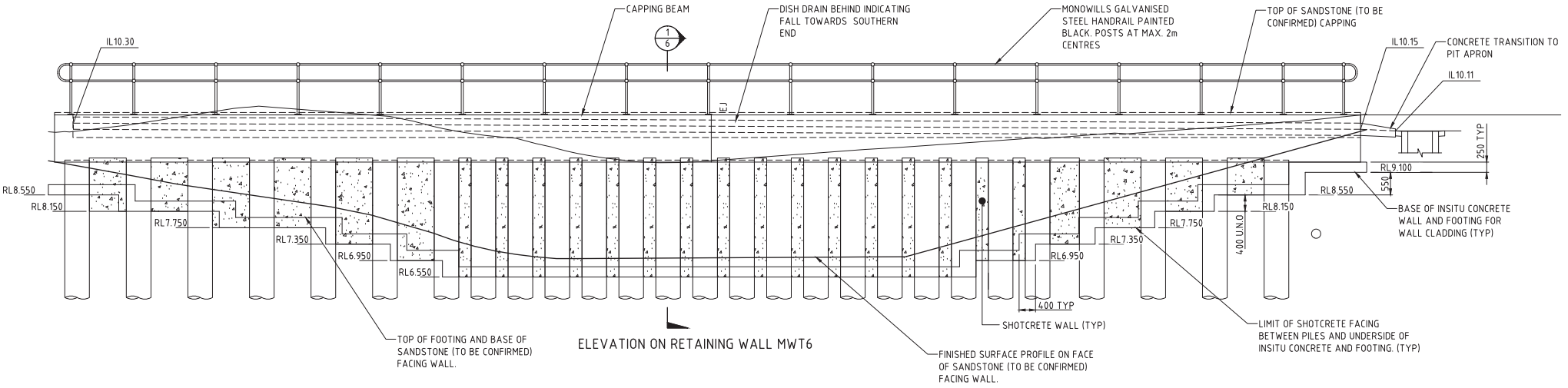
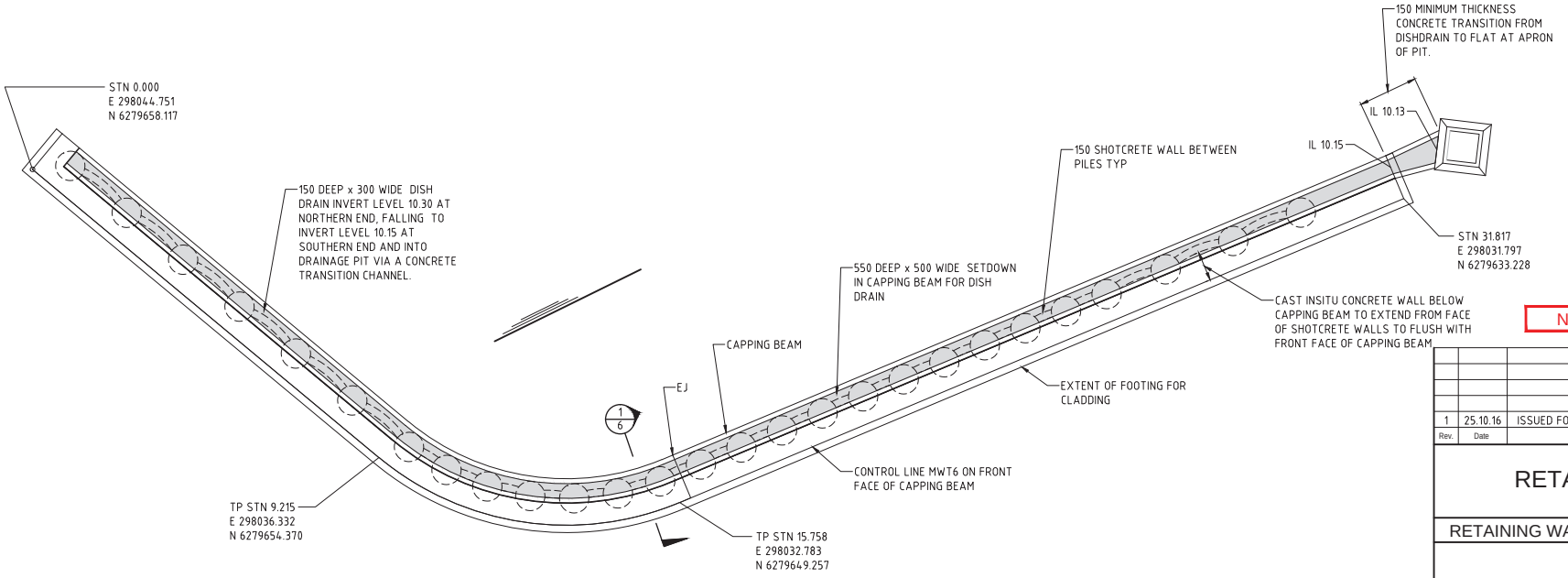
FACSIMILE 02 8849 2818

PREPARED	CHECKED	REGISTRATION No. OF PLANS	
DESIGN S.F.	J.A.S.		
DRAWING I.M.	A.S.	BRIDGE NUMBER	
APPROVED DESIGN QA RECORDS		ISSUE STATUS: 100% DESIGN	
DIRECTOR		SHEET No. 4	ISSUE 1



ELEVATION ON RETAINING WALL MWT6



PLAN - RETAINING WALL MWT6

GENERAL NOTES

SCALE 0 1000 2000 3000mm
1000 500
OR AS SHOWN
DIMENSIONS ARE IN MILLIMETRES.
STATIONS AND REDUCED LEVELS ARE IN METRES.
REDUCED LEVELS ARE TO AUSTRALIAN HEIGHT DATUM.

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Ch'd	App'd
1	25.10.16	ISSUED FOR 100% DESIGN	I.M.	S.F.	J.S.

HAWKESBURY CITY COUNCIL

RETAINING WALL MWT6

AT WINDSOR

RETAINING WALL CONCRETE DETAILS - SHEET A

JACOBS
NB98005-ECP-DG-

ROADS AND MARITIME SERVICES
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PREPARED	CHECKED	REGISTRATION No. OF PLANS
DESIGN S.F.	J.A.S.	
DRAWING I.M.	A.S.	BRIDGE NUMBER
APPROVED DESIGN QA RECORDS		ISSUE STATUS: 100% DESIGN
DIRECTOR		SHEET No. 5 ISSUE 1

Appendix 5

Assumptions

Project: WINDSOR BRIDGE REPLACEMENT

ASSUMPTIONS

CLIENT: JACOBS

Location/Item	Description
Scope:	**Project: WINDSOR BRIDGE REPLACEMENT**
Drawings and Documentation	100% DD Scour Protection 100% DD Roadworks 100% DD Pavement Markings, Signs & Barriers 100% DD Cross Sections 100% DD Sewer & Recycled Water Plan & Details 100% DD Bridgeworks (sheets 1-140) Watermain adjustment (sheet 1-8), Issue No. 5 Final Lighting Design - Lighting Assessment Summar 80% DD Landscaping 100% DD General 100% DD Drainage & Water Quality 100% DD Utilities 100% DD Pavement & Kerbs 100% DD Property Works TCS: Windsor Rd, Macquarie St, Bridge St & George St Earthworks treatments - northern side Electrical drawings - Endeavor Energy sheets 1-6 Ministerial Conditions of Approva Proposed treatment options for the northern approach (SKM Internal Memo Freemans Reach Road Staging Sketches Wilberforce Road Staging Sketches QA Spec Q6 Bridgework Specs: B63, B80, B113, B115, B152, B153, B200, B204, B220, B223, B240, B241, B246, B264, B280M B281, B284, B312, B315, B319, B341, B344, B345 General Specs: G1, G2-C2, G10, G36, G38, G40, G71 Materials Specs: 3051, 3071, 3151, 3152, 3153, 3154, 3204, 3211, 3222, 3252, 3253, 3254, 3258, 3259, 3261, 3268, 3269, 3351, 3353, 3354, 3356, 3357, 3385, 3400, 3412, 3552, 3556, 3557, 3580 Roadworks Specs: R111, R15, R33, R44, R50, R53, R55, R63, R71, R73, R101, R1106, R107, R116, R131, R132, R141, R142, R143, R173, R178, R179, R201, R204 Windsor Topsoil Plan Windsor Design Windsor Survey Subgrade South Windsor Cut Fill north Macquarie Park access Windsor Cut Fill north Wilberforce Road summary Windsor Cut Fill south summary Windsor Cut Fill north Freemans Reach Road summary Windsor Survey Subgrade north 100% Detailed Design Report - Roadworks 100% Detail Design - Bridge report
Project Duration	approx: 156 weeks
Noise attenuation	None
Acquisition	Based on areas provided in property drawings, rural rates applied (from RMS global strategic rates
Property Adjustment	As per property adjustment drawings
Primary Testing	2% of construction cost
Work as Executed Drawings	1% of construction cost
Project Length CHAINAGE LENGTH (m)	1000
Services	For services crossing the bridge (excluding sewer & water), the costs of conduits has been priced in SOP, the cost of infrastructure has been priced in SOR (takin care not to include excavation for the extent of services on the bridge). All sewer & water has been priced in SOR in G7
- ITS	Assume ITS pit dimensions of: Comms 900x900 as per query shee Cost of concrete encasing of shared trench (at Bridge St ch385) - split between ITS (50%, 4 conduits), Street Lighting (25%, 2 conduits) and Telecoms (25%, Telstra & 1 Council 50mm dia conduits) based on no. of conduits
- Electrical	33kV relocation excluded, since undertaken by Endeavor Energy last year (2014) as per query shee
- Telecommunications	Assume council comms is optic fibre
- Water	Note: the scale on the Sydney water drawings sheet 1&2 is actually 1:1000, not 1:500 as suggeste
- Asbestos	Allowance of 200m of asbestos conduits to be disposed of as a provisional quantity
G4P5	We have made an allowance for the provision of optical fibre to principals project accommodation - assuming it is not a long distance to connection point, ie. appro 20m. It is not clear from the drawings
Environmental	Allow 500 hay bales Allowed silt fencing, project length, both sides Pit Traps - Allowed for new and existing pits Allowed for 1 truck cleaning facility per 1000m of project lengtl Allowance made for archaeologist, for avoiding/protecting maritime archaeological areas, as per query sheet. Priced in G Allowance made for vibration and noise specialist, as per query sheet. Priced in G Allowance made for Heritage advisor, as per query sheet. Priced in G1. No allowance made for heritage finishes as scope has not yet been provided Community manager covered in Project Summary Community liason, environment manager covered within overheads (refer query sheet, MR1 Allowance made for 4 pre & post construction land conditition assessment reports Heritage building condition inspections - allowed for the buildings in the vicinity of Thompson square to be classed as herita
Earthworks	Allowance for unsuitable: 20% pavement area 300mm depth. (Provisional quantity only In addition to the General earthworks volumes provided (which in email from Darren Horwood dated 22.12.15 state an assumed pavement depth of 720mm) w have allowed an extra 300mm deep of cut under pavement type 1A to take into account the 300mm UZF layer (as shown in the pavement profile) Allowed to dispose of excess excavated material under R44P6, so includes excavation from Retaining Wall, G7 Street Lighting (50%), G7 Unsuitable, R11 (50%) R11 Unsuitable, R33, R55, R155 ITS (33%), G1 Scour & G1 Scour Unsuitable Allowed for imported fill to be used to make up the balance - assuming that the excavated material for the scour protection willl not be suitable for use as material f general fill No allowance made for contaminated materials - as query 3.01 notes that none had been found as part of the IES investigation
Drainage	$75,000 allowance made for GPT, as per query 3.0

Pavement	For PT7, asphalt overlay, have allowed this to include the concrete median area (assuming the 100mm concrete median will be placed on top of asphalt to ensure is 100mm above finished pavement level To obtain the depth of the variable thickness correction course for the asphalt overlay, the end area method has been used with the relevant cross sectio Main Pavement is to be pavement type 1A (as per the plans) - not PT1E
Bridges and Structures	RW at Abut A: Allowed anti graffiti treatment to exposed brick facing For Bridge abutment & RW excavation quantites, we have allowed to exc & backfill 1.5m working space on either side plus battered excavatio Load transfer platform to remain in place, subsequent pavement layers to be placed on top, as per email dated 18.01.16 from Bruno Dalla-Palm No Allowance has been made for works to the existing abutments to be retained (noting that the design report p194 of the roadworks pdf says the construction lookout and viewpoint on the northern bank is currently outside the project scope) The pricing of the navigation lights have been excluded, as per query 3.5 Cast yard piles assumed 600dia. Temp Launching Support Piles assume 600 dia. Bridge: temporary casing allow for piles in Abutement A - Pile length = Socket length (stable materia
Guideposts	Allow to replace existing along Wilberforce & Freemans Reach Rd, as per query sheet
Landscaping	Allowance of 1.5% of total construction cost

Design updated as March 2017	No change to the northern side of the river southern approach roadworks lowered by 1m southern abutment lowered by 1m and no change on the northern abutment - bridge longitudinal grade is now 1.9% 450mm dia watermain is assumed to be attached to the underside of the bridge - No allowance was made for trenchless option No changes to utilities relocation works Option 4 used for Thompson Square grading Option B used for Windsor Wharf access by lowering The Terrace by maximum 0.7m to achieve 4.3m clearance under the bridge No allowance has been made for disable parking near the wharf area.

Appendix 6

Estimate Approval & Acceptance Form

Estimate approval and acceptance

Transport Roads & Maritime Services

Project	**Windsor Bridge replacement over Hawkesbury River**		
Road No:	**Macquarie St to Wilberforce Rd**	**Project No:**	**A/66737**
Location:	**Windsor, Hawkesbury**	**Region/ Office**	**Greater Sydney**
Estimate of cost:	**$104million P90 $OT** (construction June 2018 to March 2021)	**Estimate status:**	**Detail**
Date:	**18/05/2017**		

Preparation of Project Estimate

The estimate for this project has been prepared in accordance with the Scope, Estimating and Cost Control for Development Projects Guidelines. The details of the scope and estimate and proposed program of works are attached.

I have undertaken a peer review:

Name: Graham Standen
Position Title: Senior Project/Delivery Manager
Date: 19.05.2017

Concurred
Q.M.
Principal Mgr.
19.5.17.

I recommend that the estimate be approved in an amount of P50 - $93million and P90 - $97million ($ March 2017).

..... 18/05/2017
Project Manager Date:

Estimate Review and Concurrence

On the basis of the information provided, concurrence is given to the estimate cost of P50 - $93million and P90 - $97million ($ March 2017).

Estimate Concurrence
Major infrastructure projects (Estimated cost>$10M)

19.05.17
.....
Engineering Estimating Manager
Project Estimating, Technical and Project Services
Date

Estimate Approval

I concur with / approve the Detail estimate cost of P50 - $93million and P90 - $97million ($ March 2017). Based on construction starting in June 2018 and finishing March 2021, the outturn estimate for this project is P50 - $101million ($OT) and P90 - $104million ($OT). The out turn estimate has been evaluated using 5% escalation.
I recommend that the Project Budget be established at this amount.

GM, Project Office:
Western Sydney
Pacific Highway
Greater Sydney
Freight and Regional
Easing Sydney's Congestion
GM, Motorway Projects
GM, Project Delivery

.....
General Manager,
Greater Sydney Project Office, Technical and Project Services
Date

Acceptance

I accept the Detail estimate cost of P50 - $93million / P90 - $97million ($ March 2017) and P50 - $101million ($OT) / P90 - $104million ($OT) and support the Project Budget.

.....
General Manager, Project Services
Date

Acceptance

I accept the Detail estimate cost of P90 $97million ($ March 2017) and P90 - $104million ($OT).

Director, Infrastructure Development
Chief Operating Officer (Sydney's Congestion / Motorway Projects)

.....
Director, Technical and Project Services
Date