Appendix A

Consideration of clause 228(2) factors and matters of national environmental significance and Commonwealth land

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline (DUAP 1995/1996) and the *Roads and Related Facilities EIS Guideline* (DUAP 1996) as detailed in the REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the Proposal on the natural and built environment.

Factor	Impact
a) Any environmental impact on a community? The Proposal may cause minor short-term environmental impacts on the community during construction, such as local traffic and access disruption and noise impacts on residents, however the potential impacts would be minimised with the implementation of the safeguards as detailed in this REF. The community would benefit from safer travelling conditions and more efficient traffic movements along HLD in Georges Hall. Initially local residents may experience some disruption due to traffic diversions as a result of the proposed right turn ban into Rabaul Road, however this would reduce over time as road users get used to the proposed arrangement. Operationally there would be some increased noise, however this would not exceed 2 dB(A) in any location impacted by the changes. The Proposal would result in visual impacts due to the removal of vegetation and trees, however a replanting strategy would be carried out in suitable locations nearby to mitigate for the removal of vegetation.	Minor, short-term negative Long-term positive
b) Any transformation of a locality? The Proposal would not transform the locality. The visible changes created from the Proposal would largely be contained within the existing road corridor.	Nil
c) Any environmental impact on the ecosystems of the locality? The Proposal may have potential environmental impacts on the ecosystems of a locality however the potential impacts would be minimised with the implementation of the safeguards in Section 7.2 of this REF which include a re-planting strategy in the surrounding area.	Minor, short-term negative
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? The Proposal would not be likely to reduce the aesthetic, recreational, scientific or other environmental quality or value of the locality, as most of the physical works would generally be contained within the existing road formation and in areas previously modified from urban development.	Negligible
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The Proposal is unlikely to have an effect on a locality, place or building of significance or other special value for present or future generations. Any potential impacts on unknown items would be minimised with the implementation of the safeguards summarised in Section 7.2 in this REF. The chosen compound site location would be reinstated following construction.	Nil

Factor	Impact
f) Any impact on the habitat of protected fauna (within the meaning of the *Biodiversity Conservation Act 2016)?* The Proposal would result in the removal of up to 1.2 ha of native and exotic vegetation, including 0.49 ha of threatened ecological communities contained within the road reserve and public open space. This vegetation includes areas mapped as Riverflat Eucalypt Forest threatened ecological community, however upon inspection by an ecologist, these areas were deemed not to meet the relevant condition threshold. Despite this, tests of significance were undertaken which demonstrated that the Proposal would not result in a significant impact on this ecological community. A replanting strategy incorporating species part of this community would be implemented in suitable locations nearby as mitigation for the removal of this vegetation. No threatened flora or fauna species were identified within the Proposal location, though it is noted that the Proposal has the potential to provide foraging habitat for threatened microbats. A test of significance was carried out under the BC Act which indicated there would be no significant impact on these species. Based on the limited physical extent of the Proposal and with the implementation of the recommended management measures, the overall impacts of the Proposal upon threatened and non-threatened biodiversity is considered to be low.	Minor, negative, short-term Low, negative, long-term
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Based on the outcomes of the biodiversity assessment, the Proposal is unlikely to endanger any species of animal, plant or other form of life, providing the safeguards in this REF are implemented.	Minor, negative, short-term Negligible, negative, long-term
h) Any long-term effects on the environment? The Proposal would have a long term minor negative visual impact as a result of the removal of roadside trees. Impacts are considered minor due to the limited scope of these works and the implementation of the safeguards summarised in Section 7.2 in this REF which include a replanting strategy.	Minor, negative, long-term
i) Any degradation of the quality of the environment? The Proposal would potentially degrade the quality of the environment in the short-term during construction with regards to traffic delays, noise, amenity and generation of small volumes of construction waste, however the potential impacts would be minimised with the implementation of the safeguards in Section 7.2 of this REF.	Minor, negative, short-term Moderate, positive and long-term
j) Any risk to the safety of the environment? The Proposal would improve the overall safety for road users and pedestrians on HLD in Georges Hall, and any potential safety impacts would be minimised with the implementation of the safeguards summarised in Section 7.2 in this REF.	Minor, positive, long-term
k) Any reduction in the range of beneficial uses of the environment? The Proposal would cause a minor reduction in the use of the road from lane closures, which would potentially increase travelling time for road users in the	Minor, negative, short-term

Factor	Impact
short-term. However, there would be a positive long-term impact of reduced travel time through the intersection for road users. Pedestrians would benefit from the new pedestrian footpath provided on the eastern side of HLD between Haig Avenue and Rabaul Road. The local community and road users would benefit from the formalised drainage network improvements on the eastern side of HLD.	Minor, negative, short-term Minor, positive, long-term
l) Any pollution of the environment? The Proposal may potentially cause some minor pollution of the environment due to the proposed construction activities and potential for minor spills and leaks, however the potential impacts would be minimised with the implementation of the safeguards summarised in Section 7.2 in this REF.	Minor, negative, short-term
m) Any environmental problems associated with the disposal of waste? The waste generated during the Proposal would be contained and removed for disposal to approved recycling facilities or to licensed landfill in accordance with the safeguards in Chapter 3 of this REF. No environmental problems are anticipated for the disposal of waste given the scale of works.	Minor, negative, short-term
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal would not significantly increase demands on resources, which are, or are likely to become, in short supply. Relatively small amounts of materials would be required for the proposed work. The safeguards listed in Section 7.2 of this REF would be implemented to minimise any impacts.	Nil
o) Any cumulative environmental effect with other existing or likely future activities? The Proposal has the potential to have cumulative environmental effects with other existing or likely future activities including positive effects on travel efficiency along HLD. During construction there is potential for cumulative impacts in terms of road access as a result of on-going construction in the vicinity of Bankstown Airport. Any potential negative impacts on the environment would be minimised with the implementation of the safeguards summarised in Section 7.2 in this REF.	Minor, negative, short-term
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	Nil

Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the EPBC Act 1999, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the Proposal should be referred to the Australian Government Department of Agriculture, Water and the Environment.

A referral is not required for proposed actions that may affect nationally listed threatened species, endangered ecological communities and migratory species. Impacts on these matters are still assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
a) Any impact on a World Heritage property?	Nil
b) Any impact on a National Heritage place?	Nil
c) Any impact on a wetland of international importance?	Nil
d) Any impact on a listed threatened species or communities? The biodiversity assessment concludes that the overall impact of the Proposal on threatened and non-threatened species and communities would be low and can be mitigated through the safeguards under this REF.	Low
e) Any impacts on listed migratory species?	Nil
f) Any impact on a Commonwealth marine area?	Nil
g) Does the Proposal involve a nuclear action (including uranium mining)?	Nil
h) Additionally, any impact (direct or indirect) on the environment of Commonwealth land?	Nil

Appendix B

Statutory ISEPP consultation checklists

Infrastructure SEPP

Certain development types

Development type	Description	Yes / No	If 'yes' consult with	ISEPP clause
Car Park	Does the project include a car park intended for the use by commuters using regular bus services?	No	Canterbury-Bankstown Council	ISEPP cl. 95A
Bus Depots	Does the project propose a bus depot?	No	Canterbury-Bankstown Council	ISEPP cl. 95A
Permanent road maintenance depot and associated infrastructure	Does the project propose a permanent road maintenance depot or associated infrastructure such as garages, sheds, tool houses, storage yards, training facilities and workers' amenities?	No	Canterbury-Bankstown Council	ISEPP cl. 95A

Development within the Coastal Zone

Issue	Description	Yes / No / NA	If 'yes' consult with	ISEPP clause
Development with impacts on certain land within the coastal zone	Is the Proposal within a coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land?	No	Canterbury-Bankstown Council	ISEPP cl. 15A

Note: See interactive map here: ***https://www.planning.nsw.gov.au/policy-and-legislation/coastal-management***. Note the coastal vulnerability area has not yet been mapped.

Note: a certified coastal zone management plan is taken to be a certified coastal management program

Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a *substantial* impact on the stormwater management services which are provided by council?	Yes	Canterbury-Bankstown Council	ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will *strain* the capacity of the existing road system in a local government area?	Yes	Canterbury-Bankstown Council	ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a *substantial* impact on the capacity of any part of the system?	No	Canterbury-Bankstown Council	ISEPP cl.13(1)(c)

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a *substantial* volume of water?	No	Canterbury-Bankstown Council	ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a *minor* or *inconsequential* disruption to pedestrian or vehicular flow?	Yes	Canterbury-Bankstown Council	ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than *minor* or *inconsequential* excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Yes	Canterbury-Bankstown Council	ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than *minor* or *inconsequential?*	No	Canterbury-Bankstown Council	ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a *minor* extent?	No	Canterbury-Bankstown Council	ISEPP cl.15
Flood liable land	Are the works located on flood liable land? (to any extent). If so, do the works comprise more than minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance?	No	State Emergency Services	ISEPP cl.15AA

Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable* land published by the New South Wales Government.

Public authorities other than councils

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act*?*	No	Environment, Energy and Science, DPIE	ISEPP cl.16(2)(a)
National parks and reserves	Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	No	Environment, Energy and Science, DPIE	ISEPP cl. 16(2)(b)
Aquatic reserves	Are the works adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	No	Department of Planning, Industry and Environment	ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998?*	No	Property NSW	ISEPP cl.16(2)(d)
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No	Rural Fire Service	ISEPP cl.16(2)(f)
Artificial light	Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	No	Director of the Siding Spring Observatory	ISEPP cl.16(2)(g)
Defence communications buffer land	Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhardt LEP 2012, Narrandera LEP 2013 and Urana LEP 2011.	No	Secretary of the Commonwealth Department of Defence	ISEPP cl. 16(2)(h)
Mine subsidence land	Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	No	Mine Subsidence Board	ISEPP cl. 16(2)(i)

Appendix C

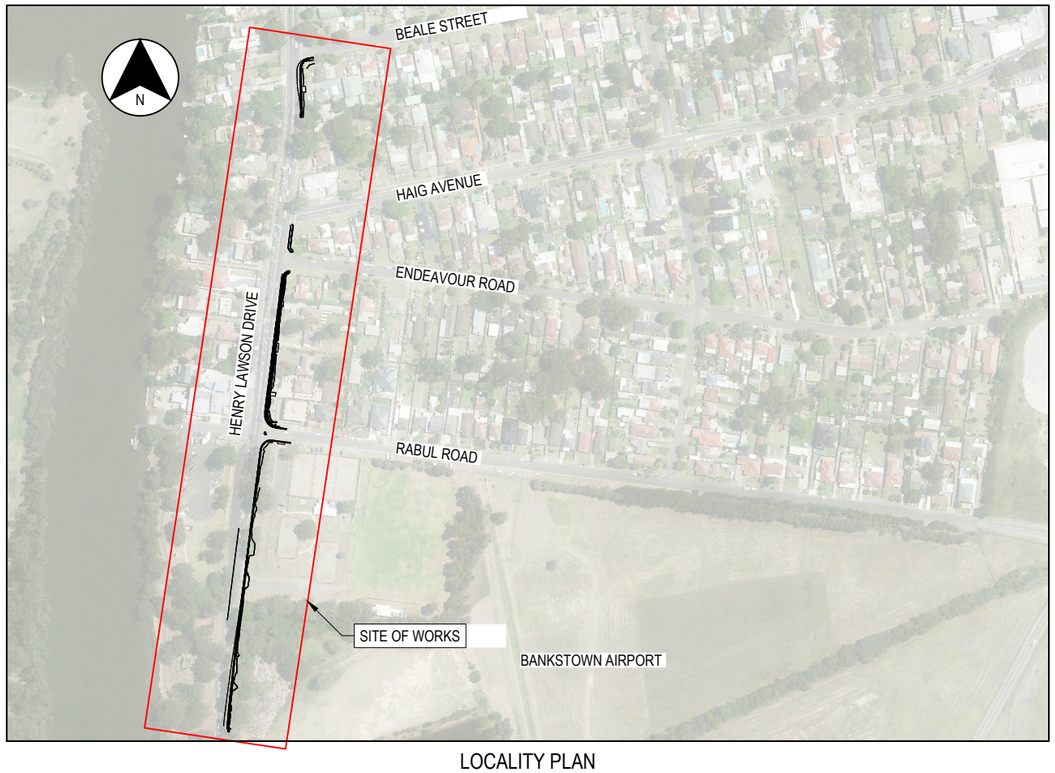
Design Drawings

CANTERBURY BANKSTOWN COUNCIL

MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL

DETAILED DESIGN



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MEGHWARB

PREPARED BY
TRANSPORT FOR NSW
DESIGN TEAM
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

DESIGNED	REVIEWED	VERIFIED
SIGNED	SIGNED	SIGNED
NAME W. YUNG	NAME B. MEGHWAR	NAME J. MCDERMOTT
TITLE DESIGNER	TITLE DESIGN LEAD	TITLE VERIFIER
DATE 06.11.2020	DATE 06.11.2020	DATE 06.11.2020

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CLIENT
NSW GOVERNMENT Transport for NSW

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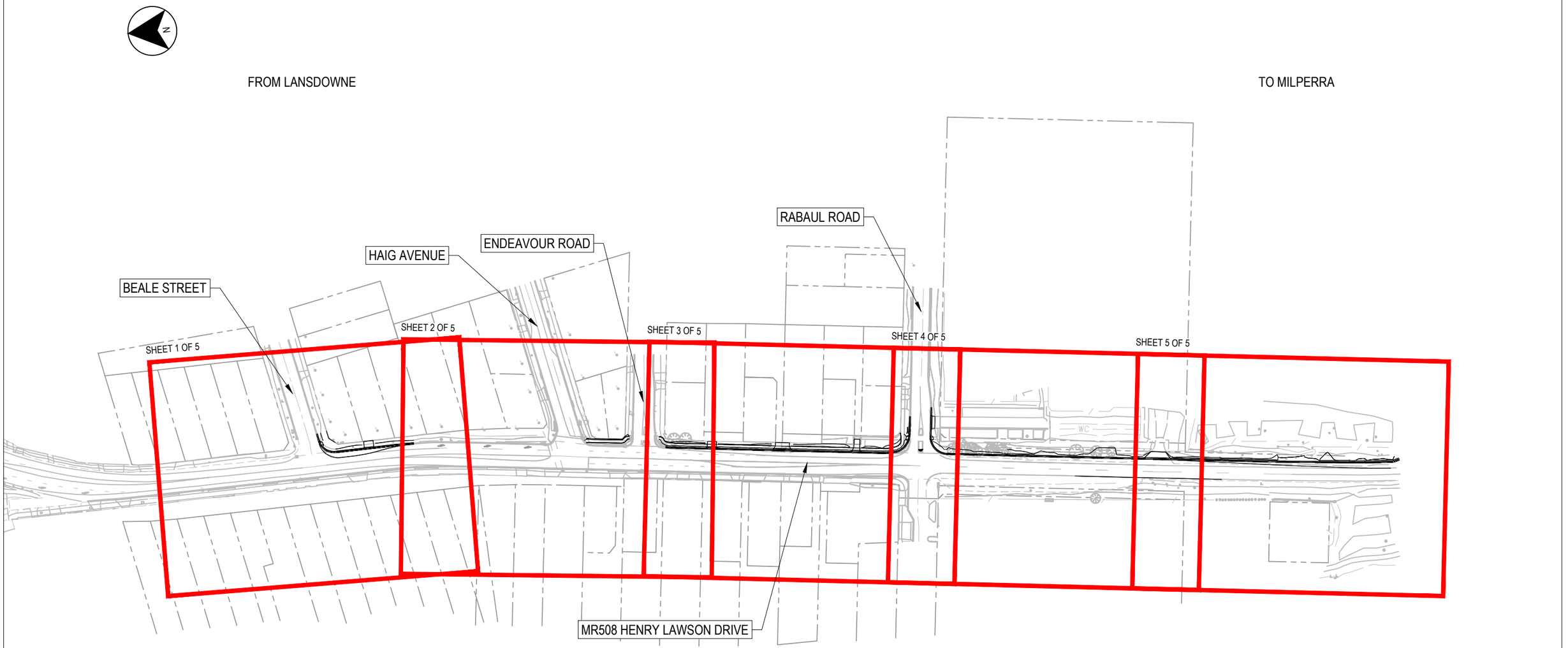
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL

A3

TfNSW PROJECT No. P0043031
DESIGN PROJECT No.
TfNSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS DETAILED DESIGN
EDMS No. -
SHEET No. SHT-GE-000001
ISSUE 1



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CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
OVERALL LAYOUT PLAN

A3

SHEET 1 OF 1

TfNSW REGISTRATION No.	PART
DS2020/000130	1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
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CODE INDEX

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GE	GENERAL
RD	ROAD WORKS
RL	ROAD LONGITUDINAL SECTIONS
RC	ROAD CROSS SECTIONS
UT	UTILITIES
SM	STORMWATER MANAGEMENT
PV	PAVEMENT
LT	ROAD LIGHTING
IT	INTELLIGENT TRANSPORT SYSTEMS
SC	SITE CLEARING AND SPOIL SITE
LS	LANDSCAPING AND SIGHT ENVELOPES
ST	STRUCTURAL DETAILS
PW	PROPERTY WORKS
CS	CONSTRUCTION STAGING
MS	MISCELLANEOUS / SUPPLEMENTARY
GT	GEOTECHNICAL
SV	SURVEY
GI	GIS

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	1	06.11.2020	PRE-AFC		A.PEREZ

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CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
DRAWING INDEX

A3

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TfNSW REGISTRATION No.: DS2020/000130 | PART: 1

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SHT-PV-000522	PAVEMENT DETAILS SHEET 2 OF 2
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SHT-PV-000531	PAVEMENT EDGE DETAILS SHEET 1 OF 3
SHT-PV-000532	PAVEMENT EDGE DETAILS SHEET 2 OF 3
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SHT-RF-001001	LINEMARKING AND SIGNAGE PLAN SHEET 1 OF 5
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SHT-RF-001003	LINEMARKING AND SIGNAGE PLAN SHEET 3 OF 5
SHT-RF-001004	LINEMARKING AND SIGNAGE PLAN SHEET 4 OF 5
SHT-RF-001005	LINEMARKING AND SIGNAGE PLAN SHEET 5 OF 5
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SHT-UT-001005	UTILITIES IMPACT ASSESSMENT PLAN SHEET 5 OF 5
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SHT-UT-002002	UTILITIES IMPACT ASSESSMENT SCHEDULE SHEET 2 OF 2
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PRESERVATION OF SURVEY INFRASTRUCTURE	
SHT-MS-001101	PRESERVATION OF SURVEY INFRASTRUCTURE SHEET 1 OF 2
SHT-MS-001102	PRESERVATION OF SURVEY INFRASTRUCTURE SHEET 2 OF 2
LIMITS OF CLEARING	
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SHT-MS-001202	LIMITS OF CLEARING SHEET 2 OF 2

ASSOCIATED DRAWINGS	
PLAN_GT0110	DETAILED SURVEY HENRY LAWSON DRIVE AND RABAUL ROAD
CADA_GT0110	CADASTRAL OVERLAY HENRY LAWSON DRIVE AND RABAUL ROAD

CODE INDEX	
	NAME
GE	GENERAL
RD	ROAD WORKS
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SV	SURVEY
GI	GIS

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SHEET 2 OF 2

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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HEIGHT DATUM: AHD

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TfNSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-GE-000012

ISSUE: 0

GENERAL NOTES

1. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RMS SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OR PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES WHERE APPLICABLE.
2. DRAWINGS TO BE READ IN CONJUNCTION WITH ALL OTHER SPECIFICATIONS FOR THE PROJECT.
3. LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
4. CO-ORDINATES ARE TO MAP GRID AUSTRALIA (MGA) CO-ORDINATE SYSTEM (ZONE 56).
5. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE (UNO). ALL LEVELS, CHAINAGES, STATIONS AND CO-ORDINATES ARE EXPRESSED IN METRES.
6. WHERE REFERENCE IS MADE TO PROPRIETARY COMPONENT NAMES ON THE DRAWINGS THE CONTRACTOR MAY PROPOSE AN ALTERNATIVE PRODUCT PROVIDED THE ALTERNATIVE IS EQUIVALENT AND SATISFIES THE REQUIREMENTS OF THE SPECIFICATION AND IS APPROVED BY THE PRINCIPAL.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE VERSION OF RMS STANDARDS LATEST AT THE TIME OF TENDER UNO.
9. WHERE AREAS ARE SHOWN AS BEING "ON HOLD" ON PLANS, ALL CORRESPONDING LONGITUDINAL SECTIONS, CROSS SECTIONS, DRAINAGE, PAVEMENTS AND OTHER DETAILS RELATING TO THAT AREA SHALL ALSO BE DEEMED TO BE "ON HOLD" UNO.
10. GEOTECHNICAL INVESTIGATIONS HAVE NOT BEEN UNDERTAKEN WITHIN THE PROPERTY BOUNDARY DUE TO NON AVAILABILITY OF PROPERTY ACCESS. A NOMINAL BATTER SLOPE OF 6 (H) TO 1 (V) HAS BEEN ADOPTED.
11. ALL PROPERTY WORKS WITHIN PROPERTY BOUNDARY SUBJECT TO AGREEMENT WITH PROPERTY OWNER AND THE PRINCIPAL.
12. DRAWING REFERENCES QUOTED ARE ONLY SHOWING THE LAST SIX DIGITS FOR SIMPLICITY.
13. FOR RMS STANDARD SUPPLEMENTARY DRAWING INDEX REFER DRAWING GE-000021.
14. ALL GRADING POINTS ARE RELATED TO FINISHED ROAD LEVEL. REFER TO TYPICAL CROSS-SECTIONS FOR STRING LABELLING CONVENTION (GE SERIES).
15. ALL LOCATIONS, ORIENTATION AND LEVELS SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING ANY WORK. REFER DISCREPANCIES TO THE PRINCIPAL. DO NOT OBTAIN DIMENSIONS FROM SCALING. EXISTING SURFACE LEVELS ON THE DRAWINGS ARE INDICATIVE ONLY.

SAFETY - IN - DESIGN INFORMATION

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH RMS SPECIFICATION G22. THIS DOCUMENT LISTS SOME DESIGN RELATED WORK HEALTH AND SAFETY HAZARDS ASSOCIATED WITH THE PROJECT DESIGN, CONSTRUCTION AND OPERATION. THERE MAY BE OTHER HAZARDS AND RISKS NOT STATED IN THIS DOCUMENT. THIS DOCUMENT DOES NOT RELIEVE THE CONTRACTOR OF ITS OBLIGATIONS UNDER THE CONTRACT AND RELEVANT LEGISLATION.
2. REFER TO SID REPORT AND DESIGN REPORT.

SIGNAGE AND LINE MARKING

1. TO ELIMINATE EXCESSIVE GLARE FROM THE SURFACE OF A SIGN IT IS TO BE TURNED APPROXIMATELY 5° AWAY FROM THE NORMAL TO THE HEADLIGHT BEAM / LINE OF SIGHT.
2. ALL SIGNAGE TO BE CLEAR OF ALL VEGETATION AND OBSTRUCTIONS.
3. SIGNS TO BE INSTALLED IN ACCORDANCE WITH AS1742.
4. THE LOCATION OF ALL EXISTING SIGNS TO BE CONFIRMED PRIOR TO COMMENCING WORK. ENSURE ADOPTED METHOD OF CONSTRUCTION WILL AVOID DAMAGE TO ALL SERVICES.
5. CONDITION ASSESSMENT TO BE UNDERTAKEN ON ALL EXISTING SIGN FACES TO BE RELOCATED PRIOR TO BEING REUSED IN ACCORDANCE WITH RELEVANT SPECIFICATIONS AND STANDARDS OR AS DIRECTED BY THE PRINCIPAL.
6. ALL EXISTING LINE MARKING EFFECTED BY THE NEW WORKS AND NOT OTHERWISE CONFLICTING WITH NEW LINE MARKING IS TO BE REINSTATED.
7. ALL LINE MARKING TO BE THERMOPLASTIC IN ACCORDANCE WITH RMS SPECIFICATION R141.
8. FOR NOTES ON PAVEMENTS REFER TO RMS DELINEATION GUIDELINE SECTION 9.
9. FOR REMOVAL OF LINE MARKING REFER TO RMS DELINEATION GUIDELINE SECTION 14.
10. RAISED PAVEMENT MARKERS SHALL BE PLACED ON ALL LANE, EDGE AND BARRIER LINES. SPACING OF RAISED PAVEMENT MARKERS SHALL BE IN ACCORDANCE WITH RMS DELINEATION GUIDE AND RMS SPECIFICATION R142.
11. SIGNAGE AND LINE MARKING PLANS TO BE READ IN CONJUNCTION WITH TCS PLANS.

RMS STANDARD DRAWINGS

1. RMS STANDARD DRAWINGS CAN BE FOUND AT THE FOLLOWING LOCATION:
   http://www.rms.nsw.gov.au/business-industry/partners-suppliers/document-types/standard-drawings/index.html

STRUCTURE TYPE (DENOTED ON SCHEDULE)	STANDARD DRAWING NUMBER	DESCRIPTION	LAST AMENDED
	R0200	STORMWATER DRAINAGE SERIES - GULLY PITS	
SA1, SA2,SA3	R0220-01	GULLT PIT TYPE SA PIPE DIAMETER UP TO 450 mm	JUN -17
	R0220-03	PRECAST CONCRETE LINTELS FOR TYPE SA GULLY PITS	JAN-17
	R0220-28	GULLY PIT TREATMENT FOR PIPES GREATER THAN 450 mm DIAMETER	JAN-17
	R0220-43	PIT TO PIPE CONNECTION	JAN-17
	R0220-45	INDIVIDUAL - RUNG LADDER (STEP IRONS) FOR DRAINAGE PITS	JAN-17
	R0220-49	GULLY PITS CONCRETE PIPE EXTENSION	JAN-17
RSG	R0220-36	INLET SUMP WITH RAISED STEEL GRATE	JAN-17
SB	R0220-51	STANDARD GULLY PIT TYPE SB	JAN-17
	R0240	STORMWATER DRAINAGE SERIES - PIPES	
	R0240-01	TYPE HS3 CONDITIONS	JAN-17
	R0300	KERB AND CHANNEL SERIES	
	R0300-01	STANDARD KERB AND GUTTER SHAPES	NOV-17
	R0300-04	STANDARD VEHICULAR CROSSING FOR USE WITH TYPE SA KERB AND CHANNEL	JAN-17
	R0300-10	KERB TRANSITION TYPE SM TO TYPE SF	JAN-17
	R0300-11	KERB RAMPS	OCT-17

CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWINGS		
STANDARD DRAWING NUMBER	TITLE	REVISION
S-008	STANDARD MEDIUM DUTY VEHICULAR FOOTWAY CROSSING (VFC)	01/05/2017
S-027	STANDARD FOOTPAVING RESIDENTIAL FOOTWAYS	01/05/2017

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A3
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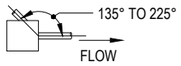
TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-GE-000021	1

DRAINAGE - GENERAL

1. THE DOCUMENTED DRAINAGE SYSTEM IS DETAILED ONLY FOR THE PERMANENT ROAD CONFIGURATION UNO. CONSTRUCTION REQUIREMENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
2. PIPES THROUGH PITS ARE TO BE ALIGNED WITH UPSTREAM PIPE CENTRELINE TO OUTLET PIPE CENTRELINE AT DOWNSTREAM PIT FACE AS SHOWN;



3. ANY PERMITS FOR DIVERSION WORKS REQUIRED DURING CONSTRUCTION SHALL BE OBTAINED PRIOR TO CONSTRUCTION WORKS BY THE CONTRACTOR FROM THE PRINCIPAL.
4. EXISTING STORMWATER DRAINAGE PITS, PIPES AND CULVERTS WITHIN THE LIMITS OF WORKS SHALL BE ABANDONED AS SPECIFIED IN THE DRAWINGS AND IN ACCORDANCE WITH RMS STANDARD SPECIFICATIONS, METHODS AND EXTENT OF ABANDONMENT TO BE CONFIRMED ON SITE BY THE CONTRACTOR AND APPROVED BY THE PRINCIPAL. ANY EXPOSED REINFORCEMENT TO BE PROTECTED IN ACCORDANCE WITH REQUIREMENTS FOR NEW CONSTRUCTION.
5. IN LOCATIONS WHERE NEW PAVEMENT OR ROAD WIDENING WORKS ARE PROPOSED, ANY NEW OR EXISTING PIPES WITH LESS THAN 300 mm COVER BELOW THE UNDERSIDE OF THE SELECTED MATERIAL ZONE SHALL BE CONCRETE ENCASED.
6. DURING CONSTRUCTION EXCAVATIONS SHALL BE SECURELY SHORED AND BENCHED TO PREVENT THE SIDES OF THE EXCAVATION FROM COLLAPSING. AS REQUIRED ON NSW WORK COVER EXCAVATIONS WORK CODE OF PRACTICE.

DRAINAGE - LONGITUDINAL AND TRANSVERSE DRAINAGE

1. ALL PIPES ARE TO BE STEEL REINFORCED SPUN CONCRETE UNO. ALL CONCRETE PIPES SHALL HAVE HS3 TYPE INSTALLATION AS PER RMS R0240-01.
2. BEDDING AND SUPPORT FILL MATERIAL FOR ALL NEW LONGITUDINAL DRAINAGE TRENCHES SHALL BE IN ACCORDANCE WITH RMS SPEFICATION R11 AND R44.
3. CONCRETE PIPE CLASSES HAVE BEEN DETERMINED BASED ON TYPE HS3 SUPPORT, FINISHED SURFACE LEVEL AND TRENCH OR EMBANKMENT CONDITION INSTALLATION TO AS3725 AND SPECIFICATION UNO. CONCRETE PIPES ARE TO BE RUBBER RING JOINTED SPIGOT AND SOCKET TYPE UNO. THERMAL ENVIRONMENT CONDITION OF TABLE 3.1 OF AS/NZS 4058:2007 APPLIES. MINIMUM COVER FOR REINFORCEMENT IS 10 mm.
4. MINIMUM COVER TO ALL NEW PIPES TO BE 300 mm BELOW THE UNDERSIDE OF THE SELECTED MATERIAL ZONE UNO.
5. CONNECTION BETWEEN PIPES AND STRUCTURES TO BE UNDERTAKEN IN ACCORDANCE WITH RMS SPECIFICATION AND DRAWINGS UNO.
6. PIPE LENGTHS PROVIDED IN DRAINAGE LONG SECTIONS ARE CALCULATED FROM PIT REFERENCE POINT TO PIT REFERENCE POINT.

DRAINAGE - EXISTING STORMWATER PIPES

1. EXISTING STORMWATER DRAINAGE PIPE AND PIT LAYOUT SHOWN IN THE DRAWINGS ARE INDICATIVE ONLY. ALL LOCATIONS, ORIENTATION AND LEVELS OF EXISTING SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING ANY WORK.
2. LAYOUTS OF EXISTING STORMWATER DRAINAGE HAVE BEEN PREPARED BASED ON A COMBINATION OF NEW SURVEY DATA OBTAINED DURING CURRENT DESIGN, PREVIOUSLY AVAILABLE SURVEY DATA, AND COUNCIL GIS DATA (WHERE SURVEY IS NOT AVAILABLE).
3. WHERE AN EXISTING PIT HAS ONLY ONE PIPE OUTLET, THE SETOUT / REFERENCE POINT OF THE EXISTING PIT IS BASED ON THE SURVEYED PIPE INVERT LEVEL.
4. WHERE EXISTING PIT HAS TWO OR MORE CONNECTION PIPES, THE SETOUT / REFERENCE OF THE EXISTING PIT IS BASED ON THE INTERSECTION POINT OF THE CENTERLINE OF EACH PIPE.
5. WHERE A CONNECTION IS MADE TO AN EXISTING DRAINAGE PIPE OR PIT, THEN THE LEVEL OF THAT ELEMENT MUST BE SURVEYED AND ANY DISCREPANCIES SUBMITTED TO THE PRINCIPAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.

DRAINAGE STRUCTURES (DRAINAGE PITS DESIGNED FOR 50 YEARS)

1. CONCRETE DRAINAGE STRUCTURES TO BE IN ACCORDANCE WITH RMS QA SPECIFICATION R53 UNO
2. DRAINAGE STRUCTURES HAVE BEEN DESIGNED IN ACCORDANCE WITH AS3600-2018 UNO
3. DESIGN LIFE OF NEW CONCRETE DRAINAGE STRUCTURES IS 50 YEARS UNO.
4. DESIGN LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS5100.2 – 2017.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND PROVISION OF ANY TEMPORARY BRACING, PROPPING, ETC. REQUIRED DURING CONSTRUCTION. STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED.
6. FOUNDATION SUPPORT FOR DRAINAGE STRUCTURES TO BE PROVIDED IN ACCORDANCE WITH RMS QA SPECIFICATION R11.
7. INADEQUATE FOUNDING MATERIAL FOR PIPES AND STRUCTURES SHALL BE REMOVED OR IMPROVED IN ACCORDANCE WITH RMS QA SPECIFICATION R11.
8. RMS STANDARD DETAILS TO BE ADOPTED ONLY WHERE REFERENCED.
9. ALL PITS DEEPER THAN 600 TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH RMS DRAWING R0220-45
10. STEEL GRATES AND FRAMES ARE TO BE FABRICATED FROM MILD STEEL AND HOT DIPPED GALVANISED. ALL GRATES AND FRAMES TO BE “MEDIUM / HEAVY TRAFFICABLE” CLASS D UNO. GRATES AND FRAMES WITHIN THE PAVEMENT SURFACE (INCLUDES ADJOINING SO GUTTER) ARE TO BE BICYCLE SAFE IN ACCORDANCE WITH AS 3996 UNO.
11. ALL WELDS TO COMPLY WITH AUSTRALIAN STANDARD AS 1554.1. FILLET WELDS TO BE NOT LESS THAN 6 mm UNO.
12. ALL EXPOSED STEEL TO BE GALVANISED IN ACCORDANCE WITH AS/NZS 2312 AND AS/NZS 4680. GALVANISING TO THREADED FASTENERS TO BE IN ACCORDANCE WITH AS 1214. MINIMUM GALVANISING 600 G / SQM OTHER THAN ON FASTENERS.
13. GRATE SUPPORT TO BE CONSTRUCTED LEVEL TO ENSURE THAT THE GRATE DOES NOT ROCK AFTER INSTALLATION.
14. FOR LOCATION AND LEVEL OF PITS AND HEADWALLS REFER TO DRAINAGE DRAWING LONG SECTIONS AND SCHEDULES.
15. CONSTRUCTION JOINT PREPARATION: EXISTING CONCRETE SURFACE TO BE CLEANED, SCABBLED AND ROUGHENED IN ACCORDANCE WITH RMS QA SPECIFICATION R53 PRIOR TO CASTING OF NEW PIT SECTION
16. CONCRETE EXPOSURE CLASSIFICATION B1 UNO.
17. MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH AND NOMINAL COVER TO REINFORCEMENT FOR DRAINAGE PITS UNO :
    - CAST IN-SITU – CAST AGAINST GROUND: 32 MPa / 75 mm
    - CAST IN-SITU – CAST ELSEWHERE: 32 MPa / 40 mm
18. EDGES SHALL BE CHAMFERED 20 x 20
19. EXPOSED SAWCUT REINFORCEMENT BARS TO BE TREATED WITH CORROSION INHIBITING COATING
20. DESIGN LIFE FOR NEW DRAINAGE CONCRETE STRUCTURES IS 50 YEARS UNO.
21. PIT BASE TO BE CLEANED, SCABBLED AND ROUGHENED IN ACCORDANCE WITH RMS QA SPECIFICATION R53 PRIOR TO PLACING MASS CONCRETE BENCHING.
22. MINIMUM 28 DAY CONCRETE COMPRESSIVE STRENGTH AND NOMINAL COVER TO REINFORCEMENT FOR CONCRETE CASING TO PIPES UNO. 25 MPa / 60 mm. CONCRETE TO BE PLACED USING MECHANICAL VIBRATION.

DRAINAGE - SUBSOIL

1. REFER TO PAVEMENT DRAWINGS FOR SUBSURFACE DRAINAGE LOCATIONS, PATHS AND DETAILS. SUBSURFACE DRAINAGE / TRENCH DRAINS SHALL CONFORM TO RMS R33.

DRAINAGE - SCOUR PROTECTION

1. THE THICKNESS OF THE RIP-RAP ROCK PROTECTION SHALL BE A MINIMUM OF TWICE THE D_{50} STONE SIZES SPECIFIED ON THE DRAWING D_{50}=150 mm UNO.
2. THE STONE SHALL BE REASONABLY WELL GRADED THROUGHOUT THE RIP-RAP LAYER. STONE SIZES SHALL BE DEPENDENT ON THE D_{50} VALUE SPECIFIED ON THE DRAWING D_{10} SHALL BE $0.5XD_{50}$ AND D_{90} SHALL BE $1.35XD_{50}$. STONES SMALLER THAN THE SPECIFIED D_{10} ARE NOT TO EXCEED 20% BY WEIGHT OF EACH LOAD.
3. RIP-RAP ROCK IS TO BE HARD, DENSE, DURABLE, RESISTANT TO WEATHERING AND ANGULAR IN SHAPE. IT SHALL BE FREE FROM OVERBURDEN, SPOIL, SHALE AND ORGANIC MATTER. ROCK THAT IS LAMINATED, FRACTURED, POROUS OR OTHERWISE PHYSICALLY WEAK WILL BE UNACCEPTABLE.
4. AN APPROXIMATE GUIDE TO STONE SHAPE IS THAT THE BREADTH OR THICKNESS OF A SINGLE STONE SHOULD BE NOT LESS THAN ONE-THIRD ITS LENGTH. ROUND MATERIAL CAN BE USED AS RIP-RAP ROCK PROVIDED IS NOT PLACED ON SLOPES GREATER THAN 3H:1V.
5. STONE SHOULD BE DARK IN COLOUR-EITHER GREY OR DARK BROWN SIMILAR TO SOIL PROFILE RIP-RAP ROCK MATERIAL TO BE SUBMITTED TO THE SUPERINTENDENT FOR APPROVAL.
6. GEOFABRIC UNDER RIP-RAP ROCK TO BE IN ACCORDANCE WITH RMS SPECIFICATION D&C R63 UNO.

PROPERTY STORMWATER DRAINAGE DISCHARGE

1. SURVEY OF EXISTING PROPERTY STORMWATER DRAINAGE DISCHARGE OUTLET LOCATIONS HAS NOT BEEN UNDERTAKEN AS PART OF THE DESIGN PROCESS.
2. LOCATION AND LEVEL OF ALL EXISTING PROPERTY STORMWATER DRAINAGE DISCHARGE OUTLETS INTO COUNCIL DRAINAGE SYSTEM OR TO ROAD KERB MUST BE OBTAINED BY CONTRACTOR PRIOR TO CONSTRUCTION.
3. ALL LEVELS MUST BE CHECKED FOR CONFLICT WITH ANY SERVICES AND TO ENSURE THE PROPERTY STORMWATER DRAINAGE CAN RE-CONNECT INTO THE NEW DRAINAGE SYSTEM OR NEW ROAD KERB, CONSISTENTLY WITH THE EXISTING CONNECTION.
4. uPVC PIPE CONNECTING EXISTING PROPERTY STORMWATER TO BE MINIMUM IPLEX 150 DIAMETER CLASS SN 8 OR APPROVED EQUIVALENT (DSME 150 RRJ).
5. PIPE BEDDING AND COVER REQUIREMENTS FOR uPVC PIPES SHALL COMPLY WITH THE RMS SPECIFICATION R23 AND AS/NZS 2032:2006.

UTILITIES

1. FOR UTILITIES THAT HAVE BEEN RELOCATED OR REQUIRE ADJUSTMENT FOR THE WORKS, REFER TO INDIVIDUAL UTILITY DIVERSION DRAWINGS AND DETAILS FROM THE RELEVANT UTILITY AUTHORITY.
2. IN ORDER TO AVOID DAMAGE TO THE UTILITIES THE CONTRACTOR SHALL BE RESPONSIBLE FOR CO-ORDINATING THE WORKS ADJACENT TO ANY UTILITY WITH THE RELEVANT UTILITY AUTHORITY IN ACCORDANCE WITH THE AUTHORITY REQUIREMENTS.
3. THE CONTRACTOR SHALL CO-ORDINATE WITH THE RELEVANT UTILITY AUTHORITIES AND THE PRINCIPAL WITH RESPECT TO ANY TEMPORARY DIVERSIONS NECESSARY FOR CONSTRUCTION STAGING WORKS.
4. FOR UTILITY INFORMATION REFER TO UT SERIES DRAWINGS.
5. POTHOLING OF ALL SERVICES SHOWN ON DRAWINGS HAS NOT BEEN UNDERTAKEN AS PART OF THE DESIGN PROCESS.
6. LOCATION AND LEVEL OF ALL SERVICES CROSSING NEW DRAINAGE MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ALL LEVELS MUST BE CHECKED FOR CONFLICT WITH ANY SERVICES, AND ANY CONFLICTS TO BE RESOLVED WITH THE PRINCIPAL.
7. THE LOCATION OF EXISTING PROPERTY CONNECTIONS TO UTILITIES LOCATED WITHIN THE ROAD RESERVE HAVE NOT BEEN LOCATED AND SURVEYED. IT WILL BE THE CONTRACTORS RESPONSIBILITY TO LOCATE EACH PROPERTY CONNECTION AND ARRANGE ANY REQUIREMENT FOR RECONNECTION TO NEW LINES. THE CONTRACTOR SHALL ALSO PROTECT ALL PROPERTY CONNECTIONS DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL MANAGE ANY DISRUPTION TO SUPPLY TO PRIVATE PROPERTY AND ENSURE THAT SUPPLY IS AVAILABLE AT THE END OF EACH DAYS ACTIVITIES.
8. SERVICES SHOWN ARE INDICATIVE ONLY AND IS NOT GUARANTEED COMPLETE NOR CORRECT. CONTRACTOR TO CONFIRM LOCATION OF ALL SERVICES PRIOR TO COMMENCING WORK. CONTRACTOR TO ENSURE ADOPTED METHOD OF CONSTRUCTION WILL AVOID DAMAGE TO ALL SERVICES.
9. SERVICE AUTHORITIES ARE TO BE CONTACTED PRIOR TO THE COMMENCEMENT OF WORKS FOR ARRANGEMENTS TO BE MADE REGARDING THE PROTECTION, ADJUSTMENT OR RELOCATION OF SERVICES IF NECESSARY. INFORMATION PROVIDED ON THE DRAWINGS WITH RESPECT TO SERVICES IS FOR GUIDANCE ONLY.
10. PRIOR TO THE START OF EXCAVATION, ALL NEW TEMPORARY EXCAVATIONS FOR UTILITIES NEAR CUT OR FILL BATTERS ARE TO BE ASSESSED ON SITE BY THE CONTRACTOR'S EXPERIENCED GEOTECHNICAL ENGINEER FOR THEIR POTENTIAL IMPACT ON BATTER STABILITY DURING CONSTRUCTION.

PROPERTY WORKS CONSTRUCTION

1. MAKE GOOD ANY DISTURBANCE TO EXISTING LAWNS AND TOP SOIL. TURF AND RESHAPE ALL DISTURBED AREAS INCLUDING REPLACEMENT OF EXISTING SHRUBS, HEDGES ETC. AS SHOWN ON DRAWINGS AND AGREED WITH THE PROPERTY OWNER AND THE PRINCIPAL.
2. CLEAN UP AND REMOVE CONTRACTOR'S WASTE FROM THE SITE CAUSED DURING THE ADJUSTMENT WORK.
3. RELOCATE / REMOVE AND REPLACE EXISTING FENCES, GATES, LETTERBOX AS SHOWN ON THE DRAWING. PRINCIPAL TO CONFIRM EXACT INSTRUCTION WITH PROPERTY OWNER.
4. EXISTING PRIVATE PROPERTY SERVICE CONNECTIONS AND DRAINAGE ARE NOT INDICATED ON THESE DRAWINGS. THESE NEED TO BE LOCATED AND ADJUSTED AS REQUIRED. MAINTAIN EXISTING ALIGNMENT WHERE POSSIBLE.
5. ACCESS TO PROPERTIES TO BE MAINTAINED BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION, OR AS OTHERWISE AGREED WITH THE PROPERTY OWNER AND THE PRINCIPAL.
6. ALL REDUNDANT FENCING TO BE REMOVED AND RECYCLED WHERE POSSIBLE.
7. THE CADASTRAL BOUNDARY IS SUBJECT TO CONFIRMATION ON SITE BY THE CONTRACTOR USING A REGISTERED LAND SURVEYOR.
8. SIGNIFICANT TREES HAVE BEEN IDENTIFIED ON THE DRAWINGS FOR REMOVAL WHERE REQUIRED, WHERE REMOVAL OF ADDITIONAL UNIDENTIFIED TREES ARE REQUIRED TO CONSTRUCT THE PROPERTY WORKS, OBTAIN APPROVAL FROM THE PRINCIPAL BEFORE REMOVING ADDITIONAL TREES.
9. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH RMS SPECIFICATION R204.

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GENERAL NOTES

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TINSW REGISTRATION No. DS2020/000130
PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
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REINFORCEMENT NOTES

1. ALL REINFORCEMENT SHALL COMPLY WITH AS4671 AND BE GRADE 500N UNO.
2. COGS, HOOKS, SPLICES AND PIN DIAMETERS SHALL BE IN ACCORDANCE WITH AS3600-2018
3. REINFORCEMENT MAY BE DISPLACED SLIGHTLY WHERE NECESSARY TO CLEAR STEEL DOWELS, ANCHOR BOLTS, DRAINAGE PIPES, FORMED HOLES AND RECESSES
4. UNLESS NOTED OTHERWISE, THE MINIMUM DEVELOPMENT AND LAP LENGTHS OF BARS SHALL BE AS FOLLOWS:

BAR SIZE:		N12	N16	N20	N24	N28	N32	N36	N40
DEVELOPMENT LENGTH	HORIZONTAL BARS WITH >300 mm OF CONCRETE CAST BELOW THE BAR	550	750	950	1150	1400	1650	1950	2250
	OTHER BARS	400	550	750	900	1100	1300	1500	1750
LAP LENGTH	HORIZONTAL BARS WITH >300 mm OF CONCRETE CAST BELOW THE BAR	700	950	1200	1500	1750	2100	2500	2850
	OTHER BARS	500	700	950	1150	1400	1650	1900	2200

   WHERE MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION, THE TABULATED LAP LENGTHS INCREASE BY 30% UNLESS NOTED OTHERWISE
5. ALL LAPPED PORTIONS OF BARS TO BE IN CONTACT
6. WHERE LAPPED SPLICES ARE USED, THE SEPARATION BETWEEN LAPPED PORTIONS OF BARS SHALL NOT EXCEED 3 x BAR SIZE
7. LAP LENGTHS FOR UNEQUAL BAR SIZES TO BE BASED ON THE LARGER OF THE LAP LENGTH OF THE SMALLER BAR AND THE DEVELOPMENT LENGTH OF THE LARGER BAR
8. WHERE LAPS ARE NOT SHOWN THEY SHALL SATISFY THE REQUIREMENTS OF RMS QA SPECIFICATION R53 AND RMS QA SPECIFICATION B80 AS RELEVANT
9. WHERE REBATES OR RECESSES ARE REQUIRED, MINIMUM CLEAR COVER TO THE REINFORCEMENT SHALL BE MAINTAINED
10. MECHANIAL COUPLERS SHALL BE CAPABLE OF DEVELOPING A STRESS IN TENSION OR COMPRESSION OF NO LESS THAN 1.1FSY, AS APPROPRIATE TO THE WEAKER BAR AT THE SPLICE. THE COUPLER SHALL BE SUBMITTED TO THE PRINCIPAL FOR ACCEPTANCE
11. REINFORCEMENT IS SHOWN DIAGRAMMATICALLY. IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION
12. SPLICES OF REINFORCEMENT SHALL ONLY BE MADE IN POSITIONS SHOWN
13. WRITTEN APPROVAL OF THE PRINCIPAL SHALL BE OBTAINED FOR ANY OTHER SPLICES
14. DO NOT WELD REINFORCEMENT UNLESS SHOWN ON THE DRAWING

BAR MARKING LEGEND

THE METHOD USED TO DESCRIBE REINFORCEMENT ON THE DRAWINGS IS AS FOLLOWS:

N16-300 EF

- EF — INFORMATION FOR PLACING
- 300 — SPACING ALONG LIMIT LINE
- N16 — BAR SIZE / DIAMETER IN MILLIMETRES

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TfNSW REGISTRATION No.: DS2020/000130 — PART 1

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LEGEND SHEET

LINEMARKING

LINEMARKING TAG

PAVEMENT ARROW TAG

SURVEY (EXISTING)

- CABLE JUNCTION BOX (PEJB)
- LARGE SIGN (SI)
- ELECTRICAL CABLE MANHOLE (PEMH)
- SIGN POST (PSIN)
- DRILL HOLE AND WING (PDHL)
- EXISTING VALVE BOX
- POLE LIGHT (PLPL)
- STOP VALVE (WATER)
- KERB INLET (KI)
- WATER HYDRANT
- SURVEY MARKS (BOLTS, PEGS, NAILS)
- TRAFFIC SIGNAL JUNCTION BOX (PSJX)
- TRAFFIC CONTROL SIGNAL (PSGL)
- RUBBISH BIN (PBIN)
- TELEPHONE SINGLE CONCRETE PIT (PTSP)
- TELEPHONE TWIN CONCRETE PIT (PTTP)
- PIER COLUMN POINT (PBPI)
- DRAINAGE JUNCTION MANHOLE (PDJM)
- TELEPHONE BOX POINT (PTBX)
- TELEPHONE DISTRIBUTION PILLAR (PTDP)
- TELEPHONE SUMP (TS)
- UNIDENTIFIED SERVICE
- DISTRIBUTION FUSE POINT (PEFP)
- TRAFFIC SIGNAL CONTROLLER (TCS)
- WATER HYDRANT (PWHY)
- POLE POWER (PPPL)
- LUMINAIRE
- MAIL BOX
- POWER POLE AND LIGHT (PPLP)
- MANHOLE COVER (PSMH)
- D 450 — EXISTING PIPE - 450 DIA (U4)
- EXISTING LIGHT WITH OUTREACH (LI)
- EXISTING ABOVE GROUND JOINING POST (PTJP)
- D 300 — EXISTING PIPE - 300 DIA (U2)
- EXISTING INLET TO SUMP (PILT)
- EXISTING METER (PWMR)
- EXISTING DISH DRAIN (DD)
- EXISTING PARKING METER (PKME)
- POWER SERVICE PILLAR UNDERGROUND (PEUP)
- G I PIPE (PGPI)
- FIRE HYDRANT (WATER)
- OPTICAL FIBRE PIT (POFP)
- BOLLARD (AC)
- TOP OF CONCRETE JUNCTION BOX
- UNIDENTIFIED POLE
- BUS STOP (PBUS)
- PETROL PUMP
- DRAINAGE PIPE INVERT
- OPTICAL FIBRE JUNCTION BOX (POFJ)
- SPEED ZONE LINEMARKING
- ARROW RIGHT TURN (AR)
- ARROW LEFT TURN (AL)
- ARROW STRAIGHT AHEAD (AS)
- EXISTING POST - DOUBLE SIDED (PSDS)
- TRANSFORMER CABINET CENTRE (PETC)
- FENCE POST OR GUIDE POST (POST)
- WM — WATER MAIN MARKER (PWMM)
- TSP — EXISTING STD 1.1m BY 1.1m MAIN PIT (PTMP)
- TM — EXISTING TRAFFIC MARKER (SILENT COP) (PTMX)
- EXISTING GULLY PIT (PGUL)
- D 375 — EXISTING PIPE - 375 DIA (U3)
- D 525 — EXISTING PIPE - 525 DIA (U5
- SLH — EXISTING LAMPHOLES (PSLH)
- SVP — EXISTING VENT PIPE (PSVP)
- AP — EXISITING ALIGNMENT PIN (PAPN)
- EGL — EXISTING GARDEN LIGHT (PLGN)
- SF — EXISTING DRAIN SUBSOIL FLUSH POINT (PSFP)
- EXISTING AIR VALVE (PWAV)
- FLASH — EXISTING CAMERA - FLASH UNIT (PCFU)
- CAM — EXISTING RED LIGHT-SPEED-TRAFFIC CAMERA (PCAM)
- IN 300 Dia — EXISTING INVERT - 300 DIA (PI02)
- EXISTING TOPO SPOT HEIGHT
- EXISTING DRAIN TABLE
- EXISTING SIGN WITH OUTREACH
- EXISTING TRAFFIC LIGHT WITH OUTREACH (TO)
- EXISTING HISTORICAL POINT OF INTEREST (PHIS)
- TREE TRUNK - 1200mm DIA PT11
- TREE TRUNK - 1000mm DIA PT10
- TREE TRUNK - 900mm DIA PT09
- TREE TRUNK - 800mm DIA PT08
- TREE TRUNK - 700mm DIA PT07
- TREE TRUNK - 600mm DIA PT06
- TREE TRUNK - 500mm DIA PT05
- TREE TRUNK - 400mm DIA PT04
- TREE TRUNK - 300mm DIA PT03
- TREE TRUNK - 200mm DIA PT02
- TREE TRUNK - 100mm DIA PT01
- TREE FOLIAGE - 1M SPREAD (PF01)
- TREE FOLIAGE - 2M SPREAD (PF02)
- TREE FOLIAGE - 4M SPREAD (PF03)
- TREE FOLIAGE - 6M SPREAD (PF04)
- TREE FOLIAGE - 7M SPREAD (PF05)
- TREE FOLIAGE - 8M SPREAD (PF06)
- TREE FOLIAGE - 10M SPREAD (PF07)
- TREE FOLIAGE - 12M SPREAD (PF08)
- TREE FOLIAGE - 15M SPREAD (PF09)

ABREVIATIONS

TCS	TRAFFIC CONTROL SIGNAL
DRG	DRAWING(S)
RCP	STEEL REINFORCED CONCRETE PIPE
STD	STANDARD

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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0 1	10.08.2020 06.11.2020	DRAFT ISSUE (DETAILED) PRE-AFC		A. PEREZ A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

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DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LEGEND

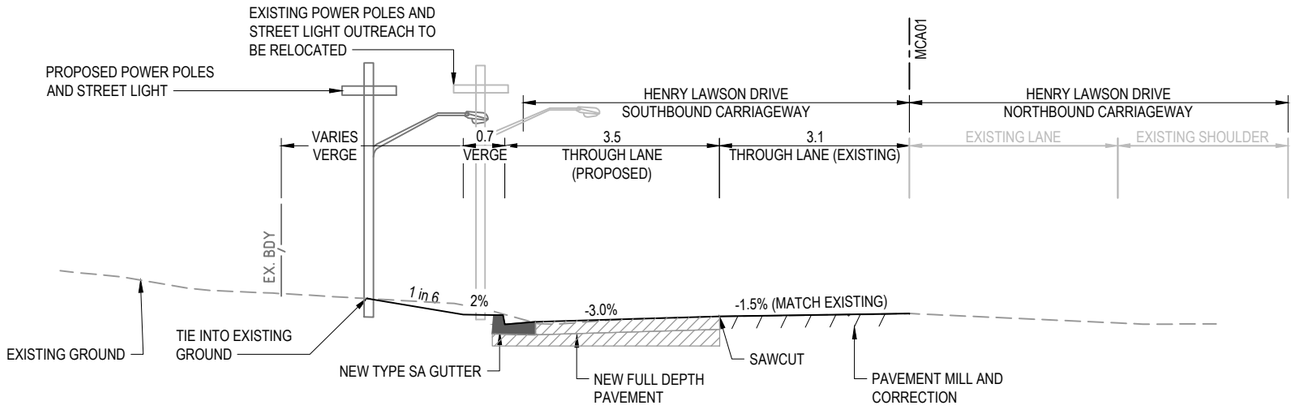
A3

SHEET 1 OF 1

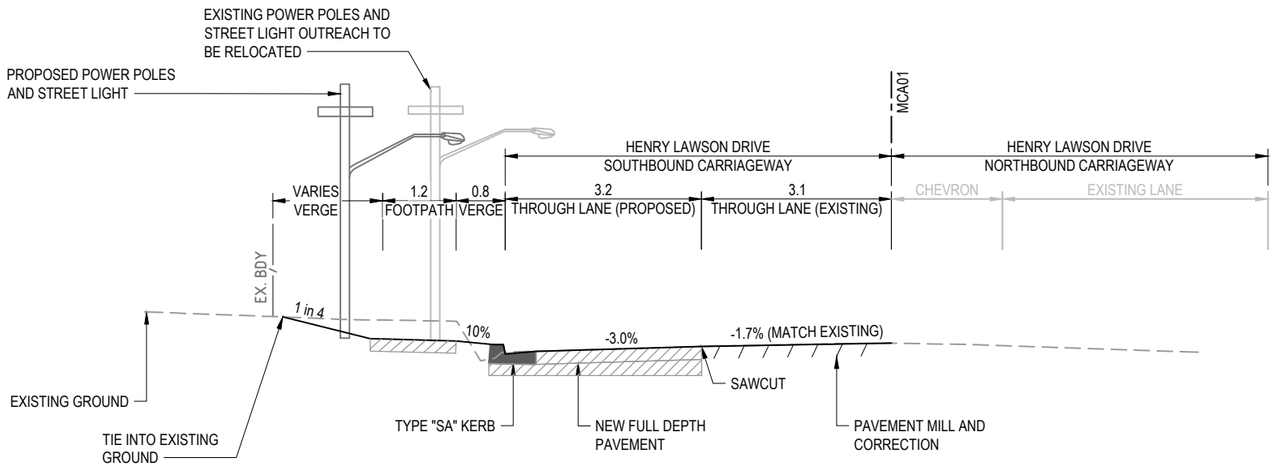
PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-GE-000041	1



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH360 (APPROX.)
SCALE 1:100



TYPICAL SECTION ON HENRY LAWSON DRIVE
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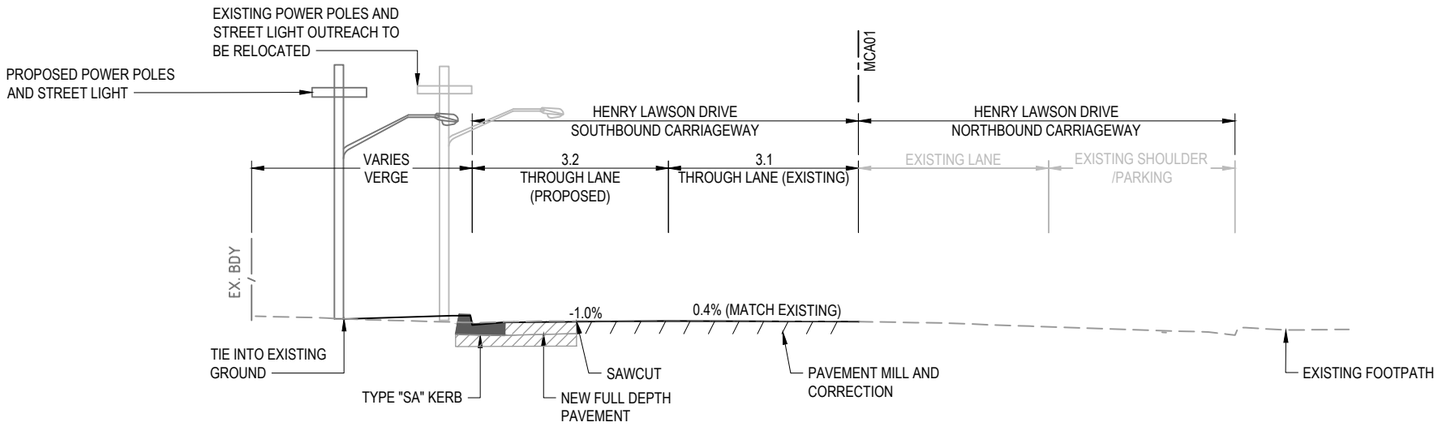
SCALE 1:100



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH40 (APPROX.)
SCALE 1:100

LEGEND

- EXISTING SURFACE
- MILL AND CORRECTION
- NEW PAVEMENT (REFER NOTE 1)

NOTES

1. FOR PAVEMENT PROFILES REFER TO PAVEMENT DRAWINGS PV-000501 TO PV-000502, FOR PAVEMENT DETAILS REFER TO DRAWINGS PV-000521 TO PV-000533.
2. FOR GENERAL NOTES REFER TO DRAWINGS GE-000021 TO GE-000023.
3. FOR CROSS FALL DETAILS ON EXISTING AND PROPOSED ROADS REFER TO CROSS SECTION DRAWINGS RC-005001 TO RC-005012.

CHECK PRINT

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES: -

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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1	06.11.2020	PRE-AFC		

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.5 0 0.5 1 1.5 2m — 1 : 100 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
TYPICAL CROSS SECTIONS

A3
SHEET 1 OF 1

TfNSW REGISTRATION No.: DS2020/000130 PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-GE-000051
ISSUE: 1

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

NOTES

1. FOR MEDIANS, KERB RETURNS, SETOUTS AND TABLES, REFER TO SHEETS RD-001101 TO RD-001201.
2. FOR ALIGNMENT CONTROL SETOUT TABLES, REFER TO SHEET RD-001005.
3. FOR KERB SCHEDULE, REFER TO SHEET RD-001101 TO RD-001103.
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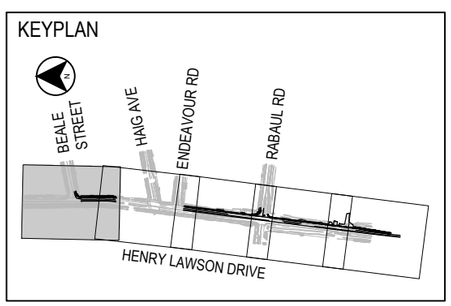

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

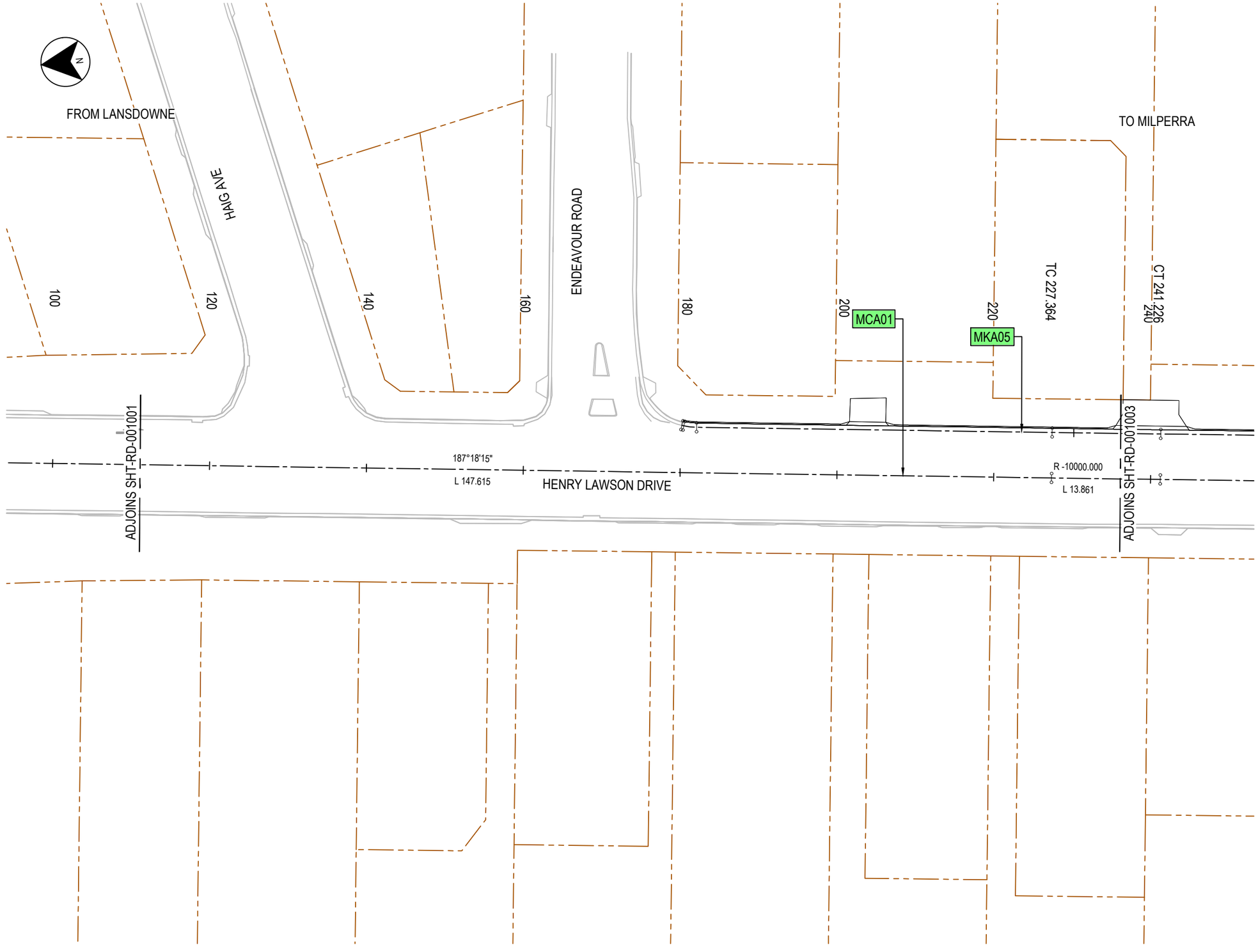
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

A3

SHEET 1 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001001	1



LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

NOTES

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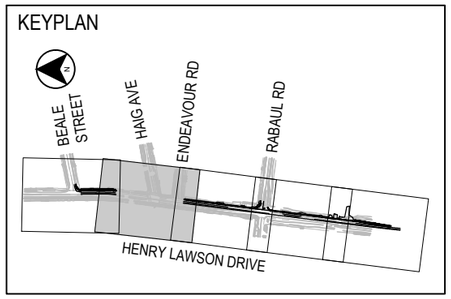
KEYPLAN



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50mm ON A3 SIZE ORIGINAL

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EXTERNAL REFERENCE FILES	

REV	DATE	AMENDMENT / REVISION DESCRIPTION
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1	06.11.2020	PRE-AFC

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DESIGN LOT CODE	-
WVR No.	
APPROVAL	A. PEREZ A.PEREZ
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	-
SCALES ON A3 SIZE DRAWING	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM	MGA ZONE 56
HEIGHT DATUM	AHD
DRAWINGS / DESIGN PREPARED BY	-
PLOT DATE / TIME	23-Nov-20 / 9:25:36 PM
PLOT BY	MEGHWARB

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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

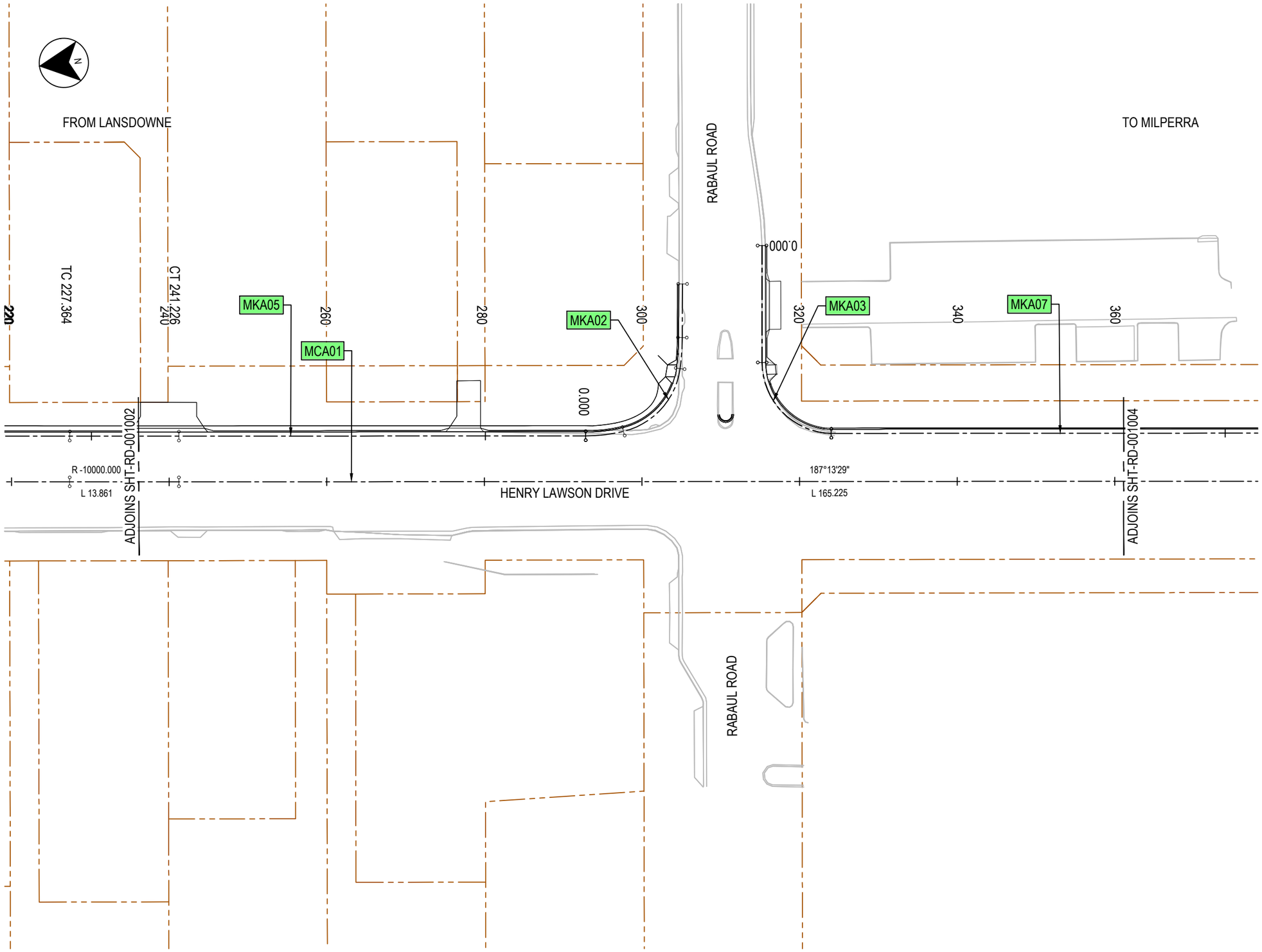
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

A3

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

SHEET 2 OF 5

TfNSW REGISTRATION No. DS2020/000130			PART 1
ISSUE STATUS: DETAILED DESIGN	EDMS No.: -	SHEET No.: SHT-RD-001002	ISSUE 1



LEGEND

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- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

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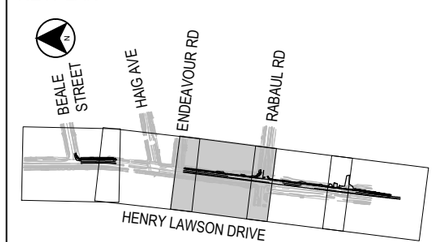
KEYPLAN



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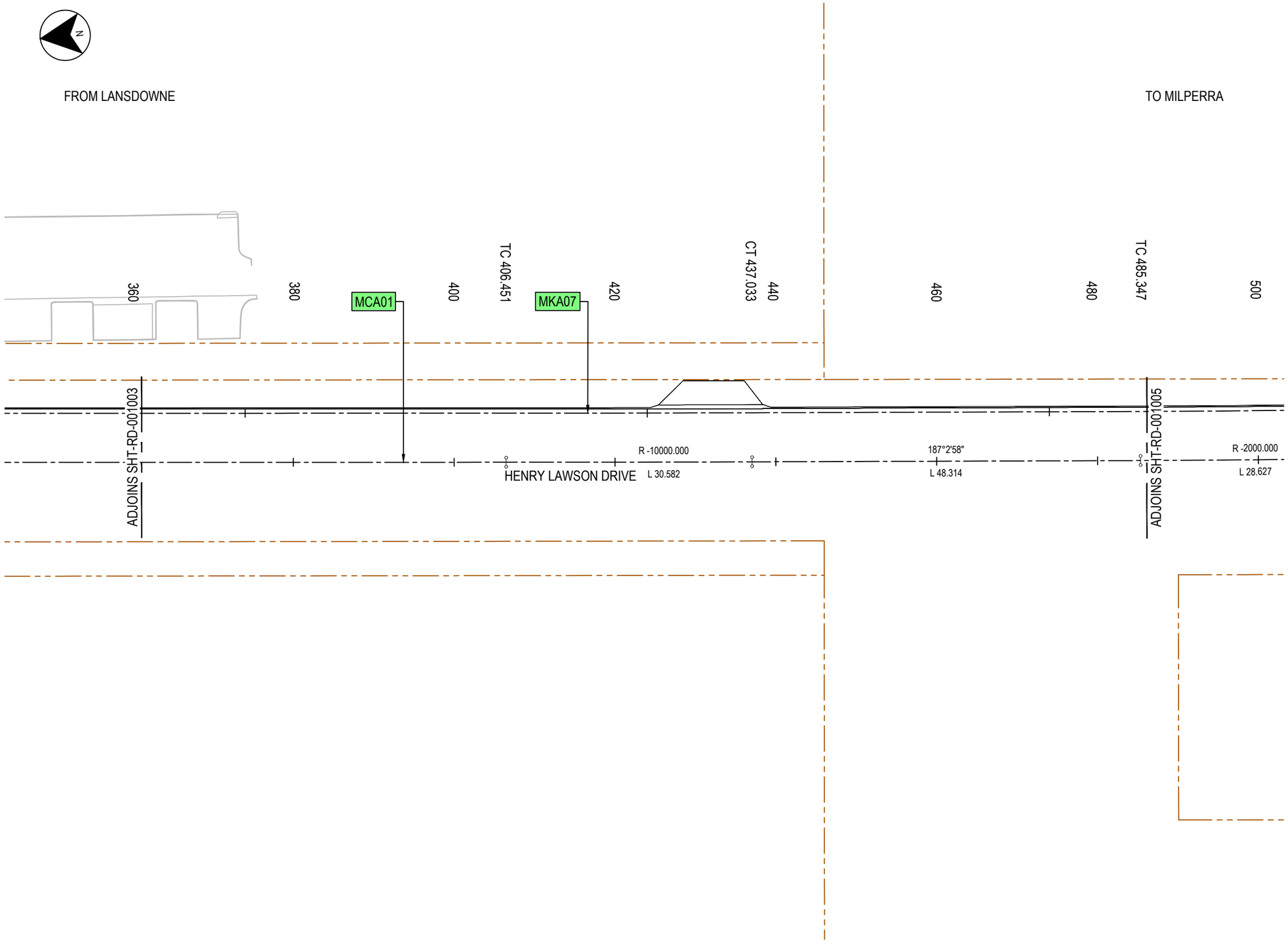

LEGEND

0.000

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- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
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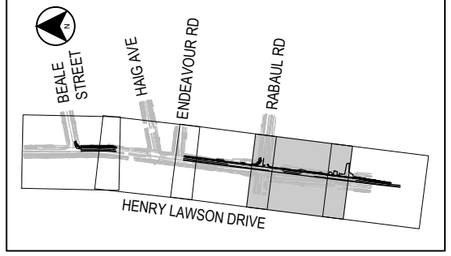

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PLOT DATE / TIME: 23-Nov-20 / 9:21:36 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

A3

SHEET 4 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

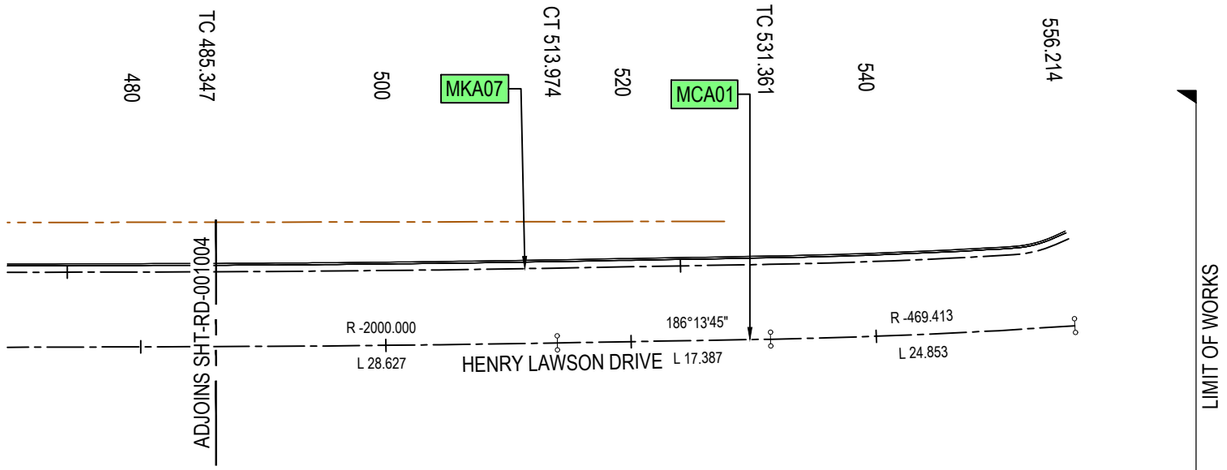
EDMS No.: -

SHEET No.: SHT-RD-001004

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA



LEGEND

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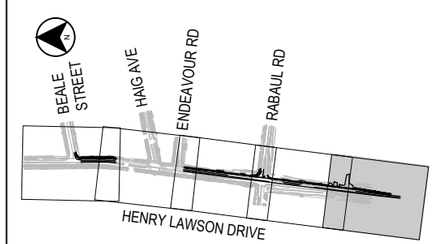
HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MCA01

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312851.611	6245660.076	179°16'40.19"	LINE		
TC	41.226	312852.131	6245618.853	179°16'40.19"	ARC	275.000	38.523
CT	79.749	312849.921	6245580.424	187°18'14.63"	LINE		147.615
TC	227.364	312831.154	6245434.007	187°18'14.63"	ARC	-10000.000	13.861
CT	241.226	312829.402	6245420.257	187°13'28.72"	LINE		165.225
TC	406.451	312808.623	6245256.344	187°13'28.72"	ARC	-10000.000	30.582
CT	437.033	312804.823	6245225.999	187°02'57.91"	LINE		48.314
TC	485.347	312798.894	6245178.050	187°02'57.91"	ARC	-2000.000	28.627
CT	513.974	312795.584	6245149.615	186°13'45.49"	LINE		17.387
TC	531.361	312793.698	6245132.331	186°13'45.49"	ARC	-469.413	24.853
End	556.214	312791.656	6245107.565	183°11'44.92"			

KEYPLAN



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DESIGN LOT CODE: -

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PLOT DATE / TIME: 23-Nov-20 / 9:21:50 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

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DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

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MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

A3

SHEET 5 OF 5

TINSW REGISTRATION No.: DS2020/000130

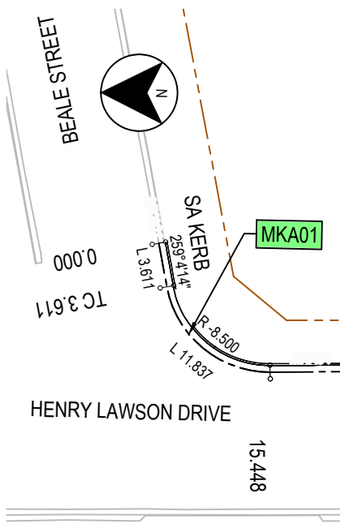
PART: 1

ISSUE STATUS: DETAILED DESIGN

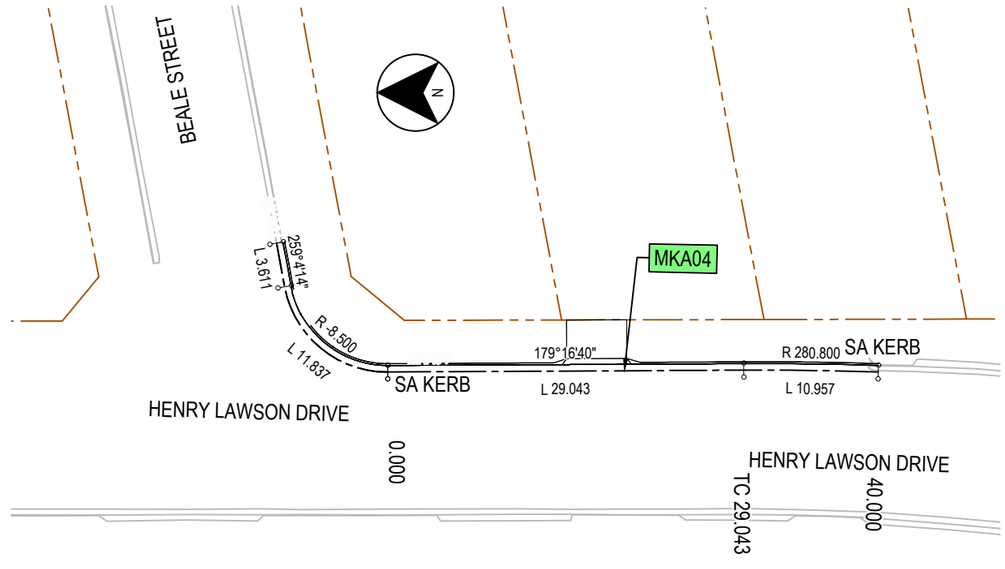
EDMS No.: -

SHEET No.: SHT-RD-001005

ISSUE: 1



CONTROL LINE MKA01
SCALE 1:500



CONTROL LINE MKA04
SCALE 1:500

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA01 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312867.998	6245657.104	259°04'13.99"	LINE		
TC	3.611	312864.452	6245656.420	259°04'13.99"	ARC	-8.500	11.837
End	15.448	312857.565	6245647.967	179°16'40.19"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA04 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312857.565	6245647.967	179°16'40.19"	LINE		
TC	29.043	312857.931	6245618.926	179°16'40.19"	ARC	280.800	10.957
End	40.000	312857.855	6245607.970	181°30'48.55"			

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
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DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

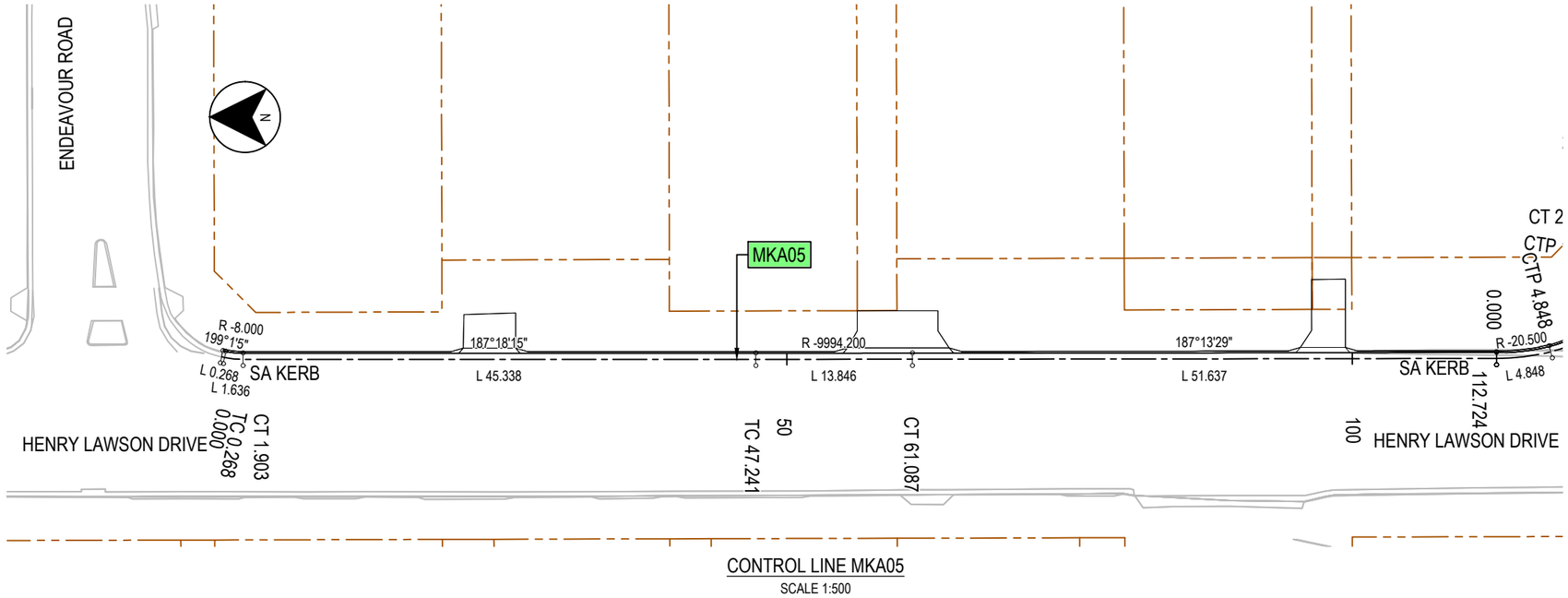
CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

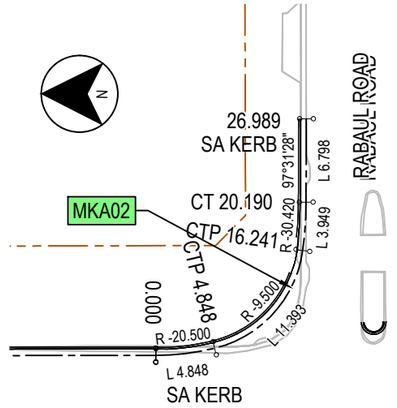
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
KERB CONTOL PLANS AND SET-OUT TABLES

A3
SHEET 1 OF 3

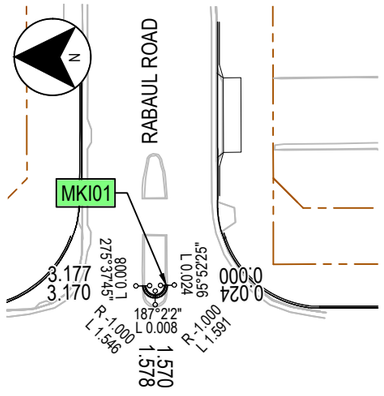
TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RD-001101
ISSUE: 1



CONTROL LINE MKA05
SCALE 1:500



CONTROL LINE MKA02
SCALE 1:500



CONTROL LINE MKI01
SCALE 1:500

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA05 - KERB TYPE - SA

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312843.130	6245480.083	199°01'05.09"	LINE		
TC	0.268	312843.043	6245479.830	199°01'05.09"	ARC	-8.000	1.636
CT	1.903	312842.671	6245478.240	187°18'14.63"	LINE		45.338
TC	47.241	312836.907	6245433.270	187°18'14.63"	ARC	-9994.200	13.846
CT	61.087	312835.157	6245419.535	187°13'28.87"	LINE		51.637
End	112.724	312828.663	6245368.308	187°13'28.87"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKI01 - KERB TYPE - SM

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312829.198	6245351.352	275°37'44.82"	LINE		
TC	0.024	312829.174	6245351.355	275°37'44.82"	ARC	-1.000	1.546
CT	1.570	312828.083	6245350.482	187°02'01.58"	LINE		0.008
TC	1.578	312828.082	6245350.474	187°02'01.58"	ARC	-1.000	1.591
CT	3.170	312828.973	6245349.357	95°52'24.79"	LINE		0.008
End	3.177	312828.980	6245349.356	95°52'24.79"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA02 - KERB TYPE - SA

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312828.663	6245368.308	187°13'28.72"	ARC		
CC	4.848	312828.625	6245363.471	173°40'25.71"	ARC	-9.500	11.393
CC	16.241	312835.614	6245355.340	104°57'45.75"	ARC	-30.420	3.949
CT	20.190	312839.485	6245354.571	97°31'28.11"	LINE		6.798
End	26.989	312846.225	6245353.681	97°31'28.11"			

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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	PRELIM. INITIAL	FINAL DATE
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DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

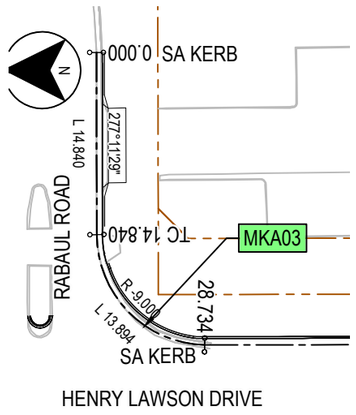
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
KERB CONTOL PLANS AND SET-OUT TABLES

A3
SHEET 2 OF 3

TINSW REGISTRATION No.: DS2020/000130
PART: 1

ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RD-001102
ISSUE: 1



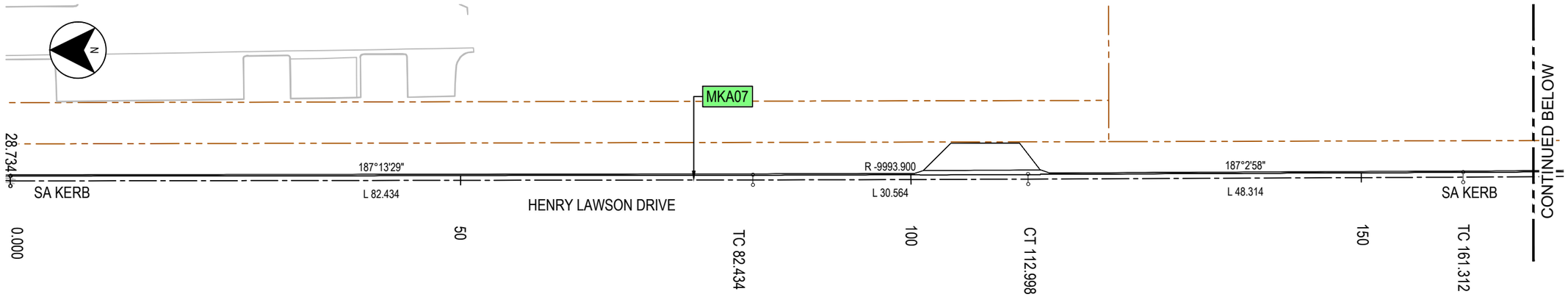
HENRY LAWSON DRIVE

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA03 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312849.787	6245343.061	277°11'29.17"	LINE		
TC	14.840	312835.064	6245344.919	277°11'29.17"	ARC	-9.000	13.894
End	28.734	312825.042	6245337.357	188°44'12.35"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA07 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312825.041	6245337.357	187°13'28.72"	LINE		
TC	82.434	312814.675	6245255.577	187°13'28.72"	ARC	-9993.900	30.564
CT	112.998	312810.877	6245225.250	187°02'57.91"	LINE		48.314
TC	161.312	312804.948	6245177.301	187°02'57.91"	ARC	-1993.900	28.540
CT	189.852	312801.648	6245148.953	186°13'45.49"	LINE		17.387
TC	207.238	312799.762	6245131.669	186°13'45.49"	ARC	-463.313	19.948
CC	227.186	312798.025	6245111.799	183°45'44.90"	ARC	-10.000	3.548
CT	230.734	312798.418	6245108.292	163°26'07.84"	LINE		1.171
End	231.905	312798.752	6245107.169	163°26'07.84"			

CONTROL LINE MKA03

SCALE 1:500



CONTROL LINE MKA07

SCALE 1:500

CONTROL LINE MKA07 DONTINUED

SCALE 1:500

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PLOT BY: MEGHWARB

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	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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	PRELIM. INITIAL	FINAL DATE
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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

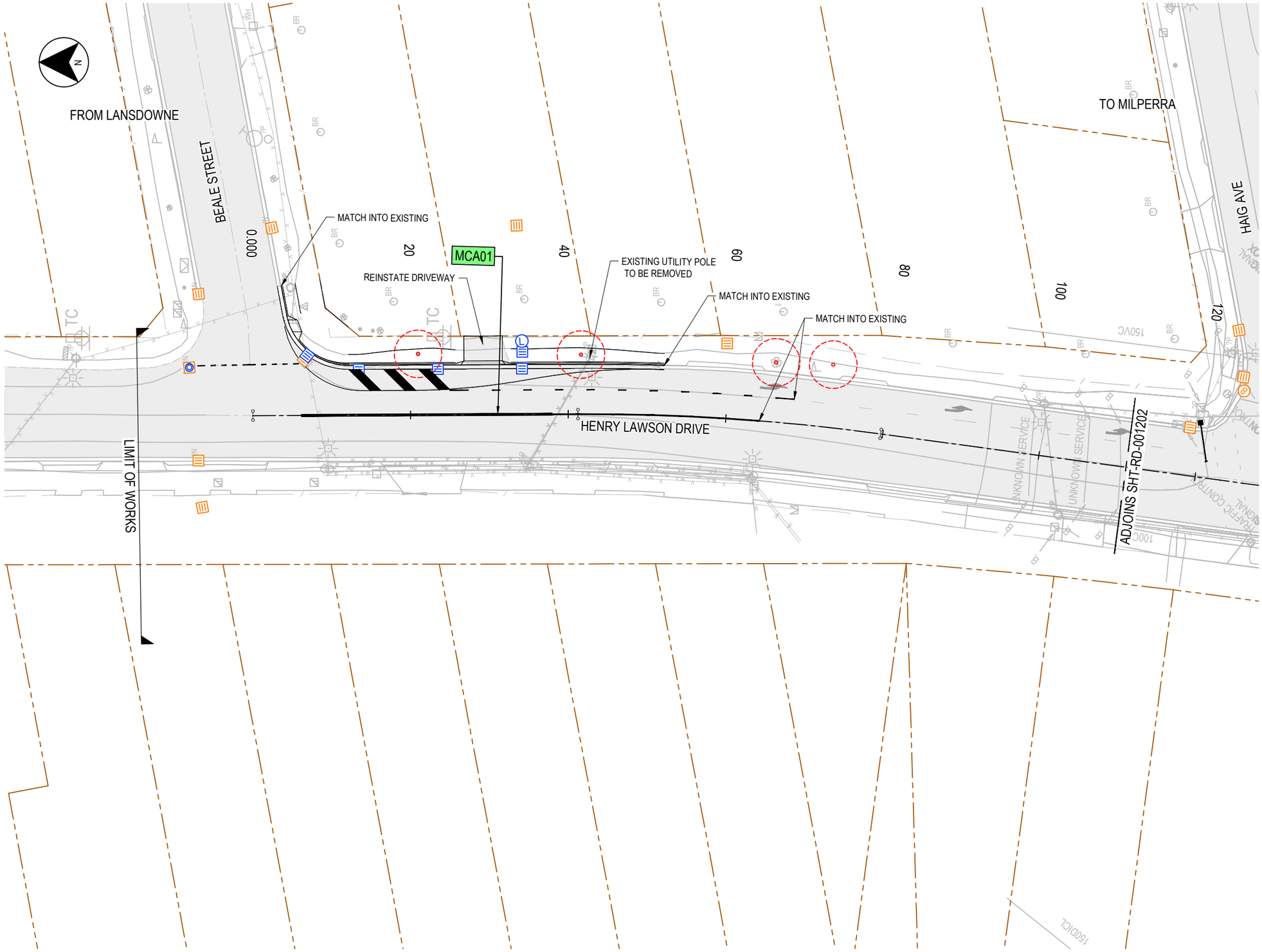
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
KERB CONTOL PLANS AND SET-OUT TABLES

A3

SHEET 3 OF 3

TfNSW REGISTRATION No.: DS2020/000130 PART: 1

ISSUE STATUS: DETAILED DESIGN EDMS No.: - SHEET No.: SHT-RD-001103 ISSUE: 1



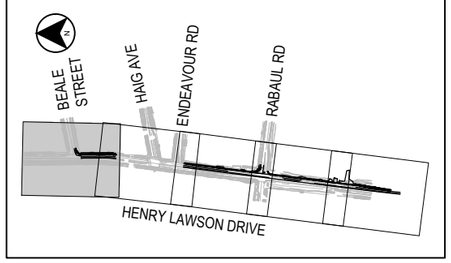
LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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PLOT DATE / TIME: 23-Nov-20 / 9:28:17 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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CLIENT: NSW GOVERNMENT Transport for NSW

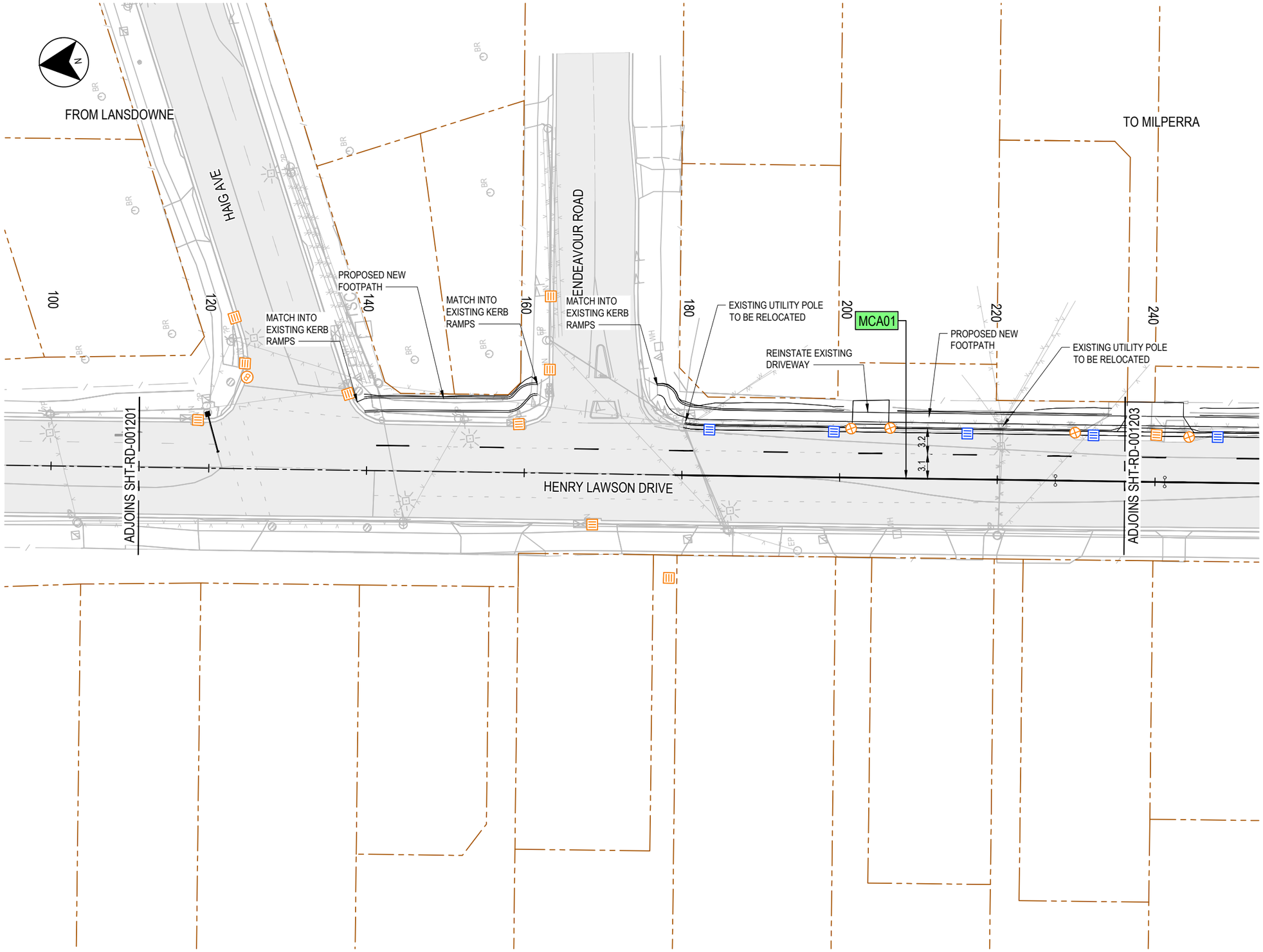
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3
SHEET 1 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001201	1



LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
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- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

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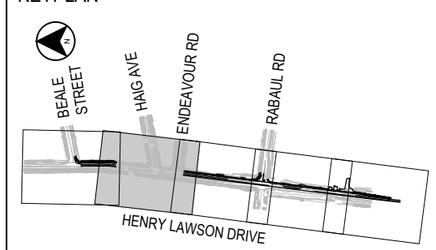
KEYPLAN



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	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

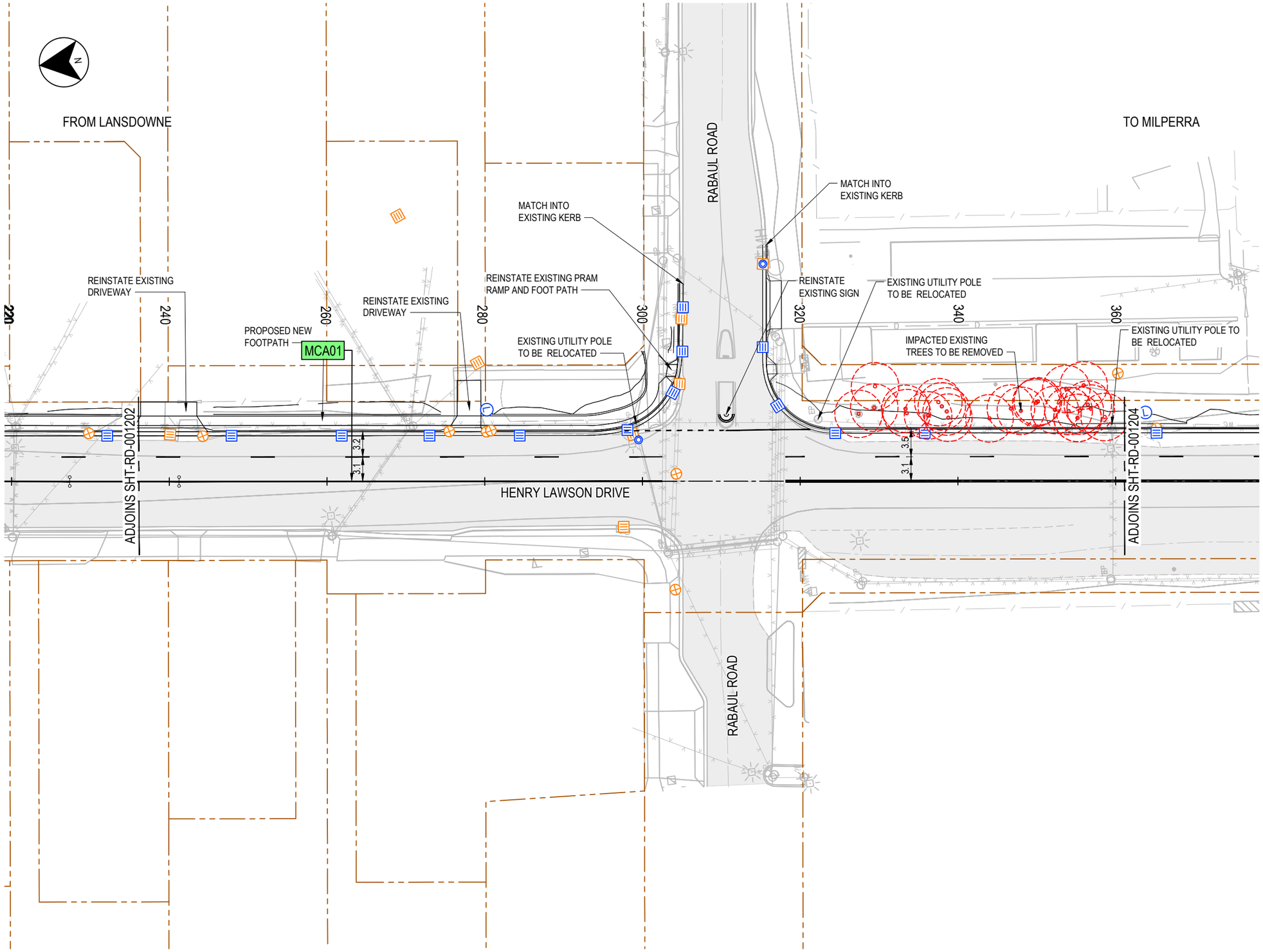
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL GENERAL ARRANGEMENT PLAN

A3

SHEET 2 OF 5

TINSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RD-001202 / 1



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
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- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
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NOTES

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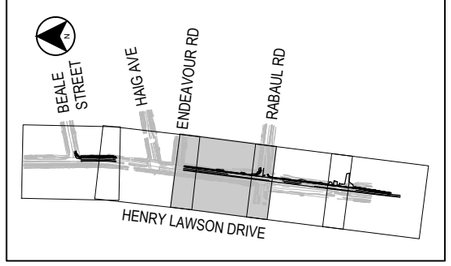
KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3

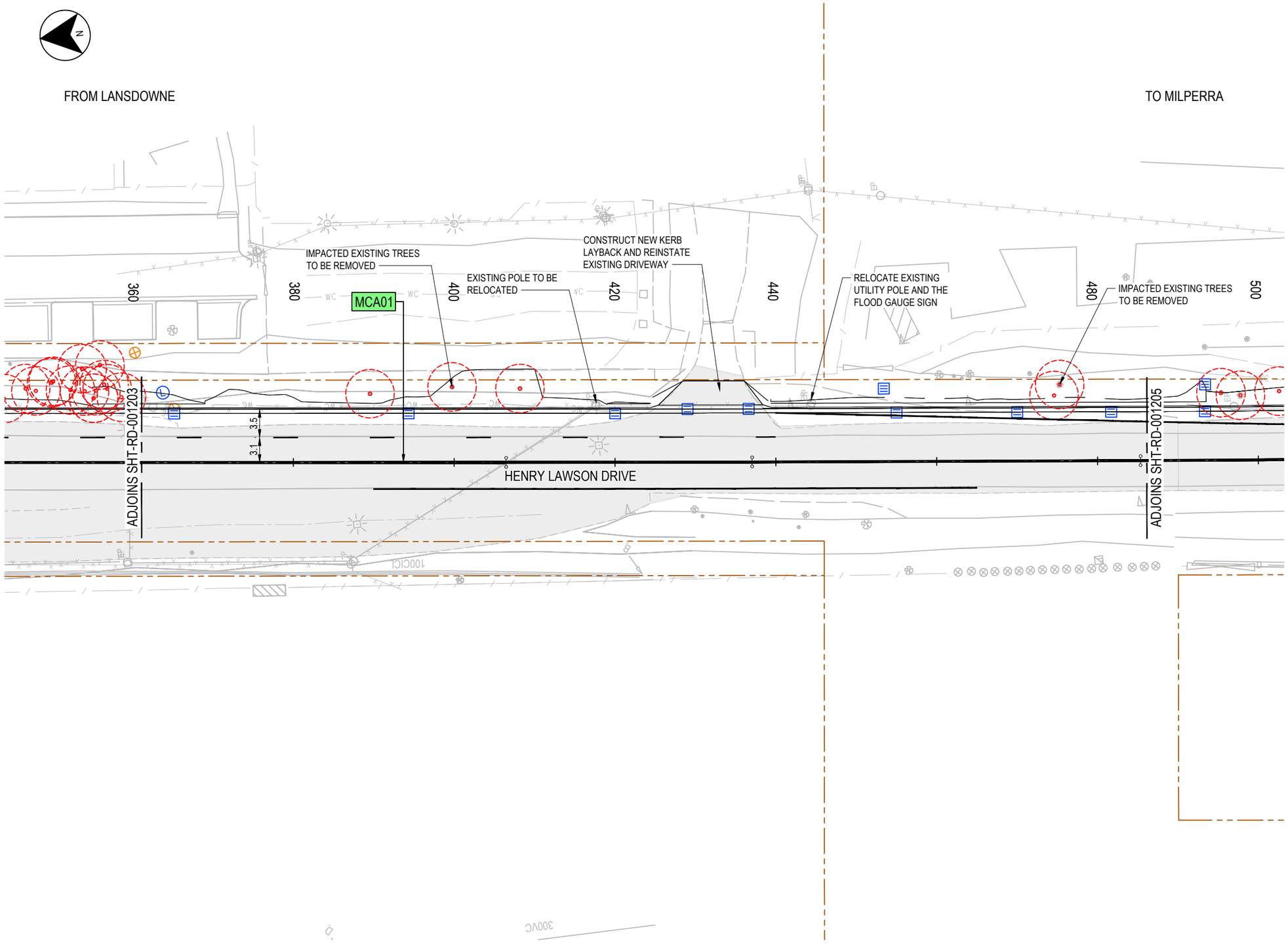
SHEET 3 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001203	1

FROM LANSDOWNE

TO MILPERRA



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
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NOTES

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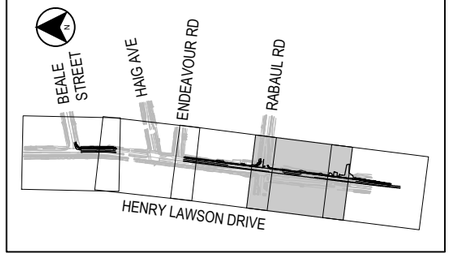
KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:27:31 PM	MEGHWARB

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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

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MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

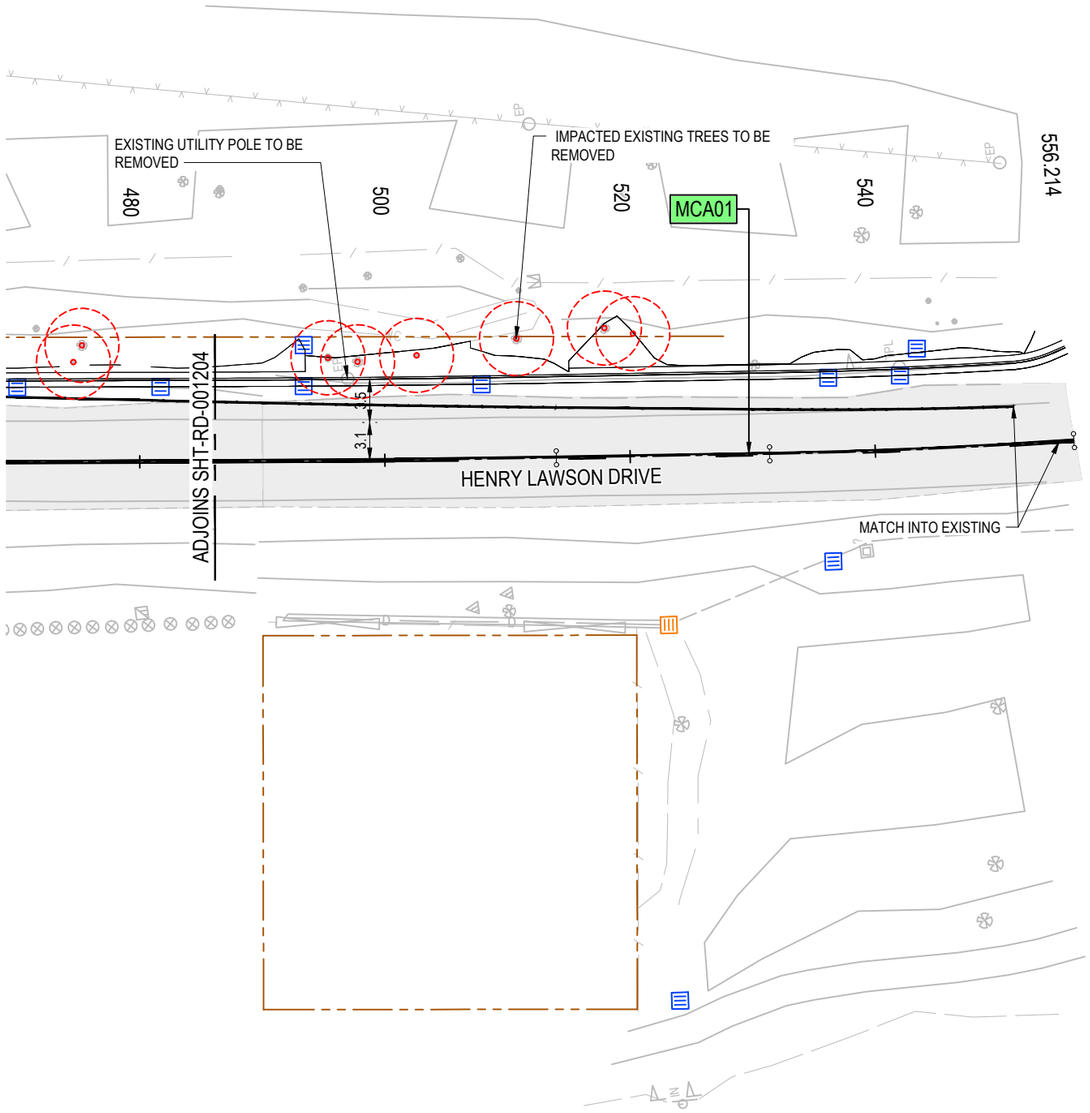
A3

SHEET 4 OF 5

TINSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001204	1

FROM LANSDOWNE

TO MILPERRA



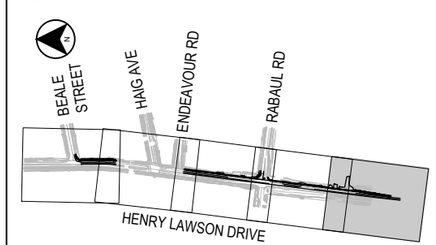
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:27:46 PM	MEGHWARB

CHECK PRINT — PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RD-001205 / 1

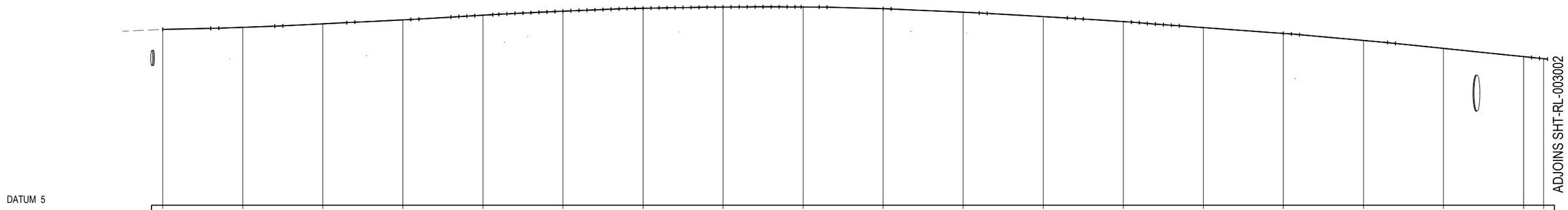
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS

	EXISTING	NEW	ABANDONED
UTILITY (COMMS)	C	C	C
UTILITY (ELECTRICAL)	E	E	E
UTILITY (GAS)	G	G	G
UTILITY (SEWER)	S	S	S
UTILITY (WATER)	W	W	W
UTILITY (STORMWATER INVERT)	D	D	D

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



DATUM 5

VERTICAL GEOMETRY	MATCH EXISTING SURFACE																		
HORIZONTAL GEOMETRY		L=41.226			R=275.000					L=147.615									
DESIGN LEVELS	MATCH EXISTING SURFACE																		
EXISTING LEVELS	9.380	9.429	9.516	9.615	9.731	9.832	9.904	9.934	9.937	9.895	9.806	9.697	9.572	9.425	9.279	9.103	8.905	8.699	8.647
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	172.500

HENRY LAWSON DRIVE - MCA01
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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PLOT DATE / TIME: 23-Nov-20 / 9:24:55 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LONGITUDINAL SECTION - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 1 OF 4

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RL-003001	1

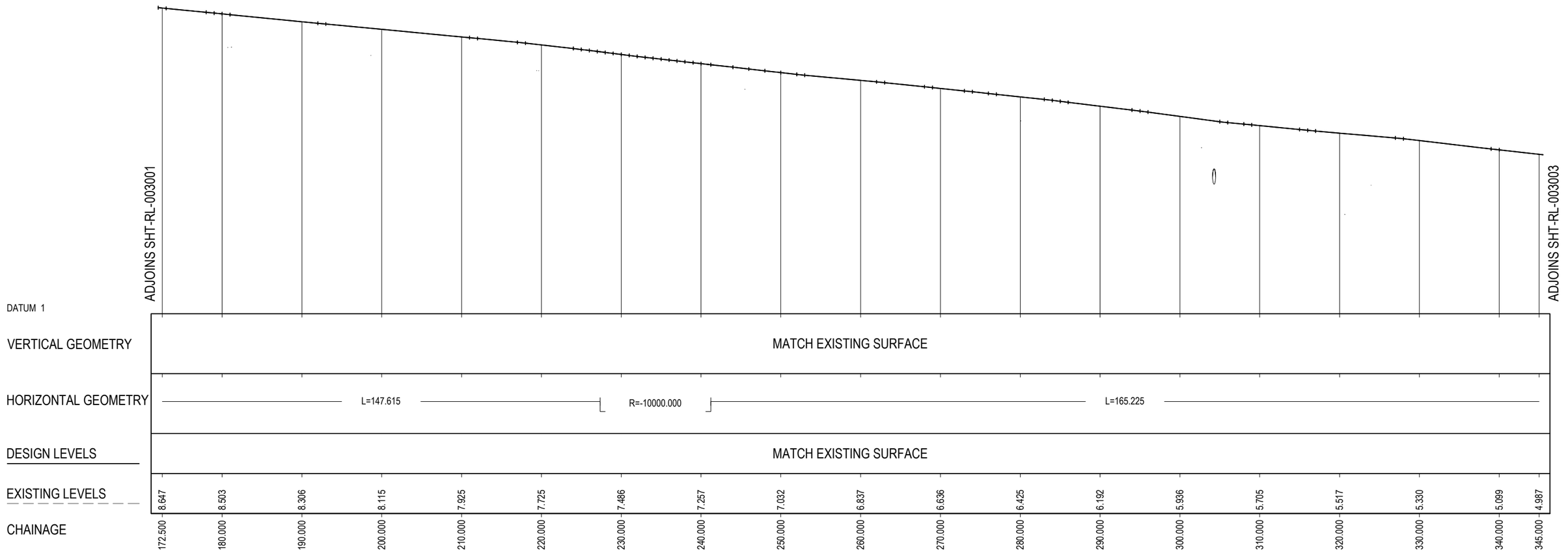
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS

	EXISTING	NEW	ABANDONED
UTILITY (COMMS)	C	C	C
UTILITY (ELECTRICAL)	E	E	E
UTILITY (GAS)	G	G	G
UTILITY (SEWER)	S	S	S
UTILITY (WATER)	W	W	W
UTILITY (STORMWATER INVERT)	D	D	D

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



HENRY LAWSON DRIVE - MCA01
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
LONGITUDINAL SECTION - MCA01
HENRY LAWSON DRIVE

A3
SHEET 2 OF 4

TfNSW REGISTRATION No.: DS2020/000130
PART: 1

ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RL-003002
ISSUE: 1

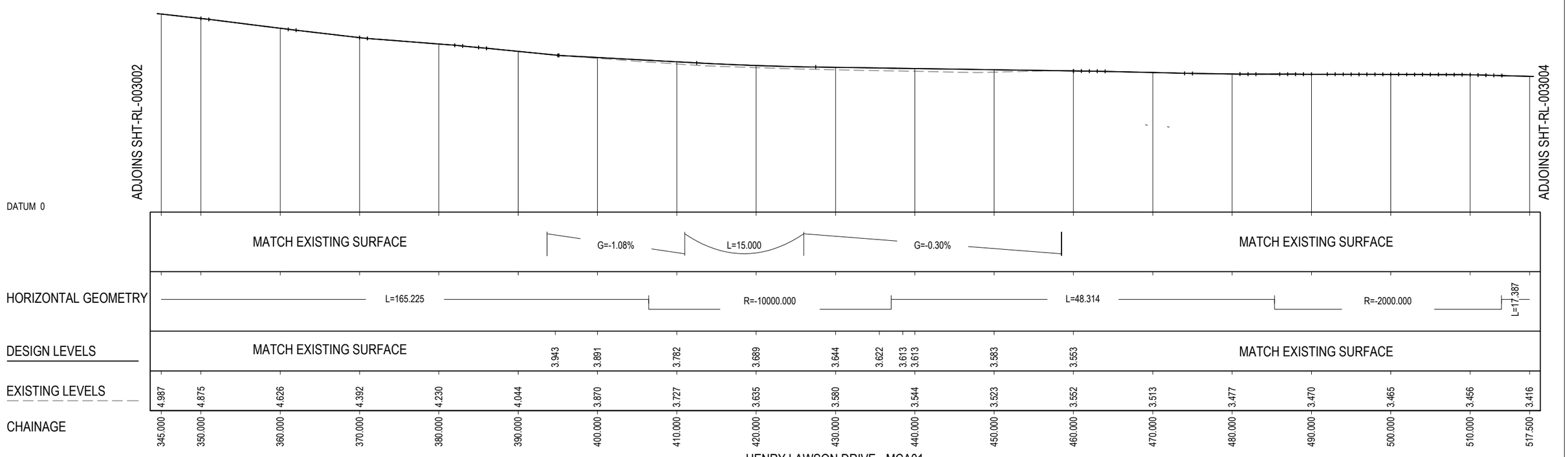
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS

EXISTING	NEW	ABANDONED	
C	C	C	UTILITY (COMMS)
E	E	E	UTILITY (ELECTRICAL)
G	G	G	UTILITY (GAS)
S	S	S	UTILITY (SEWER)
W	W	W	UTILITY (WATER)
D	D	D	UTILITY (STORMWATER INVERT)

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



HENRY LAWSON DRIVE - MCA01
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LONGITUDINAL SECTION - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 3 OF 4

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RL-003003 | ISSUE 1

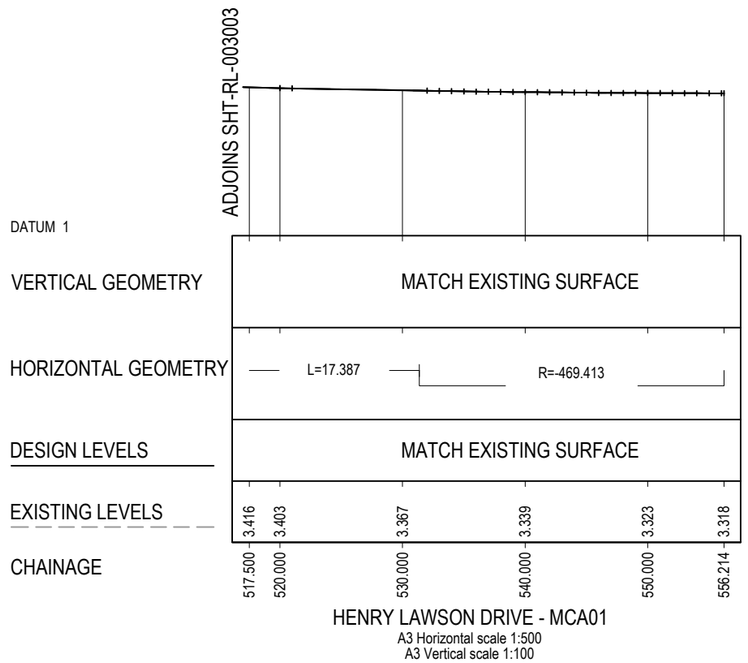
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS

	EXISTING	NEW	ABANDONED
UTILITY (COMMS)	C	C	C
UTILITY (ELECTRICAL)	E	E	E
UTILITY (GAS)	G	G	G
UTILITY (SEWER)	S	S	S
UTILITY (WATER)	W	W	W
UTILITY (STORMWATER INVERT)	D	D	D

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



HENRY LAWSON DRIVE - MCA01
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m)	
	1	06.11.2020	PRE-AFC		A.PEREZ	VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m) FULL SIZE A3	
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

PLOT DATE / TIME: 23-Nov-20 / 9:10:09 PM	PLOT BY: MEGHWARB		
CHECK PRINT	PRELIM. INITIAL	FINAL DATE	
DISCIPLINE			
DISCIPLINE			
DISCIPLINE			
DISCIPLINE			
BACKDRAFTED/CORRECTED			
CONFIRMED			

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LONGITUDINAL SECTION - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 4 OF 4

TINSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RL-003004	1

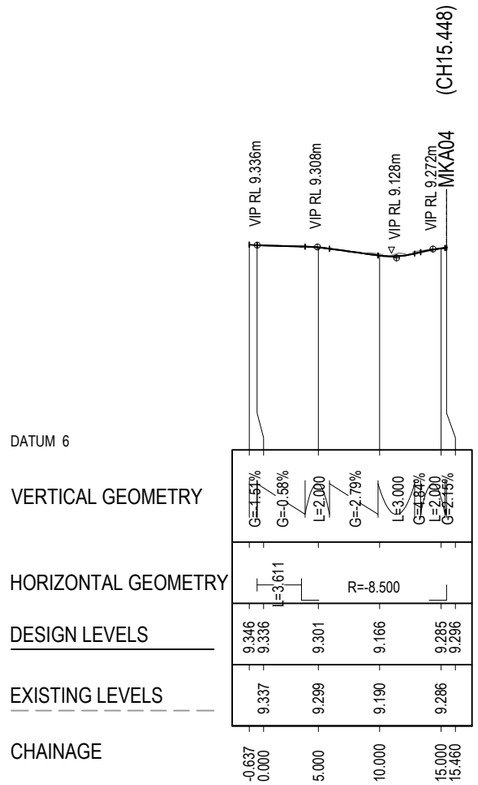
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

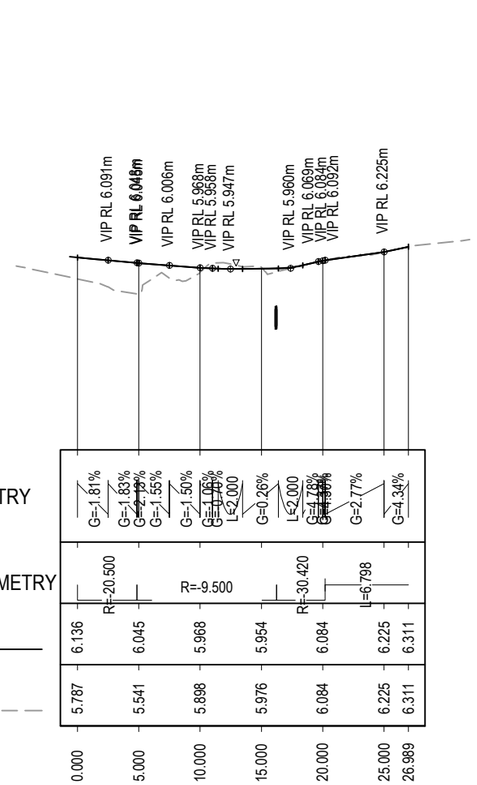
EXISTING / NEW / ABANDONED

NOTES

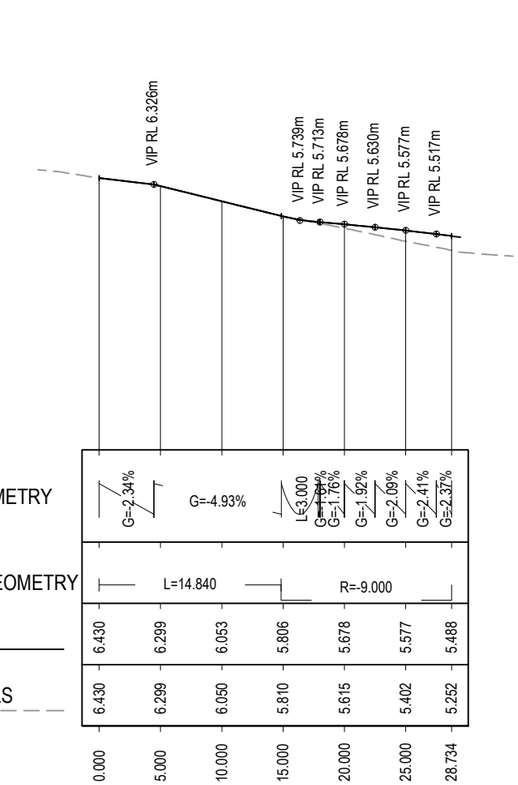
1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



BEALE ST. - HENRY LAWSON DRIVE - MKA01
A3 Horizontal scale 1:500
A3 Vertical scale 1:100



HENRY LAWSON DRIVE - RABAUL ROAD - MKA02
A3 Horizontal scale 1:500
A3 Vertical scale 1:100



RABAUL ROAD - HENRY LAWSON DRIVE - MKA03
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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PLOT DATE / TIME: 23-Nov-20 / 9:01:55 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING
HORZ. 1 : 500
2.5 0 2.5 5 7.5 10 12.5m
0.5 0 0.5 1 1.5 2 2.5m
VERT. 1 : 100 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
A3
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LONGITUDINAL SECTION - KERB CONTROL
MKA01, MKA02 & MKA03
SHEET 1 OF 5

TfNSW REGISTRATION No. DS2020/000130
PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RL-003501	0

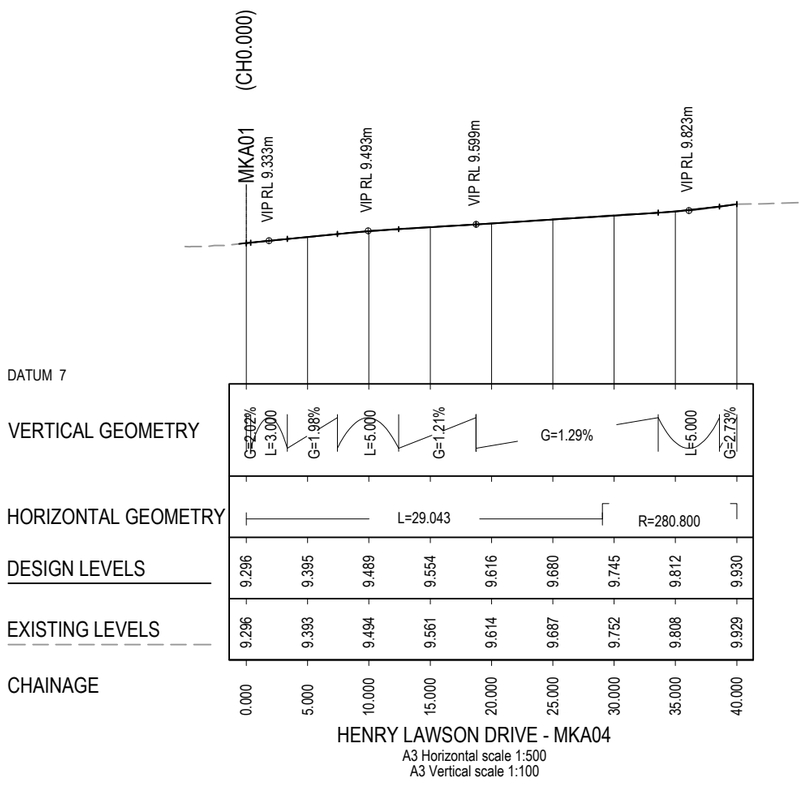
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS

	EXISTING	NEW	ABANDONED
UTILITY (COMMS)	C	C	C
UTILITY (ELECTRICAL)	E	E	E
UTILITY (GAS)	G	G	G
UTILITY (SEWER)	S	S	S
UTILITY (WATER)	W	W	W
UTILITY (STORMWATER INVERT)	D	D	D

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



HENRY LAWSON DRIVE - MKA04
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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PLOT DATE / TIME: 23-Nov-20 / 9:02:05 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING
HORZ. 1 : 500
2.5 0 2.5 5 7.5 10 12.5m
0.5 0 0.5 1 1.5 2 2.5m
VERT. 1 : 100 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
LONGITUDINAL SECTION - KERB CONTROL
MKA04

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-RL-003502

ISSUE: 0

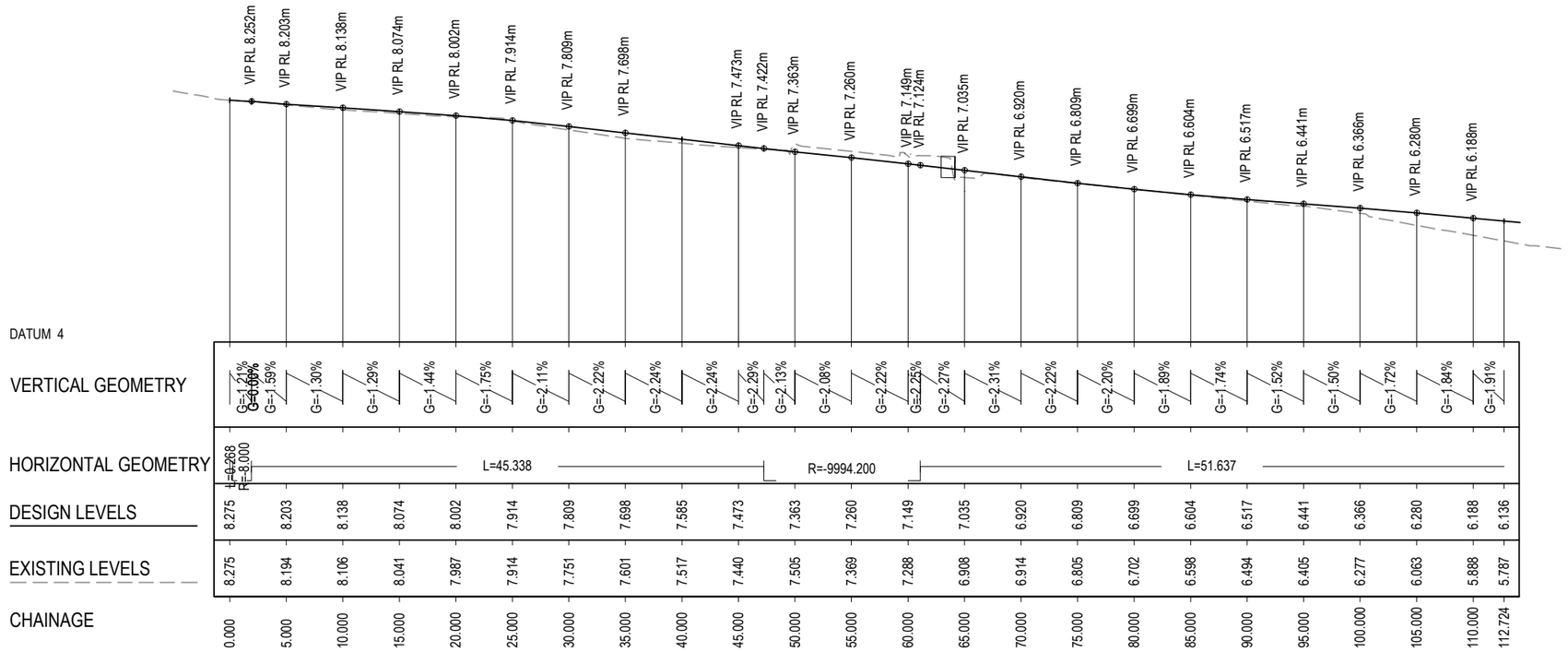
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

EXISTING / NEW / ABANDONED

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



HENRY LAWSON DRIVE - MKA05
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION
	0	10.08.2020	PRE-AFC

REVISION IN PROGRESS

WVR No. | APPROVAL: A. PEREZ

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
LONGITUDINAL SECTION - KERB CONTROL
MKA05

A3 | SHEET 3 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RL-003503 | ISSUE: 0

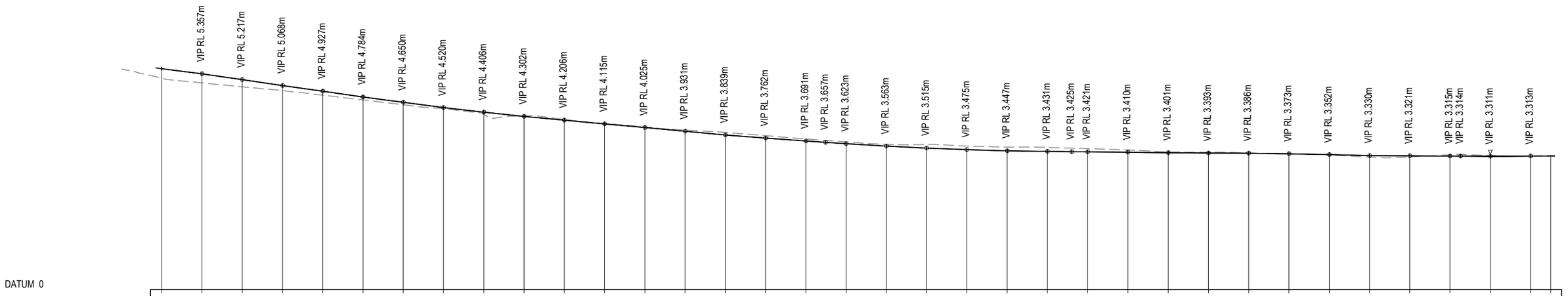
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

EXISTING / NEW / ABANDONED

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



HENRY LAWSON DRIVE - MKA07

A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

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PLOT DATE / TIME: 23-Nov-20 / 9:01:30 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

A3

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LONGITUDINAL SECTION - KERB CONTROL

MCA07 SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RL-003504	0

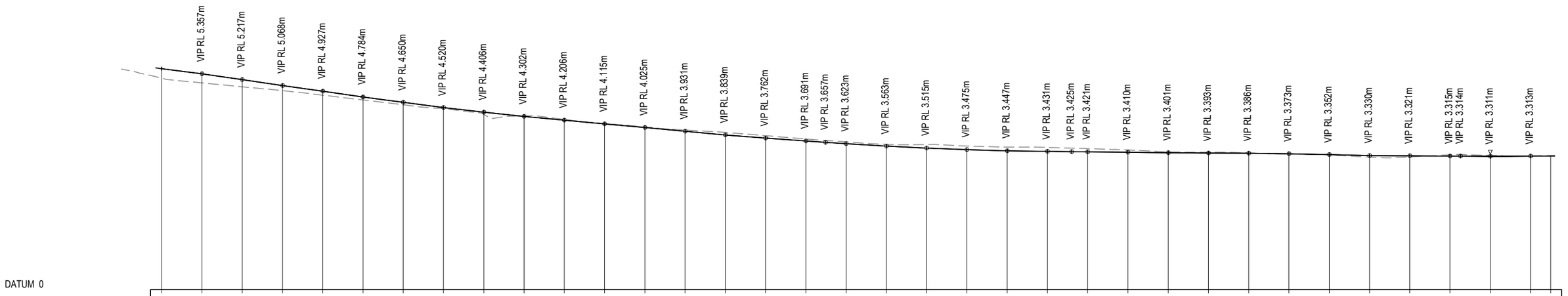
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

EXISTING / NEW / ABANDONED

NOTES

1. CIVIL LONGITUDINAL SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



CHAINAGE	DESIGN LEVEL	EXISTING LEVEL	VERTICAL GEOMETRY
0.000	5.488	5.252	G=2.61%
5.000	5.357	5.133	G=2.82%
10.000	5.217	5.037	G=2.97%
15.000	5.068	4.941	G=2.81%
20.000	4.927	4.829	G=2.86%
25.000	4.784	4.711	G=2.69%
30.000	4.650	4.589	G=2.60%
35.000	4.520	4.501	G=2.27%
40.000	4.406	4.351	G=2.08%
45.000	4.302	4.314	G=1.93%
50.000	4.206	4.227	G=1.82%
55.000	4.115	4.126	G=1.79%
60.000	4.025	4.039	G=1.88%
65.000	3.931	3.963	G=1.84%
70.000	3.839	3.903	G=1.53%
75.000	3.762	3.823	G=1.42%
80.000	3.691	3.742	G=1.40%
85.000	3.623	3.668	G=1.33%
90.000	3.563	3.605	G=1.20%
95.000	3.515	3.603	G=0.96%
100.000	3.475	3.566	G=0.80%
105.000	3.447	3.540	G=0.57%
110.000	3.431	3.531	G=0.31%
115.000	3.421	3.500	G=0.21%
120.000	3.410	3.467	G=0.19%
125.000	3.401	3.418	G=0.22%
130.000	3.393	3.411	G=0.20%
135.000	3.386	3.394	G=0.16%
140.000	3.373	3.363	G=0.13%
145.000	3.352	3.344	G=0.26%
150.000	3.330	3.293	G=0.43%
155.000	3.321	3.295	G=0.45%
160.000	3.315	3.347	G=0.17%
165.000	3.311	3.333	G=0.12%
170.000	3.313	3.321	G=0.09%
172.500	3.317	3.331	G=0.08%
			G=0.04%
			G=0.13%

HENRY LAWSON DRIVE - MKA07
A3 Horizontal scale 1:500
A3 Vertical scale 1:100

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RL-003505.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:01:43 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. (INITIAL / DATE) — FINAL (INITIAL / DATE)

	PRELIM. INITIAL	PRELIM. DATE	FINAL INITIAL	FINAL DATE
DISCIPLINE				
DISCIPLINE				
DISCIPLINE				
DISCIPLINE				
BACKDRAFTED/CORRECTED				
CONFIRMED				

CLIENT: NSW GOVERNMENT Transport for NSW

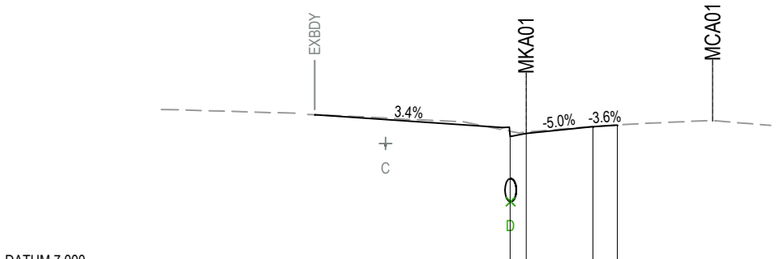
PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
LONGITUDINAL SECTION - KERB CONTROL
MCA07

A3
SHEET 5 OF 5

TINSW REGISTRATION No. DS2020/000130
PART 1

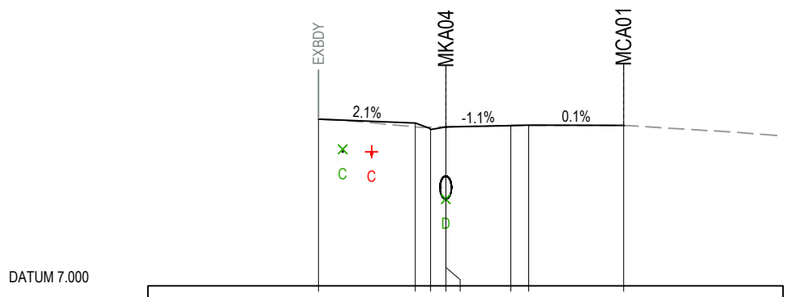
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RL-003505	0



DATUM 7.000

CUT STRINGS	EV2L	EV1L	LKL	NJR
DESIGN LEVELS		9.172 9.219	9.329	9.358
EXISTING LEVELS		9.256 9.244	9.333	9.358
DESIGN OFFSETS		-6.604 -6.085	-3.902	-3.109

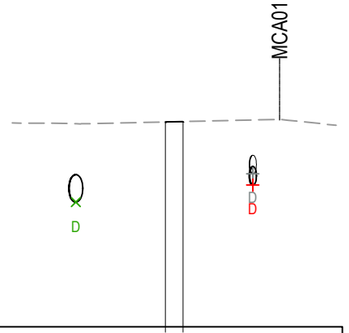
CH 10.000



DATUM 7.000

CUT STRINGS		CEL	LKL L3L		NJR
DESIGN LEVELS	9.718	9.651 9.548 9.588 9.588	9.612 9.619		9.615
EXISTING LEVELS		9.592 9.585 9.590 9.590	9.617 9.616		9.615
DESIGN OFFSETS	-9.955	-6.800 -6.300 -5.800 -5.800	-3.678 -3.100		0.000

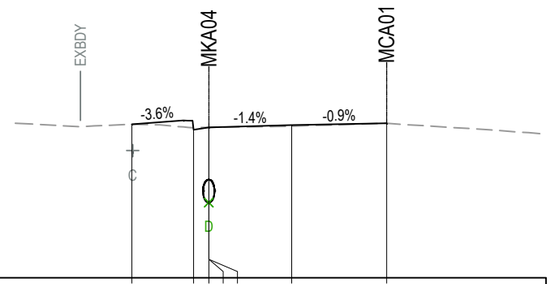
CH 30.000



DATUM 6.000

CUT STRINGS	NJR	NJR
DESIGN LEVELS	9.338	9.345
EXISTING LEVELS	9.338	9.345
DESIGN OFFSETS	-3.724	-3.153

CH 0.000



DATUM 7.000

CUT STRINGS	IAL	EVL CEL		LKL	NJR
DESIGN LEVELS	9.502	9.411 9.451 9.451 9.451		9.488	9.516
EXISTING LEVELS	9.502	9.447 9.451 9.451 9.451		9.471	9.516
DESIGN OFFSETS	-8.312	-6.300 -5.800 -5.800 -5.800		-3.100	0.000

CH 20.000

LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

EXISTING / NEW / ABANDONED

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005001.DWG			DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No. / APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)	A. PEREZ
	1	06.11.2020	PRE-AFC	A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:24:32 PM | PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

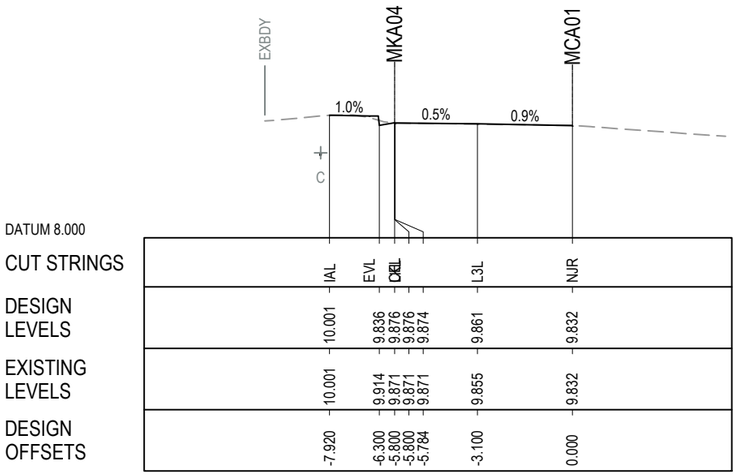
PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE — SHEET 1 OF 14

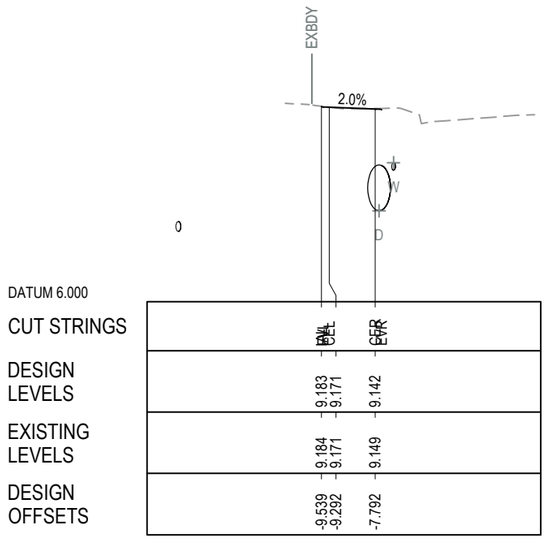
A3

TINSW REGISTRATION No. DS2020/000130 | PART 1

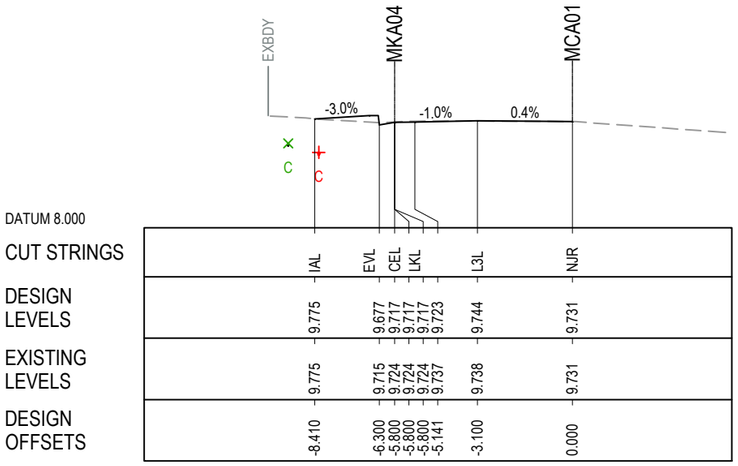
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005001	1



CH 50.000



CH 150.000



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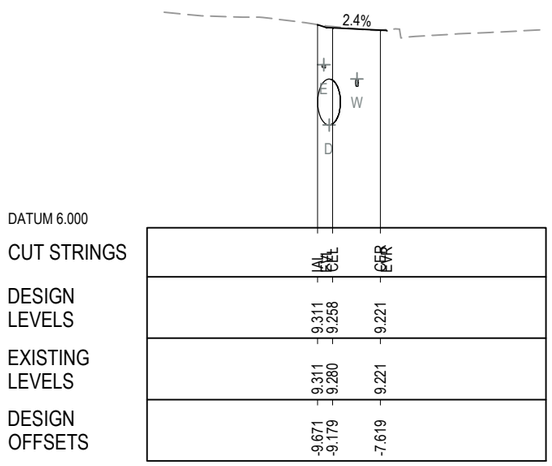


CH 140.000

LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005002.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	HORZ. 1 : 200 (1 0 1 2 3 4 5m) VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m) FULL SIZE A3	-
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD	

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:11:32 PM	MEGHWARB

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

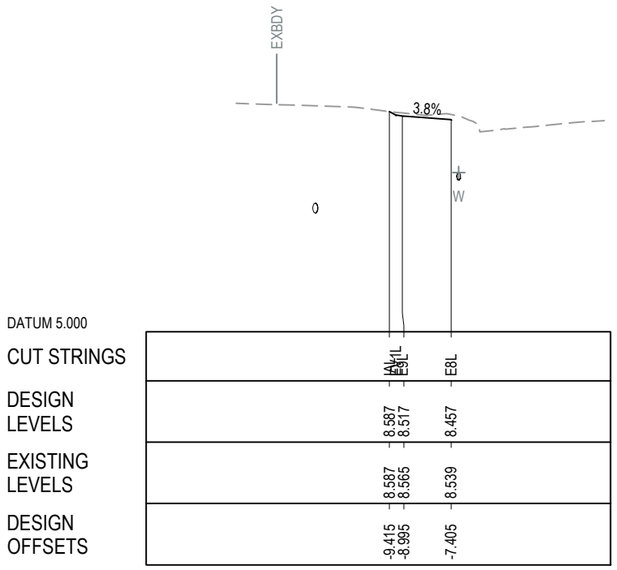
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

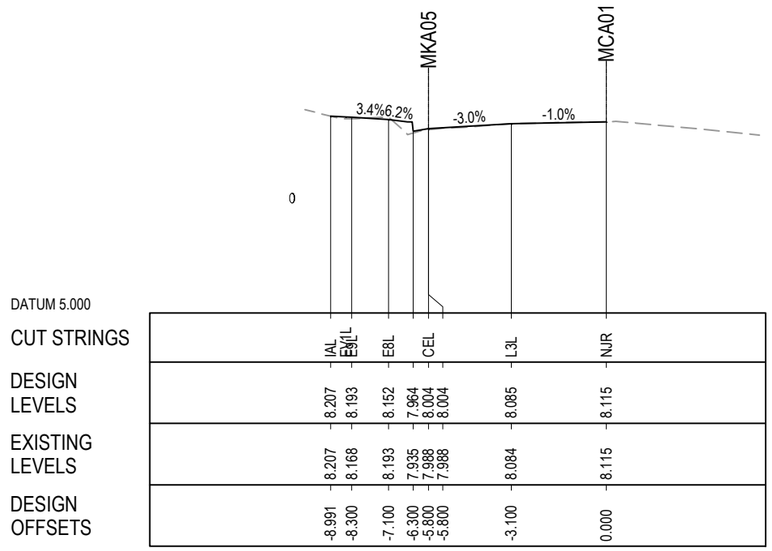
A3

SHEET 2 OF 14

TfNSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005002	1



CH 180.000



CH 200.000

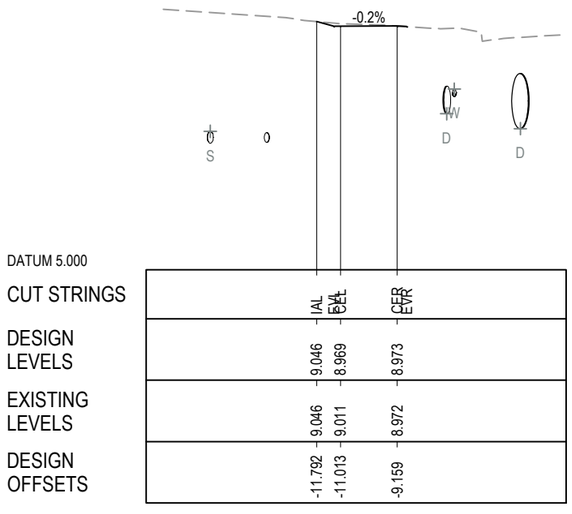
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

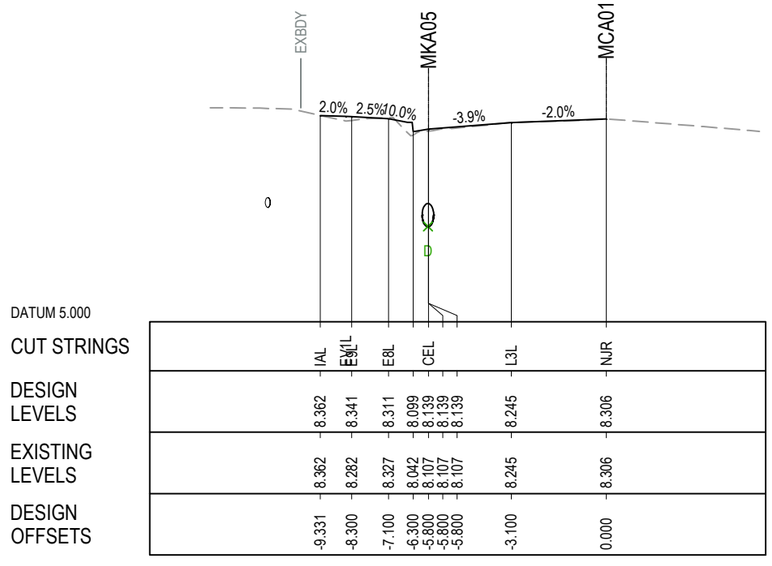
(EXISTING / NEW / ABANDONED)

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



CH 160.000



CH 190.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005003.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		PLOT DATE / TIME: 23-Nov-20 / 9:11:22 PM; PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	HORZ. 1 : 200 / VERT. 1 : 100 / FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

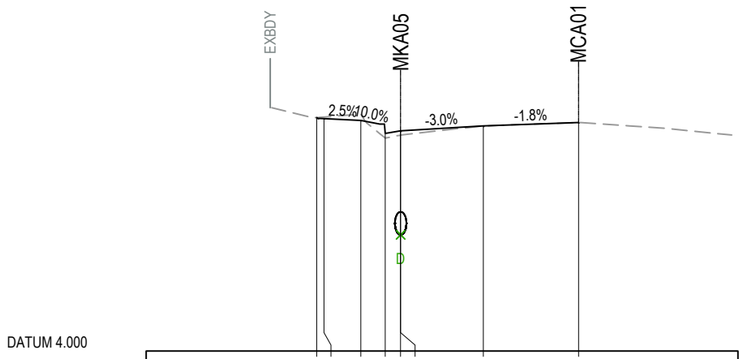
A3

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL CROSS SECTIONS - MCA01

HENRY LAWSON DRIVE

SHEET 3 OF 14

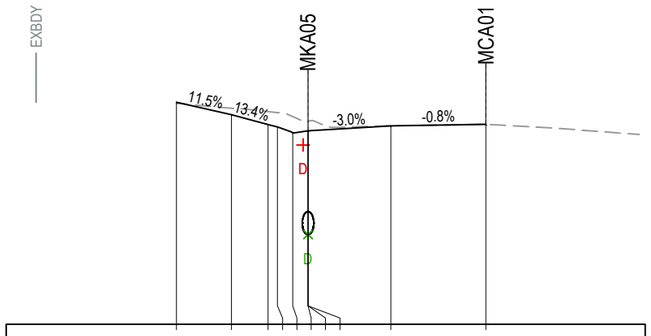
TINSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005003	1



DATUM 4.000

	IAL	EW1L	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	7.805	7.790	7.760	7.548	7.669	7.725
EXISTING LEVELS	7.805	7.816	7.860	7.473	7.669	7.725
DESIGN OFFSETS	-8.542	-8.300	-7.100	-6.300	-3.100	0.000

CH 220.000



DATUM 4.000

	E9L	E8L	CEL	L3L	NJR
CUT STRINGS					
DESIGN LEVELS	7.619	7.414	7.253 7.214 7.111 7.151 7.151	7.232	7.257
EXISTING LEVELS	7.599	7.518	7.464 7.449 7.383 7.308 7.308	7.232	7.257
DESIGN OFFSETS	-10.090	-8.302	-7.103 -6.800 -6.300 -5.800 -5.800	-3.100	0.000

CH 240.000

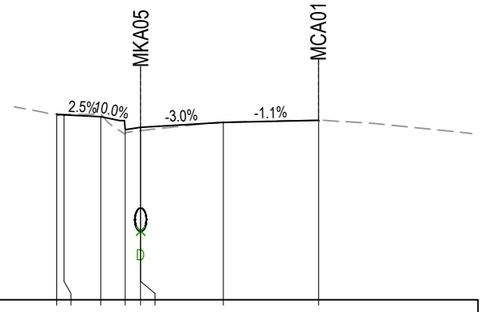
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

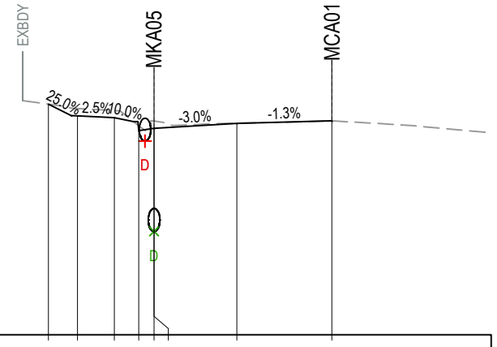
1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



DATUM 5.000

	EW1L	E9L	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	8.027	8.014	7.984	7.772 7.812 7.812	7.893	7.925
EXISTING LEVELS	8.027	8.023	8.023	7.719 7.754 7.754	7.893	7.925
DESIGN OFFSETS	-8.539	-8.300	-7.100	-6.300 -5.800 -5.800	-3.100	0.000

CH 210.000



DATUM 4.000

	IAL	EW1L	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	7.758	7.568	7.538	7.326 7.366 7.366	7.447	7.486
EXISTING LEVELS	7.758	7.687	7.653	7.408 7.481 7.481	7.447	7.486
DESIGN OFFSETS	-9.243	-8.300	-7.100	-6.300 -5.800 -5.800	-3.100	0.000

CH 230.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005004.DWG		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
EXTERNAL REFERENCE FILES			

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m; 0.5 0 0.5 1 1.5 2 2.5m) VERT. 1 : 100 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:10:54 PM | PLOT BY: MEGHWARB

CHECK PRINT

	PRELIM. INITIAL	FINAL INITIAL	FINAL DATE
DISCIPLINE			
DISCIPLINE			
DISCIPLINE			
DISCIPLINE			
BACKDRAFTED/CORRECTED			
CONFIRMED			

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 4 OF 14

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005004	1

LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

EXISTING | NEW | ABANDONED

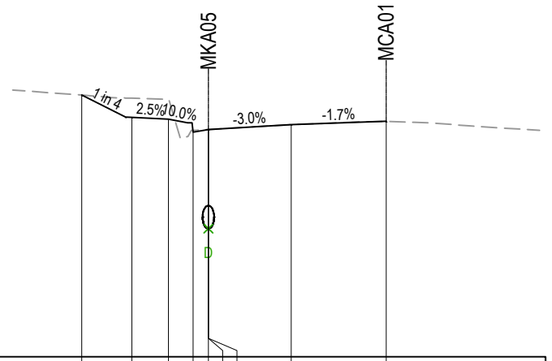
NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY

DATUM 4.000

	IAL	EWL	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	7.370	7.125	7.095	6.883 6.923 6.923 6.923	7.004	7.032
EXISTING LEVELS	7.370	7.329	7.321	6.814 6.917 6.917 6.917	7.004	7.032
DESIGN OFFSETS	-9.465	-8.300	-7.100	-6.300 -5.800 -5.800 -5.800	-3.100	0.000

CH 250.000



DATUM 3.000

	IAL	EWL	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	7.265	6.904	6.874	6.662 6.702 6.702 6.702	6.783	6.837
EXISTING LEVELS	7.264	7.213	7.194	6.690 6.705 6.705 6.705	6.783	6.837
DESIGN OFFSETS	-9.926	-8.300	-7.100	-6.300 -5.800 -5.800 -5.800	-3.100	0.000

CH 260.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005005.DWG				DESIGN LOT CODE: -	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m; 0.5 0 0.5 1 1.5 2 2.5m) VERT. 1 : 100 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:11:03 PM | PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

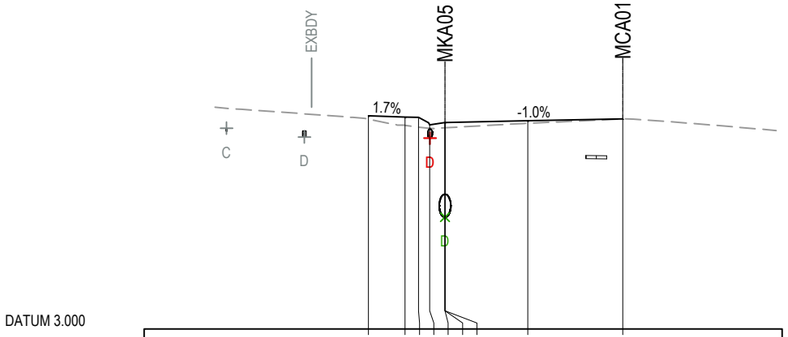
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 5 OF 14

TfNSW REGISTRATION No. DS2020/000130 | PART 1

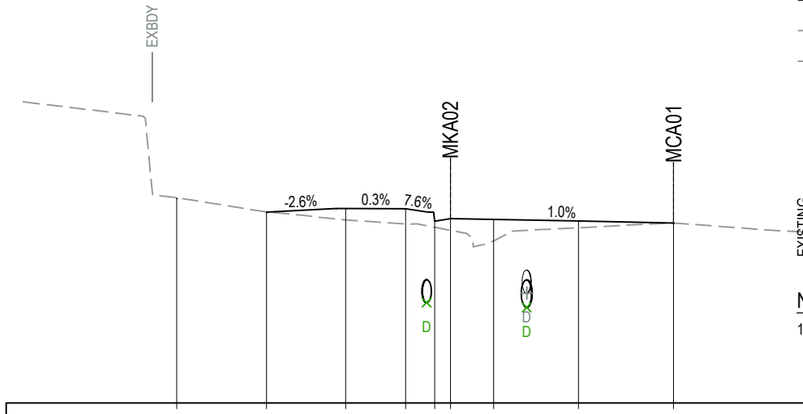
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RC-005005 | ISSUE 1



DATUM 3.000

	E9L	E8L	CEL	L3L	NJR
CUT STRINGS					
DESIGN LEVELS	6.475	6.454	6.450 6.328 6.368 6.368	6.394	6.425
EXISTING LEVELS	6.423	6.321	6.292 6.273 6.280 6.280 6.280	6.354	6.425
DESIGN OFFSETS	-8.300	-7.100	-6.660 -6.300 -5.800 -5.800 -5.800	-3.100	0.000

CH 280.000



DATUM 3.000

	IAL	IAL	EVL E9L	E8L	NLL	L3L	NJR
CUT STRINGS							
DESIGN LEVELS	6.344	6.113	6.173	6.168	5.964 6.008	5.994	5.967	5.936
EXISTING LEVELS	6.349	6.113	5.984	5.921	5.865 5.815	5.644	5.858	5.936
DESIGN OFFSETS	-16.210	-13.274	-10.693	-8.739	-7.794 -7.276	-5.869	-3.100	0.000

CH 300.000

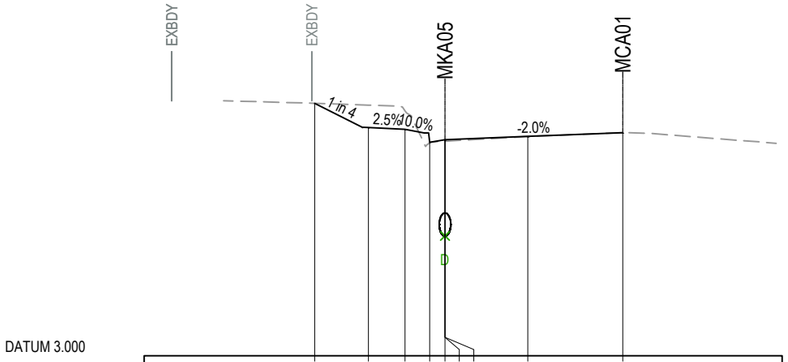
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

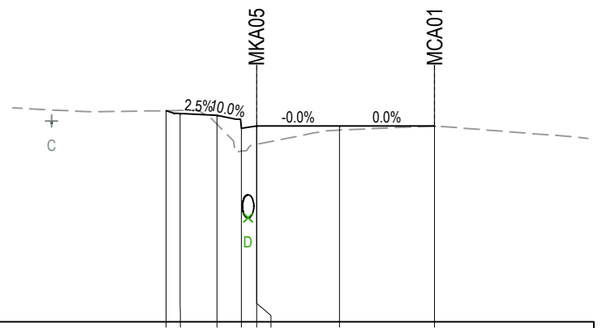
1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



DATUM 3.000

	IAL	EVL E9L	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	7.115	6.722	6.692	6.480 6.520 6.520	6.575	6.636
EXISTING LEVELS	7.115	7.085	6.989	6.467 6.496 6.496 6.496	6.572	6.636
DESIGN OFFSETS	-10.054	-8.300	-7.100	-6.300 -5.800 -5.800 -5.800	-3.100	0.000

CH 270.000



DATUM 3.000

	IAL	EVL E9L	E8L	CEL	L3L	NJR
CUT STRINGS						
DESIGN LEVELS	6.440	6.393	6.363	6.151 6.191 6.191	6.192	6.192
EXISTING LEVELS	6.440	6.443	6.220	5.780 5.892 5.892	6.124	6.192
DESIGN OFFSETS	-8.756	-8.300	-7.100	-6.300 -5.800 -5.800	-3.100	0.000

CH 290.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005006.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m); 0.5 0 0.5 1 1.5 2 2.5m; VERT. 1 : 100; FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:11:13 PM | PLOT BY: MEGHWARB

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

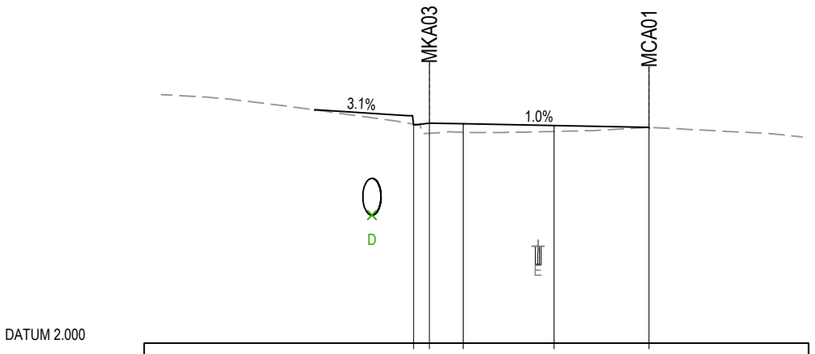
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 6 OF 14

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

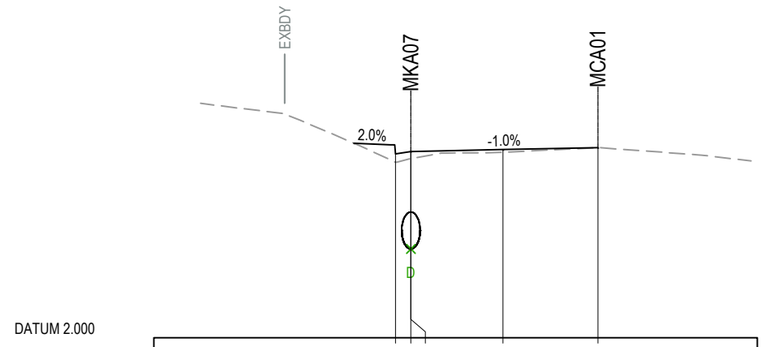
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RC-005006 | ISSUE 1



DATUM 2.000

	EVL		NLL	L3L	NJR
CUT STRINGS					
DESIGN LEVELS	5.557	5.588	5.577	5.547	5.517
EXISTING LEVELS	5.572	5.421	5.439	5.451	5.517
DESIGN OFFSETS	-7.680	-7.166	-6.061	-3.100	0.000

CH 320.000



DATUM 2.000

	EVL	CEL	L3L	NJR
CUT STRINGS				
DESIGN LEVELS	4.997	5.037	5.068	5.099
		5.037		
EXISTING LEVELS	4.862	4.920	5.024	5.099
		4.921		
DESIGN OFFSETS	-6.600	-6.100	-3.100	0.000
		-6.100		

CH 340.000

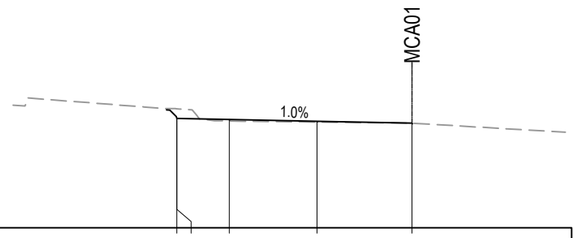
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

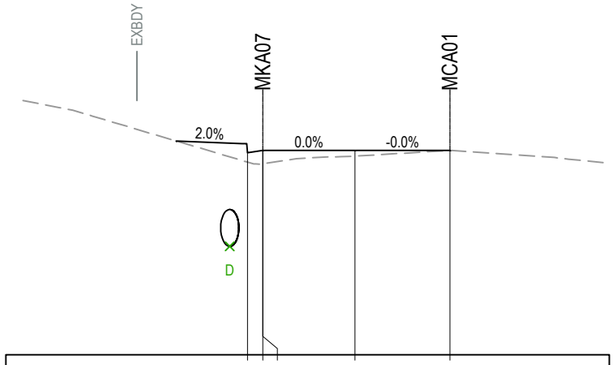
1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



DATUM 4.000

		NLL	L3L	NJR
CUT STRINGS				
DESIGN LEVELS	5.781	5.781	5.764	5.736	5.705
EXISTING LEVELS	5.939	5.939	5.740	5.722	5.705
DESIGN OFFSETS	-7.675	-7.674	-5.965	-3.100	0.000

CH 310.000



DATUM 2.000

	EVL	CEL	L3L	NJR
CUT STRINGS				
DESIGN LEVELS	5.291	5.331	5.330	5.330
		5.331		
EXISTING LEVELS	5.139	5.114	5.238	5.330
		5.114		
DESIGN OFFSETS	-6.600	-6.100	-3.100	0.000
		-6.100		

CH 330.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005007.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m); 0.5 0 0.5 1 1.5 2 2.5m; VERT. 1 : 100; FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:12:28 PM | PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. (INITIAL / DATE) / FINAL (INITIAL / DATE)

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

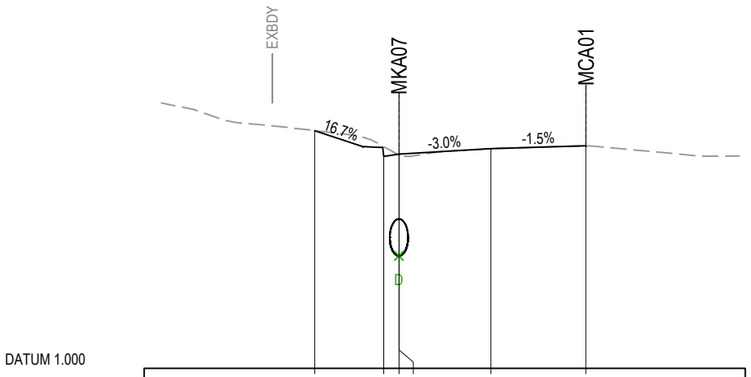
PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 7 OF 14

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

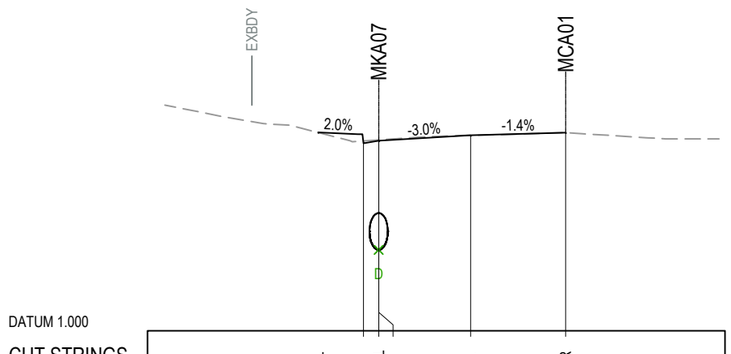
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005007	1



DATUM 1.000

	IAL	EVL	CEL	L3L	NJR
CUT STRINGS					
DESIGN LEVELS	4.873	4.451	4.491	4.581	4.626
			4.491		
EXISTING LEVELS	4.873	4.612	4.473	4.580	4.626
			4.473		
DESIGN OFFSETS	-8.852	-6.600	-6.100	-3.100	0.000
			-6.100		

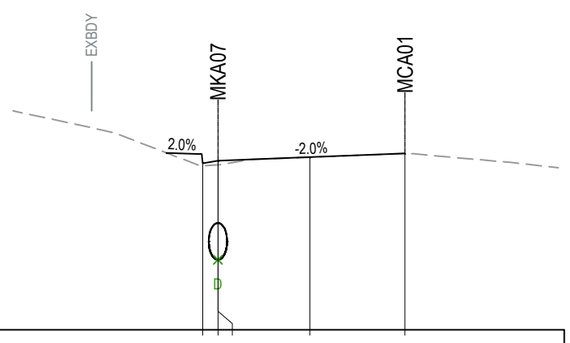
CH 360.000



DATUM 1.000

	EVL	CEL	L3L	NJR
CUT STRINGS				
DESIGN LEVELS	4.057	4.097	4.187	4.230
		4.097		
EXISTING LEVELS	4.094	4.111	4.188	4.230
		4.111		
DESIGN OFFSETS	-6.600	-6.100	-3.100	0.000
		-6.100		

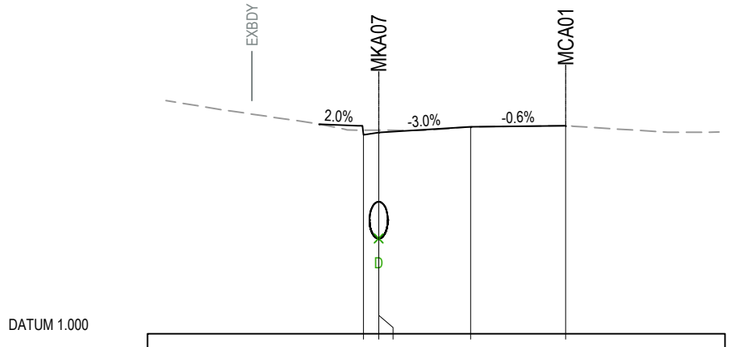
CH 380.000



DATUM 2.000

	EVL	CEL	L3L	NJR
CUT STRINGS				
DESIGN LEVELS	4.714	4.754	4.813	4.875
		4.754		
EXISTING LEVELS	4.672	4.688	4.811	4.875
		4.688		
DESIGN OFFSETS	-6.600	-6.100	-3.100	0.000
		-6.100		

CH 350.000



DATUM 1.000

	EVL	CEL	L3L	NJR
CUT STRINGS				
DESIGN LEVELS	4.242	4.282	4.372	4.392
		4.282		
EXISTING LEVELS	4.319	4.318	4.371	4.392
		4.318		
DESIGN OFFSETS	-6.600	-6.100	-3.100	0.000
		-6.100		

CH 370.000

LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005008.DWG	DESIGN LOT CODE: -	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:12:37 PM; PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES:		SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200; VERT. 1 : 100; FULL SIZE A3	CHECK PRINT (PRELIM. / FINAL; INITIAL / DATE)
		CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	DISCIPLINE; DISCIPLINE; DISCIPLINE; DISCIPLINE; BACKDRAFTED/CORRECTED; CONFIRMED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

DRAWINGS / DESIGN PREPARED BY: -

CLIENT: NSW GOVERNMENT Transport for NSW

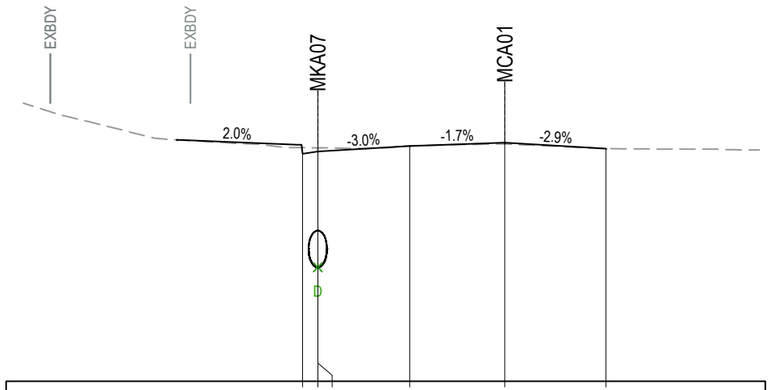
PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 8 OF 14

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

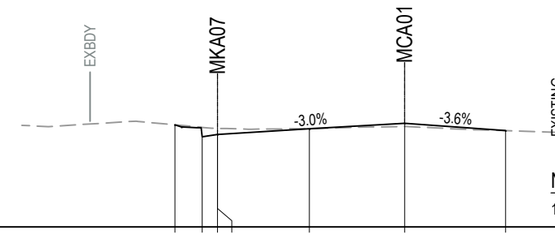
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RC-005008 | ISSUE 1



DATUM 0.000

	EVL	CEL	L3L	NJR	CER
CUT STRINGS					
DESIGN LEVELS		3.708 3.748 3.748	3.838	3.891	3.794
EXISTING LEVELS		3.810 3.808 3.808	3.839	3.870	3.794
DESIGN OFFSETS		-6.600 -6.100 -6.100	-3.100	0.000	3.300

CH 400.000



DATUM 2.000

	EVL	CEL	L3L	NJR	CER
CUT STRINGS					
DESIGN LEVELS	3.662	3.467 3.507 3.507	3.597	3.689	3.568
EXISTING LEVELS	3.662	3.621 3.605 3.605	3.600	3.635	3.568
DESIGN OFFSETS	-7.488	-6.600 -6.100 -6.100	-3.100	0.000	3.300

CH 420.000

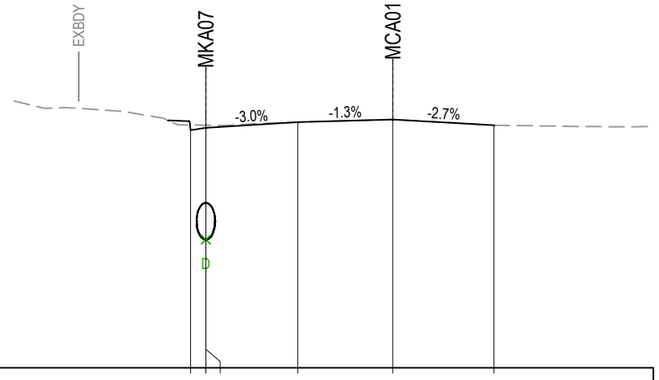
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

EXISTING / NEW / ABANDONED

NOTES

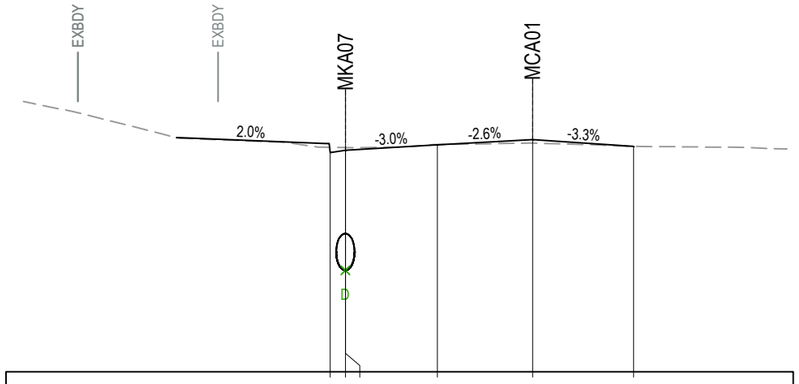
1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



DATUM 0.000

	EVL	CEL	L3L	NJR	CER
CUT STRINGS					
DESIGN LEVELS		3.873 3.913 3.913	4.003	4.044	3.953
EXISTING LEVELS		3.957 3.952 3.952	4.002	4.044	3.953
DESIGN OFFSETS		-6.600 -6.100 -6.100	-3.100	0.000	3.300

CH 390.000



DATUM 0.000

	EVL	CEL	L3L	NJR	CER
CUT STRINGS					
DESIGN LEVELS		3.570 3.610 3.610	3.700	3.782	3.673
EXISTING LEVELS		3.658 3.654 3.654	3.703	3.727	3.673
DESIGN OFFSETS		-6.600 -6.100 -6.100	-3.100	0.000	3.300

CH 410.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005009.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		PLOT DATE / TIME: 23-Nov-20 / 9:11:52 PM	PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY	CHECK PRINT (PRELIM. / FINAL; INITIAL / DATE)
	0 1	10.08.2020 06.11.2020	DRAFT ISSUE (DETAILED) PRE-AFC		A. PEREZ A.PEREZ	HORZ. 1 : 200 VERT. 1 : 100 FULL SIZE A3	-	DISCIPLINE DISCIPLINE DISCIPLINE DISCIPLINE BACKDRAFTED/CORRECTED CONFIRMED
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD		

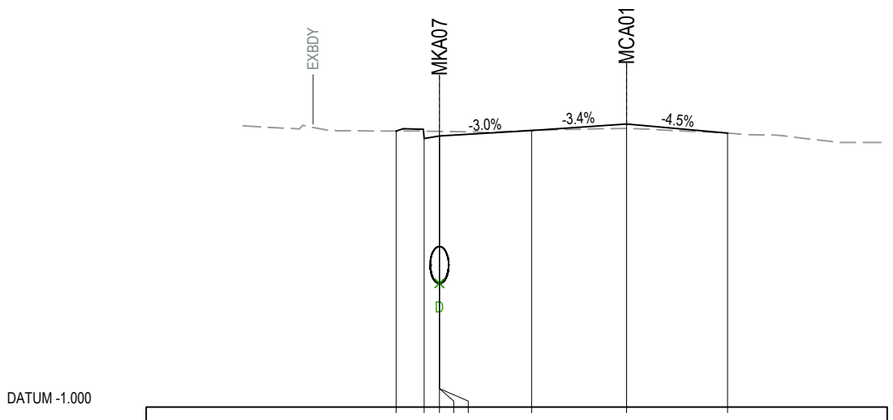
CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
A3
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE
SHEET 9 OF 14

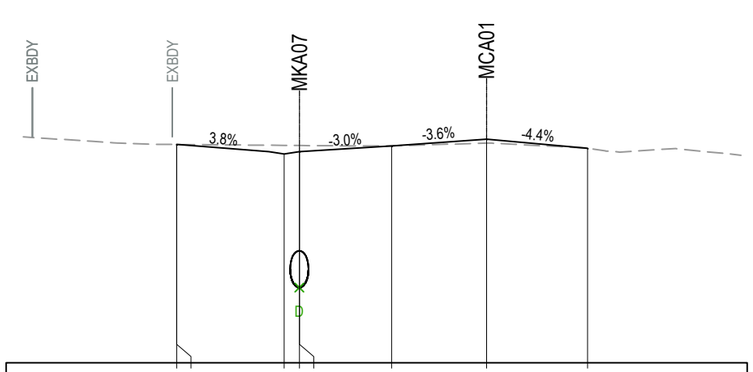
TfNSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005009	1



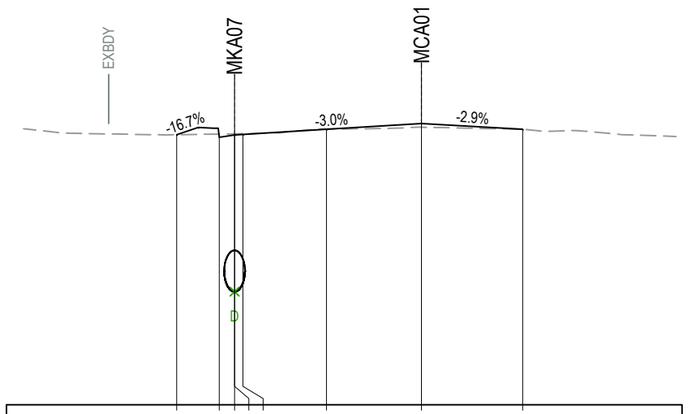
DATUM -1.000						
CUT STRINGS	IAL	EVL	CEL	LAL	NJR	CER
DESIGN LEVELS	3.501	3.379	3.419	3.509	3.613	3.466
EXISTING LEVELS	3.501	3.499	3.495	3.515	3.544	3.466
DESIGN OFFSETS	-7.512	-6.600	-6.100	-3.100	0.000	3.300

CH 440.000



DATUM 0.000						
CUT STRINGS	IAL	EVL	CEL	L3L	NJR	CER
DESIGN LEVELS	3.557	3.557	3.403	3.533	3.644	3.497
EXISTING LEVELS	3.557	3.557	3.543	3.536	3.580	3.497
DESIGN OFFSETS	-10.109	-10.102	-6.600	-3.100	0.000	3.300

CH 430.000



DATUM -1.000						
CUT STRINGS	IAL	EVL	CEL	LAL	NJR	CER
DESIGN LEVELS	3.402	3.359	3.399	3.489	3.583	3.489
EXISTING LEVELS	3.402	3.412	3.416	3.494	3.523	3.489
DESIGN OFFSETS	-7.983	-6.600	-6.100	-3.100	0.000	3.300

CH 450.000

LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005010.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:12:02 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3

SHEET 10 OF 14

TINSW REGISTRATION No.: DS2020/000130

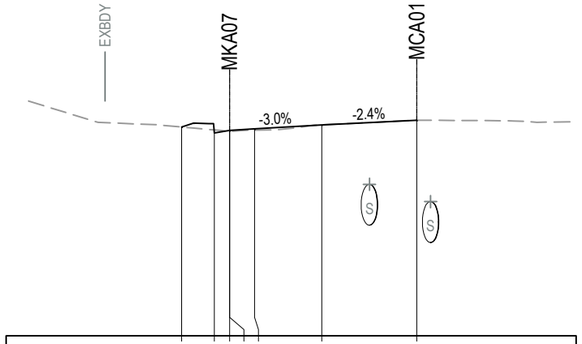
PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

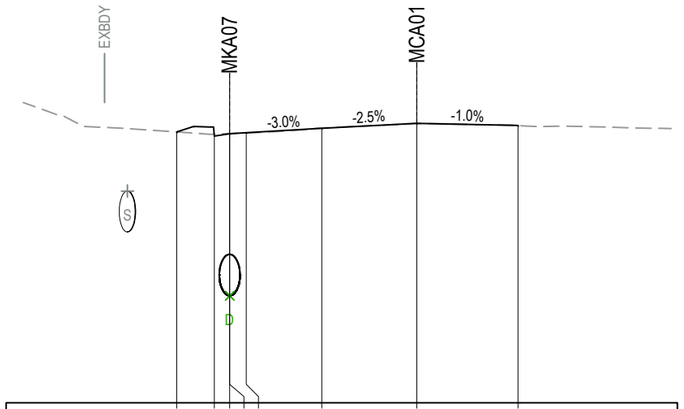
SHEET No.: SHT-RC-005010

ISSUE: 1



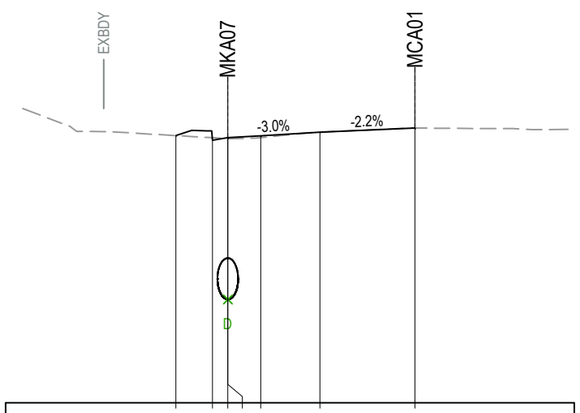
DATUM 0.000	IAL EVL	CEL	LUL	LAL	NJR
CUT STRINGS					
DESIGN LEVELS	3.403	3.308	3.348	3.438	3.513
			3.348		
			3.372		
EXISTING LEVELS	3.404	3.355	3.334	3.438	3.513
			3.334		
			3.353		
DESIGN OFFSETS	-7.665	-6.600	-6.100	-3.100	0.000
			-6.100		
			-5.293		

CH 470.000



DATUM -1.000	IAL EVL	CEL	LUL	LAL	NJR	CER
CUT STRINGS						
DESIGN LEVELS	3.413	3.345	3.385	3.475	3.553	3.519
			3.385			
			3.401			
EXISTING LEVELS	3.413	3.378	3.388	3.476	3.552	3.519
			3.388			
			3.398			
DESIGN OFFSETS	-7.833	-6.600	-6.100	-3.100	0.000	3.300
			-6.100			
			-5.562			

CH 460.000



DATUM -1.000	IAL EVL	CEL	LUL	LAL	NJR
CUT STRINGS					
DESIGN LEVELS	3.355	3.280	3.320	3.410	3.477
			3.320		
			3.352		
EXISTING LEVELS	3.355	3.320	3.305	3.410	3.477
			3.305		
			3.321		
DESIGN OFFSETS	-7.792	-6.600	-6.100	-3.100	0.000
			-6.100		
			-5.024		

CH 480.000

LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005011.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m); 0.5 0 0.5 1 1.5 2 2.5m; VERT. 1 : 100; FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:11:42 PM | PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3 | SHEET 11 OF 14

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RC-005011 | ISSUE 1

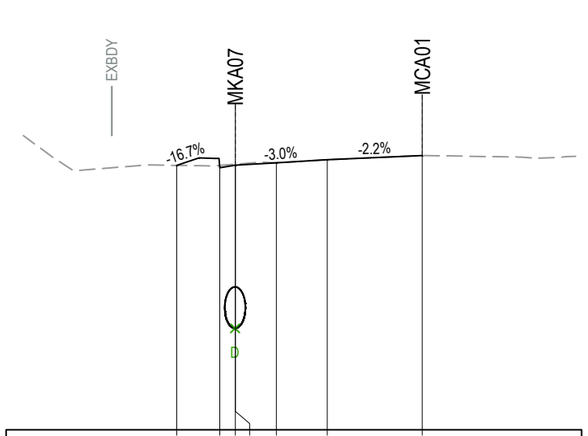
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

NOTES

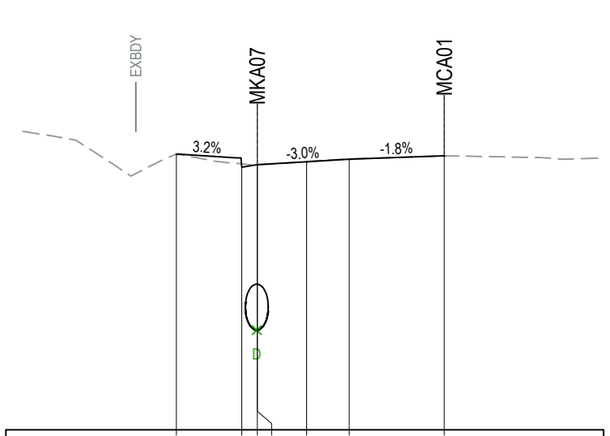
1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



DATUM -1.000

	IAL	EVL	CEL	LUL	LAL	NJR
DESIGN LEVELS	3.309	3.271	3.311	3.311	3.351	3.401	3.470
EXISTING LEVELS	3.309	3.307	3.328	3.328	3.351	3.401	3.470
DESIGN OFFSETS	-8.013	-6.600	-6.100	-6.100	-4.755	-3.100	0.000

CH 490.000



DATUM -1.000

	EVL	CEL	LUL	LAL	NJR
DESIGN LEVELS	3.493	3.281	3.321	3.321	3.369	3.411	3.465
EXISTING LEVELS	3.493	3.332	3.320	3.320	3.371	3.411	3.465
DESIGN OFFSETS	-8.738	-6.600	-6.100	-6.100	-4.486	-3.100	0.000

CH 500.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005012.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:09:54 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 200 (1 0 1 2 3 4 5m; 0.5 0 0.5 1 1.5 2 2.5m) VERT. 1 : 100 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. / FINAL (INITIAL / DATE)

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3

SHEET 12 OF 14

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-RC-005012 | ISSUE 1

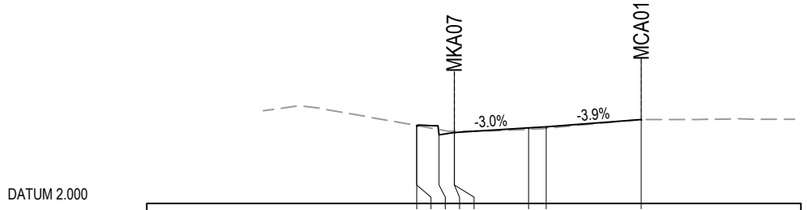
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

(EXISTING / NEW / ABANDONED)

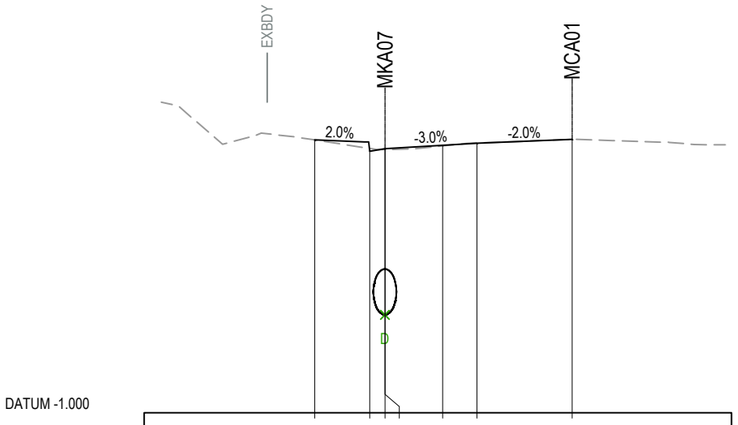
NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



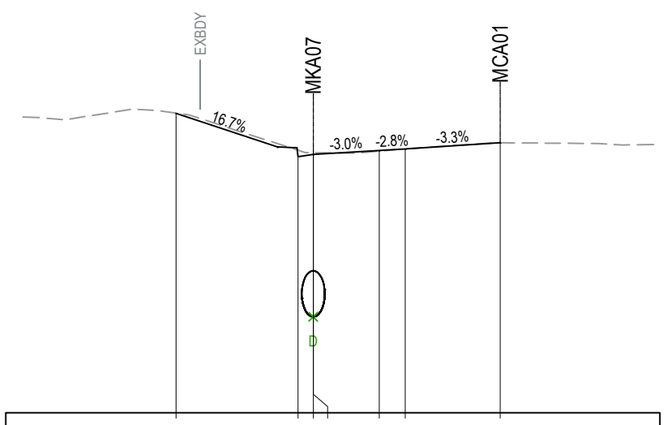
DATUM 2.000	IAL	EVL	CEL	LUL	LAL	NJR
CUT STRINGS						
DESIGN LEVELS	3.269	3.269	3.117	3.157	3.230	3.247	3.367
EXISTING LEVELS	3.269	3.269	3.204	3.177	3.177	3.207	3.224	3.367
DESIGN OFFSETS	-7.331	-7.331	-6.600	-6.100	-6.100	-3.678	-3.100	0.000

CH 530.000



DATUM -1.000	EVL	CEL	LUL	LAL	NJR
CUT STRINGS					
DESIGN LEVELS	3.446	3.264	3.304	3.304	3.360	3.394	3.456
EXISTING LEVELS	3.446	3.308	3.289	3.289	3.350	3.397	3.456
DESIGN OFFSETS	-8.398	-6.600	-6.100	-6.100	-4.217	-3.100	0.000

CH 510.000



DATUM -1.000	IAL	EVL	CEL	LUL	LAL	NJR
CUT STRINGS						
DESIGN LEVELS	3.881	3.172	3.212	3.212	3.276	3.300	3.403
EXISTING LEVELS	3.883	3.279	3.238	3.238	3.265	3.300	3.403
DESIGN OFFSETS	-10.575	-6.600	-6.100	-6.100	-3.948	-3.100	0.000

CH 520.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005013.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING / DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	HORZ. 1 : 200 (1 0 1 2 3 4 5m) / VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m) FULL SIZE A3
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD / -

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:05:48 PM	MEGHWARB

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

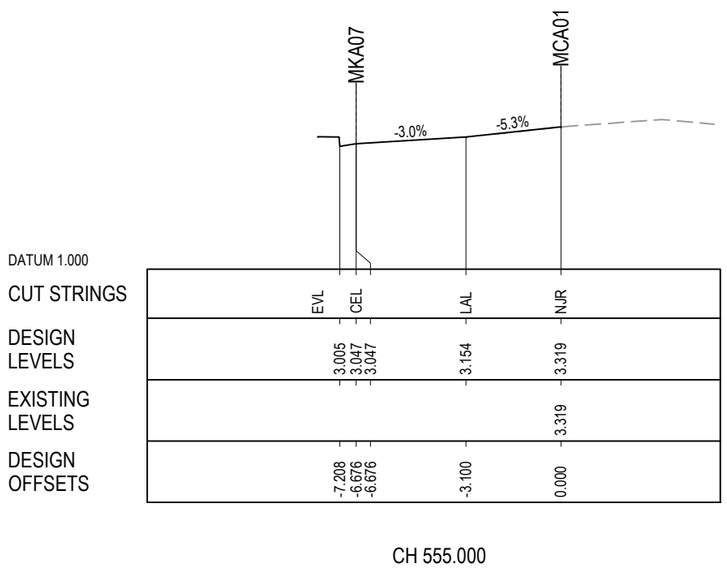
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3

SHEET 13 OF 14

TfNSW REGISTRATION No.	PART
DS2020/000130	1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005013	1



CH 555.000

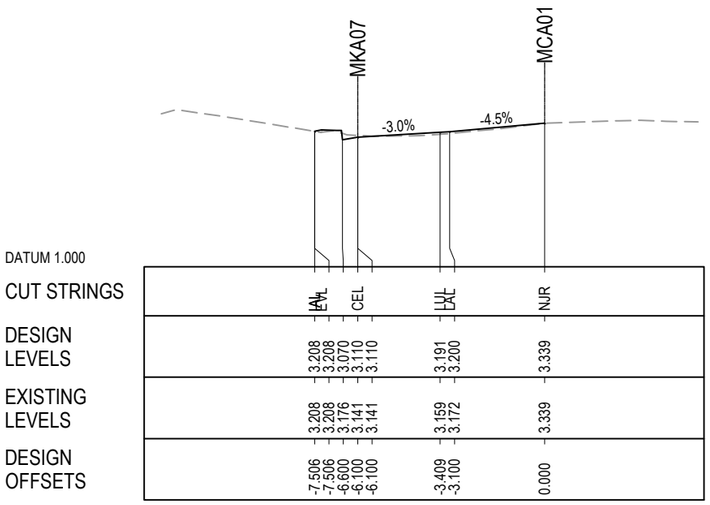
LEGEND

- DESIGN SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXISTING PAVEMENT
- UTILITY (COMMS)
- UTILITY (ELECTRICAL)
- UTILITY (GAS)
- UTILITY (SEWER)
- UTILITY (WATER)
- UTILITY (STORMWATER INVERT)

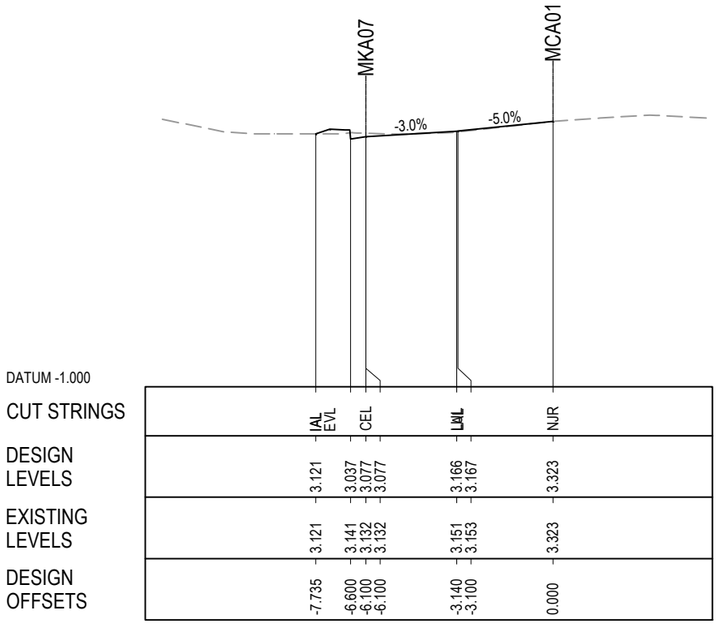
EXISTING / NEW / ABANDONED

NOTES

1. CIVIL CROSS SECTIONS DO NOT SHOW ABANDONED STORMWATER FOR CLARITY



CH 540.000



CH 550.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RC-005014.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	HORZ. 1 : 200 (1 0 1 2 3 4 5m) VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m) FULL SIZE A3	-
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:06:02 PM	MEGHWARB

CHECK PRINT — PRELIM. (INITIAL) FINAL (DATE)

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION / PINCH POINTS / PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
CROSS SECTIONS - MCA01
HENRY LAWSON DRIVE

A3

SHEET 14 OF 14

TfNSW REGISTRATION No.	PART
DS2020/000130	1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RC-005014	1

FROM LANSDOWNE

TO MILPERRA

BEALE STREET

HAIG AVE

HENRY LAWSON DRIVE

LIMIT OF WORKS

ADJOINS SHT-SM-001002

MCA01

CONCRETE ENCASE NEW PIPE. REFER TO 'PV SERIES' FOR ENCASEMENT DETAIL.

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMPHOLE. POSITION OF LAMPHOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION.

CONNECT NEW PIPE INTO EXISTING GRATED PIT. CONFIRM INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW STORMWATER PIPE

CONTRACTOR TO ADJUST POSITION AND GRATE LEVEL OF PIT WITHIN VERGE TO SUIT LOW POINT, FLOW PATH AND LANDSCAPING.

SHALLOW PIPES BETWEEN C01\02 AND C01\05. REFER TO 'PV SERIES' FOR EDGE DETAIL.

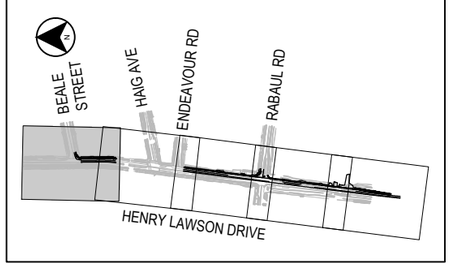
ABANDON EXISTING PIT. CONNECT EXISTING PIPE INTO NEW PIT. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT

RETAIN EXISTING PIPE BETWEEN C01\02 AND EX L16. C01\02 TO HAVE TWO OUTLET PIPES (EXISTING 300 mm PIPE AND PROPOSED 450 mm PIPE).

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- NEW STORMWATER PIPE
- EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001001.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:16:00 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER MANAGEMENT PLAN

A3

SHEET 1 OF 5

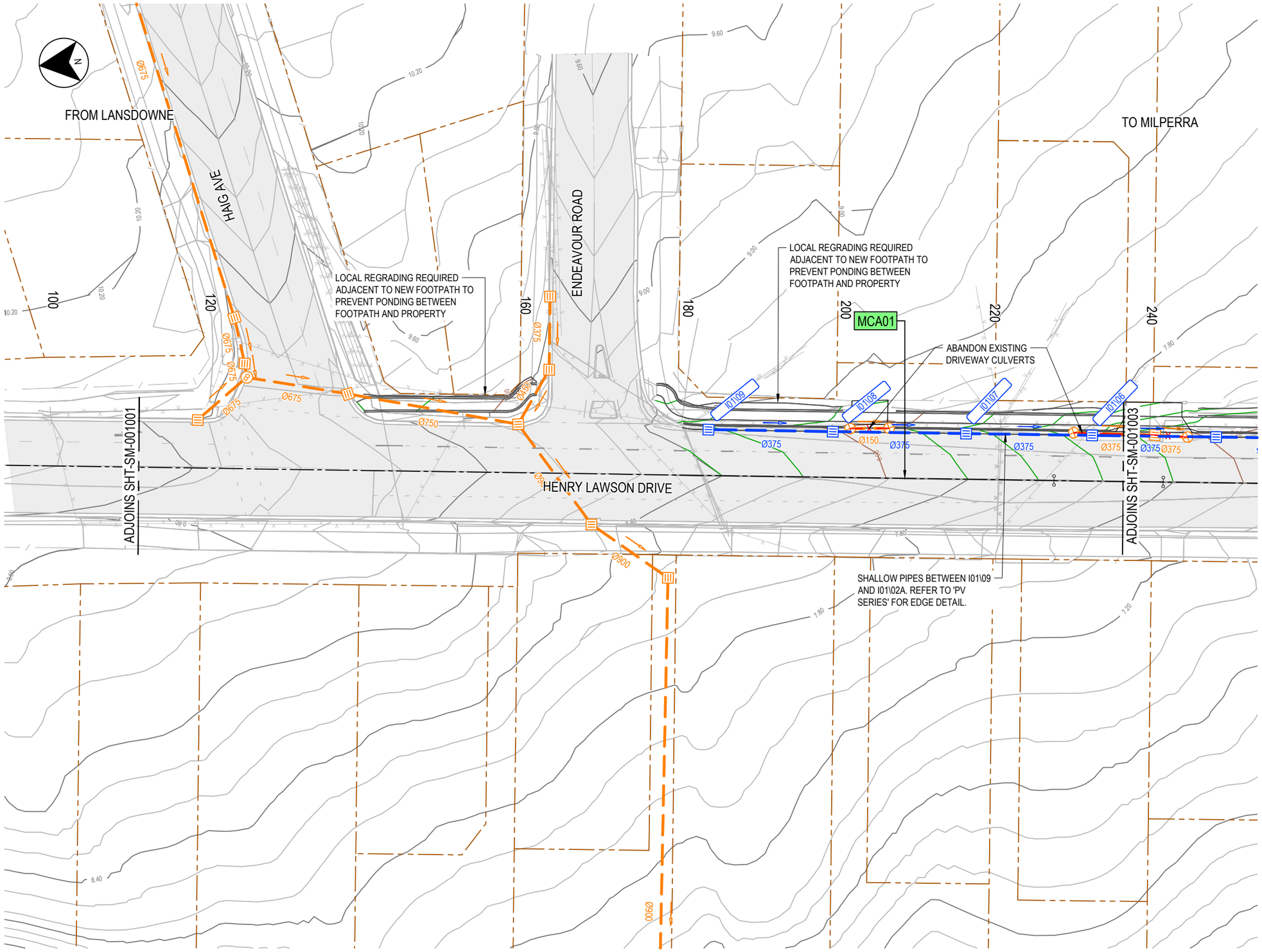
TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-001001

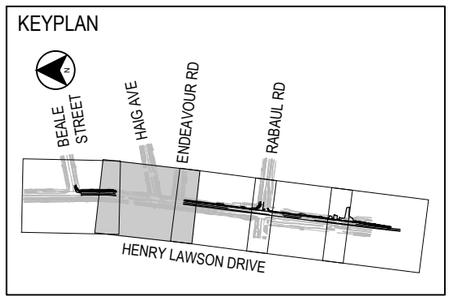
ISSUE: 1



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001002.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:16:25 PM	PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No. / APPROVAL	SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	DRAWINGS / DESIGN PREPARED BY	CHECK PRINT (PRELIM. / FINAL; INITIAL / DATE)
	0	10.08.2020	DRAFT ISSUE (DETAILED)	A. PEREZ			DISCIPLINE
	1	06.11.2020	PRE-AFC	A.PEREZ			DISCIPLINE
			REVISION IN PROGRESS				DISCIPLINE
							DISCIPLINE
					CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-	BACKDRAFTED/CORRECTED
							CONFIRMED

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3 | SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-001002	1

FROM LANSDOWNE

TO MILPERRA

RABAUL ROAD

HENRY LAWSON DRIVE

ADJOINS SHT-SM-001002

ADJOINS SHT-SM-001004

CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT

SHALLOW PIPE BETWEEN B01/03 AND B01/02. REFER TO 'PV SERIES' FOR EDGE DETAIL.

CONTRACTOR TO ADJUST POSITION OF PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND PIT B01\03.

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION

MCA01

ABANDON EXISTING PITS AND PIPE

ABANDON EXISTING PIT AND DRIVEWAY CULVERT

ABANDON EXISTING DRAINAGE PIPE

CONFIRM LOCATION AND INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW OUTLET PIPE. ADJUST EXISTING PIT LINTEL TO SUIT NEW KERB ALIGNMENT.

SHALLOW PIPE BETWEEN EX R7 AND D01/18. REFER TO 'PV SERIES' FOR EDGE DETAIL.

CONCRETE ENCASE NEW PIPE. REFER TO 'PV SERIES' FOR ENCASEMENT DETAIL.

EXISTING SEWER MAIN NEARBY

CONTRACTOR TO ADJUST POSITION OF 1.2 m PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND DRIVEWAY.

SHALLOW PIPES BETWEEN D01/18 AND D01/13. REFER TO 'PV SERIES' FOR EDGE DETAIL.

SHALLOW PIPE BETWEEN I01\09 AND I01\02A REFER TO 'PV' SERIES FOR DETAILS

ABANDON EXISTING DRIVEWAY CULVERT

ABANDON EXISTING PIT AND CONSTRUCT NEW INLET PIT.

REMOVE EXISTING 375 DIA PIPE BACK TO FIRST CLEAN AND SOUND JOINT. INSTALL NEW 375 DIA PIPE AND CONNECT INTO EXISTING 375 DIA PIPE.

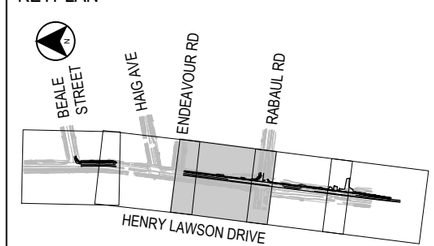
SHALLOW PIPE BETWEEN A01\02 AND I01\02A REFER TO 'PV' SERIES FOR DETAILS

CAUTION
NEW WATER MAIN NEARBY

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:18:11 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER MANAGEMENT PLAN

A3

SHEET 3 OF 5

TINSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-001003

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE TO BE BE CONFIRMED ON SITE DURING CONSTRUCTION

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

CAUTION
EXISTING SEWER MAIN NEARBY

PROTECT PROPOSED BATTER, LOW POINT AND 2 m FROM BACK OF KERB WITH ENKAMAT LINING. ENKAMAT LINING TO BE LAID AND PINNED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. REFER TO SM-SHT-000506 FOR DETAIL.

SHALLOW PIPES BETWEEN D01\18 AND D01\13. REFER TO 'PV SERIES' FOR EDGE DETAIL

ABANDON EXISTING DRAINAGE PIPE

CONTRACTOR TO CONFIRM DEPTH AND ALIGNMENT OF SEWER MAINS PRIOR TO CONSTRUCTION OF THE NEW DRAINAGE LINE TO ENSURE NO CLASH BETWEEN STORMWATER PIPE AND SEWER PIPE PROTECTION. STORMWATER PIPE WITHOUT SOCKET ACHIEVES APPROXIMATELY 25 mm CLEARANCE BELOW PROPOSED SEWER MAIN CONCRETE ENCASEMENT. THE STORMWATER PIPE SOCKETS/JOINTS SHOULD BE PLACED EITHER SIDE OF THE SEWER MAINS OR IN BETWEEN THE SEWER MAINS AND SHOULD NOT BE PLACED DIRECTLY UNDER EITHER SEWER MAIN.
CONTRACTOR TO CONFIRM NEW DRAINAGE PIPE HAS ADEQUATE CLEARANCE TO THE SEWER MAIN AND DESIGN PIPE GRADE CAN BE ACHIEVED

ADJOINS SHT-SM-001003

ADJOINS SHT-SM-001005

MCA01

EX.1.0

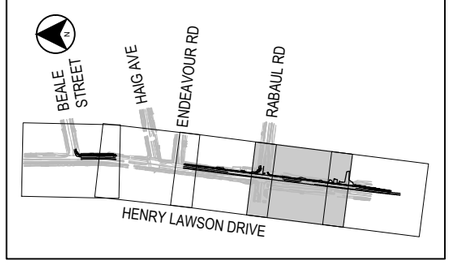
D01\02 D01\14 D01\13 D01\12 D01\11 D01\10 K01\02 D01\09 D01\08 D01\07

Ø600 Ø675 Ø750 Ø450 Ø375

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION
0	10.08.2020	DRAFT ISSUE (DETAILED)
1	06.11.2020	PRE-AFC

REVISION IN PROGRESS

DESIGN LOT CODE: WVR No. | APPROVAL: A. PEREZ, A.PEREZ

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:16:54 PM | PLOT BY: MEGHWARB

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DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3

SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-SM-001004 | ISSUE 1

FROM LANSDOWNE

TO MILPERRA

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

MCA01

480 500 520 540

556.214

ADJOINS SHT-SM-001004

LIMIT OF WORKS

Ø750 Ø750 Ø750 Ø375 Ø375 Ø750 Ø450 Ø750

D01102 D01106 D01105 D01104 D01103 D01102 D01103 D01101

EX1.1

CAUTION
EXISTING COMMS NEARBY

CAUTION
EXISTING SEWER MAIN NEARBY

CAUTION
TREE PROTECTION ZONE (TPZ) NEARBY. PIPE ALIGNMENT ENSURES LESS THAN 10% OF TPZ IS AFFECTED. REFER TO 'REF' FOR FURTHER DETAILS.

CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.

REPLACE EXISTING HEADWALL AND APRON WITH NEW LIKE-FOR-LIKE HEADWALL AND APRON. REFER TO ST SERIES DRAWINGS FOR DETAILS. INSTALL MOUNTING RING STYLE FLOOD GATE (HUME-KING FLOODGATE OR SIMILAR). RETAIN EXISTING SCOUR PROTECTION

ABANDON EXISTING PIPE DOWNSTREAM OF NEW PIT D01\02 AND CONSTRUCT NEW PIPE ON EXISTING PIPE ALIGNMENT.

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
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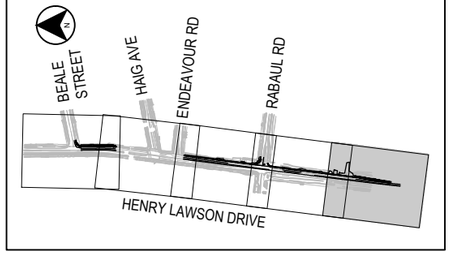
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

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EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
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BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3

SHEET 5 OF 5

TINSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN EDMS No.: - SHEET No.: SHT-SM-001005 ISSUE: 1

LONGITUDINAL PAVEMENT DRAINAGE - STRUCTURES SCHEDULE

STRUCTURE NO.	STRUCTURE TYPE	COORDINATES		DETAIL DRAWING REFERENCE	DRAWING PLAN NO.	COMMENTS
		EASTING	NORTHING			
A01\02	SA1.2	312832.648	6245356.716	#N/A	SHT-SM-001003	
EX R1	SA2	312922.852	6245344.263	EXISTING	-	
B01\03	SA3.6	312842.383	6245354.188	SHT-SM-000503	SHT-SM-001003	CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.
B01\02	SA3.6	312837.756	6245354.850	SHT-SM-000503	SHT-SM-001003	CONTRACTOR TO ADJUST POSITION OF PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND PIT B01\03.
C01\07	LAMP HOLE	312861.326	6245626.029	SHT-SM-000502	SHT-SM-001001	REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION.
C01\06	Grated Pit 600x600	312860.346	6245625.977	SHT-SM-000501	SHT-SM-001001	CONTRACTOR TO ADJUST POSITION AND GRATE LEVEL OF PIT WITHIN VERGE TO SUIT LOW POINT, FLOW PATH AND LANDSCAPING.
C01\05	SA2	312857.842	6245625.983	R0220-01 Sheet 1	SHT-SM-001001	
C01\04	SA2	312857.707	6245636.651	R0220-01 Sheet 1	SHT-SM-001001	
C01\03	SA2	312857.581	6245646.677	R0220-01 Sheet 1	SHT-SM-001001	
C01\02	SA3-SP	312859.309	6245653.233	SHT-SM-000504	SHT-SM-001001	ABANDON EXISTING PIT. CONNECT EXISTING PIPE INTO NEW PIT. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT
EX R7	SA3-ADJ-CONN	312847.399	6245343.333	R0220-43 & SHT-SM-000507	SHT-SM-001003	CONFIRM LOCATION AND INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW OUTLET PIPE. ADJUST EXISTING PIT LINTEL TO SUIT NEW KERB ALIGNMENT.
D01\18	SA1.2	312836.943	6245344.682	SHT-SM-000503	SHT-SM-001003	CONTRACTOR TO ADJUST POSITION OF 1.2 M PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND DRIVEWAY.
D01\17	SA1.2	312829.342	6245343.716	SHT-SM-000503	SHT-SM-001003	
D01\16	SA1.8	312824.988	6245336.932	SHT-SM-000503	SHT-SM-001003	
D01\15	SA2	312823.559	6245325.666	R0220-01 Sheet 1	SHT-SM-001003	
D01\14	SA2	312819.864	6245296.516	R0220-01 Sheet 1	SHT-SM-001004	
D01\13	SA2	312816.200	6245267.608	R0220-01 Sheet 1	SHT-SM-001004	
D01\12	SA2	312812.978	6245242.118	R0220-01 Sheet 1	SHT-SM-001004	
D01\11	SB2	312812.358	6245233.125	R0220-51	SHT-SM-001004	
D01\10	SB2	312811.422	6245225.578	R0220-51	SHT-SM-001004	
D01\09	SA2	312808.668	6245207.384	R0220-01 Sheet 1	SHT-SM-001004	
D01\08	SA2	312806.827	6245192.497	R0220-01 Sheet 1	SHT-SM-001004	
D01\07	SA2	312805.394	6245180.907	R0220-01 Sheet 1	SHT-SM-001004	
D01\06	SA2	312803.977	6245169.316	R0220-01 Sheet 1	SHT-SM-001005	
D01\05	SA2	312802.306	6245154.898	R0220-01 Sheet 1	SHT-SM-001005	
D01\04	SA2	312799.256	6245126.796	R0220-01 Sheet 1	SHT-SM-001005	
D01\03	Grated Pit 600x600	312784.365	6245128.263	SHT-SM-000501	SHT-SM-001005	
D01\02	Grated Pit 600x600-SP	312750.429	6245145.172	SHT-SM-000505	SHT-SM-001005	CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.
D01\01	HW-STRUCT	312742.130	6245145.974	ST SERIES DETAILS AND FLOODGATE MANUFACTURER DETAILS	SHT-SM-001005	REPLACE EXISTING HEADWALL AND APRON WITH NEW LIKE-FOR-LIKE HEADWALL AND APRON. REFER TO ST SERIES DRAWINGS FOR DETAILS. INSTALL MOUNTING RING STYLE FLOOD GATE (HUME-KING FLOODGATE OR SIMILAR). RETAIN EXISTING SCOUR PROTECTION.

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-002001.DWG

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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	FINAL ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER SCHEDULE

A3

SHEET 1 OF 2

TfNSW REGISTRATION No. DS2020/000130

PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-002001

ISSUE 1

LONGITUDINAL PAVEMENT DRAINAGE - STRUCTURES SCHEDULE

STRUCTURE NO.	STRUCTURE TYPE	COORDINATES		DETAIL DRAWING REFERENCE	DRAWING PLAN NO.	COMMENTS
		EASTING	NORTHING			
EX L1	Grated Pit 600x400	312780.919	6245142.226	EXISTING	SHT-SM-001001	
E01\02	RSG 600x600	312806.950	6245169.018	R0220-36	SHT-SM-001005	LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT
EX L19	SA3	312866.981	6245667.071	EXISTING	SHT-SM-001001	
EX L18	Grated Pit 600x400-CONN	312857.650	6245668.180	R0220-43	SHT-SM-001001	CONNECT NEW PIPE INTO EXISTING GRATED PIT. CONFIRM INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW STORMWATER PIPE
EX L16	SB	312845.869	6245666.932	EXISTING	SHT-SM-001001	
EX L17	Grated Pit 900x900	312839.939	6245666.392	EXISTING	SHT-SM-001001	
F01\02	LAMP HOLE	312822.598	6245297.586	SHT-SM-000502	SHT-SM-001004	REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION
G01\02	LAMP HOLE	312833.496	6245380.391	SHT-SM-000502	SHT-SM-001003	REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION
I01\09	SA3	312842.521	6245476.862	R0220-01 Sheet1	SHT-SM-001002	
I01\08	SA3	312840.488	6245461.206	R0220-01 Sheet1	SHT-SM-001002	
I01\07	SA3	312838.337	6245444.420	R0220-01 Sheet1	SHT-SM-001002	
I01\06	SA2	312836.304	6245428.553	R0220-01 Sheet 1	SHT-SM-001002	
I01\05	SA2	312834.318	6245412.922	R0220-01 Sheet 1	SHT-SM-001003	
I01\04	SA2	312832.560	6245399.051	R0220-01 Sheet 1	SHT-SM-001003	
I01\03	SA2	312831.160	6245388.006	R0220-01 Sheet 1	SHT-SM-001003	
I01\02	SA3	312829.722	6245376.663	R0220-01 Sheet1	SHT-SM-001003	
I01\02A	SA1.8	312828.687	6245363.016	SHT-SM-000503	SHT-SM-001003	ABANDON EXISTING PIT AND CONSTRUCT NEW INLET PIT.
I01\02B	CONNP	312827.267	6245361.787	R0220-49	SHT-SM-001003	REMOVE EXISTING 375 DIA PIPE BACK TO FIRST CLEAN AND SOUND JOINT. INSTALL NEW 375 DIA PIPE AND CONNECT INTO EXISTING 375 DIA PIPE.
EX L4A	BP	312822.405	6245357.578	EXISTING	SHT-SM-001003	
J01\03	RSG 600x600	312800.389	6245119.405	R0220-36	SHT-SM-001005	LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT
J01\02	SA2	312798.718	6245120.958	R0220-01 Sheet 1	SHT-SM-001005	
K01\02	RSG 600x600	312811.788	6245208.685	R0220-36	SHT-SM-001004	LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-002002.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:13:42 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	FINAL ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER SCHEDULE

A3

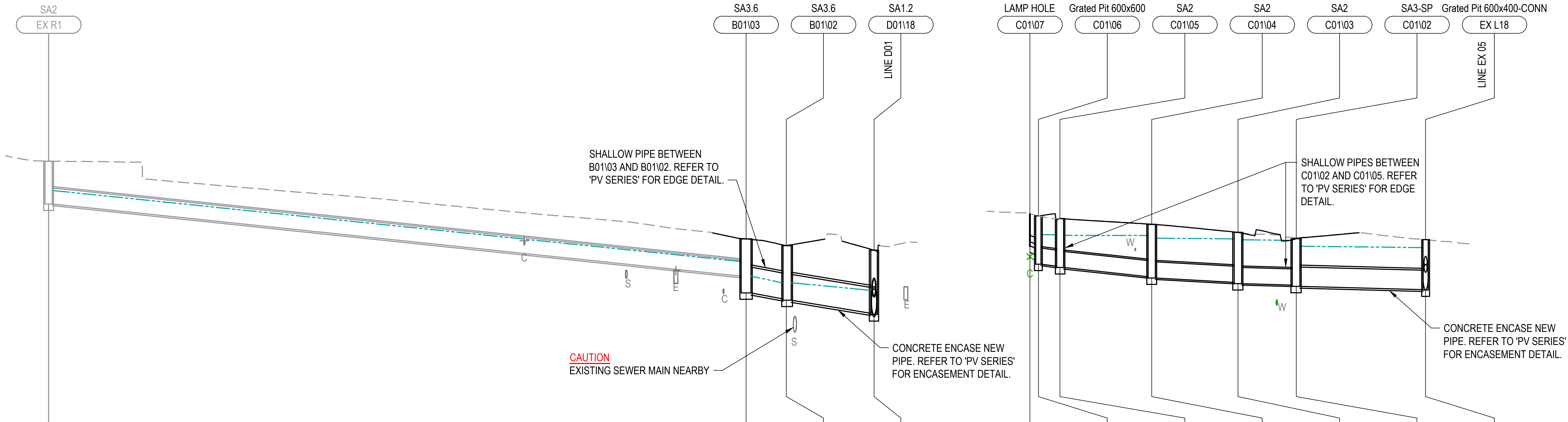
SHEET 2 OF 2

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-002002
ISSUE: 1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- 0_X $+_X$ — UTILITY (NEW)
- 0_X $+_X$ — UTILITY (EXISTING RETAINED)



LINE B01

	EX R1 – B01\03	B01\03 – B01\02	B01\02 – D01\18
10 YR ARI FLOW (m3/s)	0.19	0.36	0.43
10 YR ARI VELOCITY (m/s)	1.9	1.9	2.1
PIPE SIZE (mm) & CLASS	Ø375 EXISTING PIPE	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4
GRADE (%)	2.07%	3%	3%
LENGTH	L=81.078	L=4.674	L=10.201

DATUM R.L -2.00

	EX R1	B01\03	B01\02	D01\18
PIT LID / GRATE LEVEL	7.978	6.169	6.011	5.907
EXISTING SURFACE	7.978	6.169	6.013	5.906
10 YR ARI HYDRAULIC GRADE LEVEL	7.297	5.643 / 5.303	5.151 / 5.151	4.975 / 4.866
INVERT LEVEL	6.980	5.300 / 4.914	4.773 / 4.743	4.437 / 4.407
DEPTH TO INVERT	0.998	0.869 / 1.256	1.237 / 1.267	1.470 / 1.500
CHAINAGE	0.000	81.078	85.753	95.954

LINE C01

	C01\07 – C01\06	C01\06 – C01\05	C01\05 – C01\04	C01\04 – C01\03	C01\03 – C01\02	C01\02 – EX L18
10 YR ARI FLOW (m3/s)		0.03	0.04	0.07	0.07	0.13
10 YR ARI VELOCITY (m/s)		0.3	0.3	0.6	0.7	0.8
PIPE SIZE (mm) & CLASS	Ø200x100 RCBC	Ø375 RCP CLASS 4	Ø375 RCP CLASS 4	Ø375 RCP CLASS 4	Ø375 RCP CLASS 4	Ø450 RCP CLASS 4
GRADE (%)	5%	2%	2%	1%	0.5%	0.5%
LENGTH	L=0.982	L=2.504	L=10.669	L=10.027	L=6.779	L=15.039

DATUM R.L 1.00

	C01\07	C01\06	C01\05	C01\04	C01\03	C01\02	EX L18
PIT LID / GRATE LEVEL	9.753	9.702	9.641	9.509	9.322	9.172	9.153
EXISTING SURFACE	9.753	9.702	9.643	9.512	9.323	9.194	9.153
10 YR ARI HYDRAULIC GRADE LEVEL		9.266	9.265 / 9.252	9.247 / 9.185	9.171 / 9.148	9.136 / 8.999	8.967 / 8.803
INVERT LEVEL	9.001	8.952 / 8.583	8.533 / 8.503	8.289 / 8.259	8.159 / 8.129	8.095 / 8.065	7.990 / 7.980
DEPTH TO INVERT	0.752	0.750 / 1.119	1.109 / 1.139	1.219 / 1.249	1.163 / 1.193	1.076 / 1.106	1.163 / 1.173
CHAINAGE	0.000	0.982	3.486	14.155	24.182	30.961	46.000

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003001.DWG
DESIGN LOT CODE
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:14:39 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

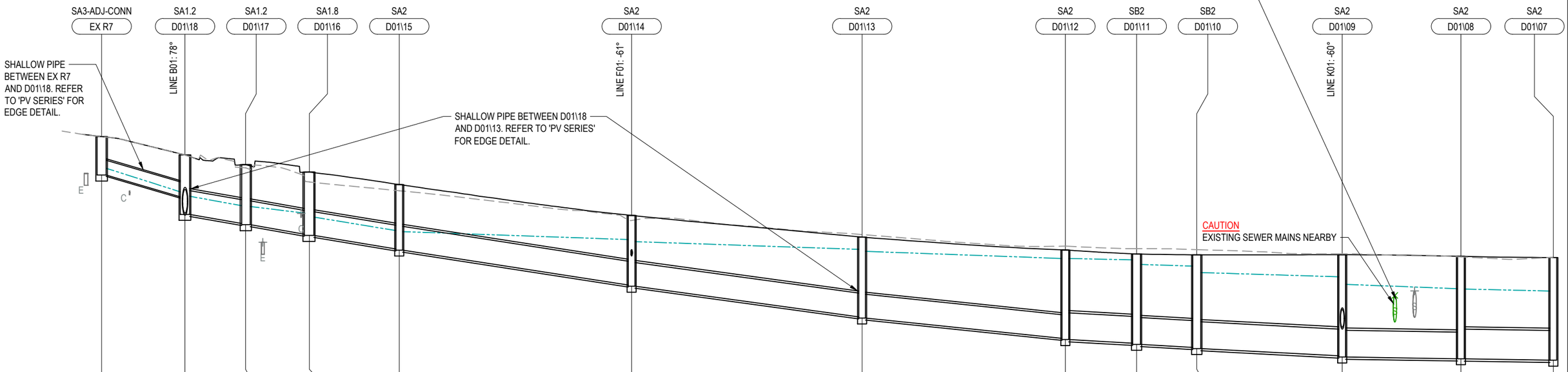
CLIENT: Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER LONG SECTIONS
SHEET 1 OF 5
A3
TfNSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No. -
SHEET No. SHT-SM-003001
ISSUE 1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- $0_x +_x$ — UTILITY (NEW)
- $0_x +_x$ — UTILITY (EXISTING RETAINED)

CONTRACTOR TO CONFIRM DEPTH AND ALIGNMENT OF SEWER MAINS PRIOR TO CONSTRUCTION OF THE NEW DRAINAGE LINE TO ENSURE NO CLASH BETWEEN STORMWATER PIPE AND SEWER PIPE PROTECTION. STORMWATER PIPE WITHOUT SOCKET ACHIEVES APPROXIMATELY 25 mm CLEARANCE BELOW PROPOSED SEWER MAIN CONCRETE ENCASEMENT. THE STORMWATER PIPE SOCKETS/JOINTS SHOULD BE PLACED EITHER SIDE OF THE SEWER MAINS OR IN BETWEEN THE SEWER MAINS AND SHOULD NOT BE PLACED DIRECTLY UNDER EITHER SEWER MAIN. CONTRACTOR TO CONFIRM NEW DRAINAGE PIPE HAS ADEQUATE CLEARANCE TO THE SEWER MAIN AND DESIGN PIPE GRADE CAN BE ACHIEVED.



	SA3-ADJ-CONN	SA1.2	SA1.2	SA1.8	SA2	SA2	SA2	SA2	SB2	SB2	SA2	SA2	SA2	
	EX R7	D01\18	D01\17	D01\16	D01\15	D01\14	D01\13	D01\12	D01\11	D01\10	D01\09	D01\08	D01\07	
10 YR ARI FLOW (m3/s)	0.06	0.5	0.5	0.51	0.49	0.5	0.51	0.52	0.62	0.65	0.73	0.73		
10 YR ARI VELOCITY (m/s)	1.8	2.2	2.1	2.2	2.1	1.8	1.8	1.5	1.7	1.8	2	1.7		
PIPE SIZE (mm) & CLASS	Ø375 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 3	Ø675 RCP CLASS 3	Ø675 RCP CLASS 3	Ø675 RCP CLASS 3 MARINE GRADE	Ø675 RCP CLASS 3 MARINE GRADE	Ø750 RCP CLASS 3 MARINE GRADE		
GRADE (%)	5.21%	3%	3%	3%	3%	2.65%	2%	1%	1%	1%	0.3%	0.3%		
DATUM R.L	-4.00													
PIT LID / GRATE LEVEL	6.372	5.907	5.662	5.475	5.161	4.382	3.833	3.507	3.407	3.386	3.391	3.347	3.318	
EXISTING SURFACE	6.370	5.906	5.581	5.227	5.003	4.254	3.898	3.605	3.542	3.518	3.412	3.334	3.323	
10 YR ARI HYDRAULIC GRADE LEVEL	5.572 / 4.975	4.866 / 4.629	4.607 / 4.438	4.339 / 3.998	3.972 / 3.772	3.719 / 3.525	3.474 / 3.295	3.295 / 3.258	3.143 / 3.103	2.939 / 2.832	2.642 / 2.531	2.523 / 2.473		
INVERT LEVEL	5.400 / 4.850	4.407 / 4.177	4.147 / 3.906	3.876 / 3.535	3.505 / 2.623	2.593 / 1.821	1.791 / 1.277	1.247 / 1.157	1.127 / 1.051	1.021 / 0.837	0.807 / 0.762	0.762 / 0.727		
DEPTH TO INVERT	0.972 / 1.057	1.500 / 1.484	1.514 / 1.569	1.599 / 1.626	1.656 / 1.759	1.789 / 2.013	2.043 / 2.230	2.260 / 2.250	2.280 / 2.335	2.365 / 2.554	2.584 /	2.585 /		
CHAINAGE	0.000 L=10.543	10.543 L=7.661	18.205 L=8.061	26.265 L=11.357	37.622 L=29.383	67.005 L=29.140	96.145 L=25.693	121.838 L=9.014	130.851 L=7.605	138.457 L=18.401	156.858 L=15.000	171.868 L=11.679	183.536	

LINE D01

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003002.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:14:50 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER LONG SECTIONS

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

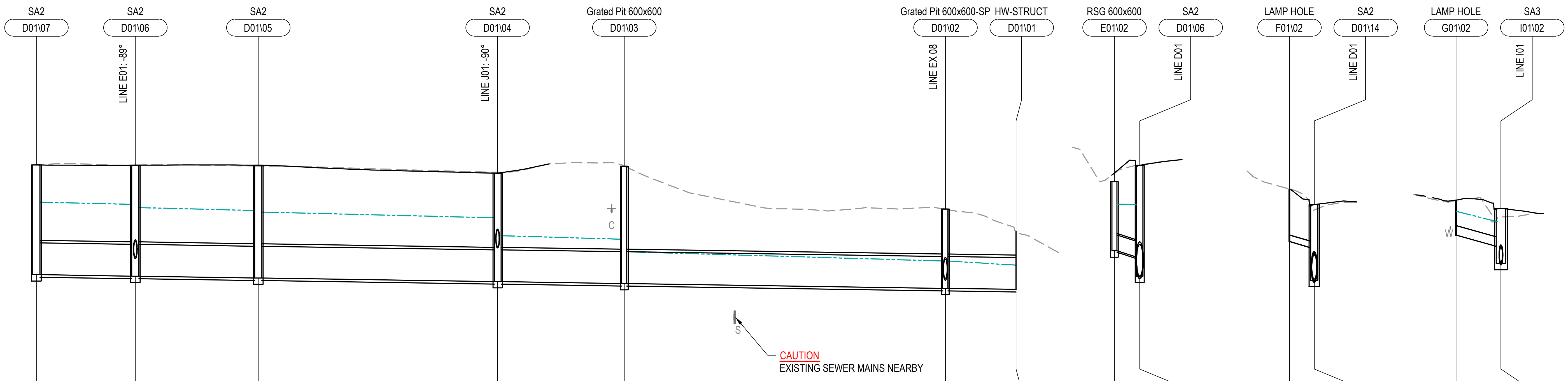
SHEET No.: SHT-SM-003002

ISSUE: 1

Last saved by: MEGHWARB(2020-11-23) Last Plotted: 2020-11-23

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- 0_X $+_X$ — UTILITY (NEW)
- 0_X $+_X$ — UTILITY (EXISTING RETAINED)



10 YR ARI FLOW (m3/s)		0.73		0.78		0.78		0.84		0.84		0.85		
10 YR ARI VELOCITY (m/s)		1.7		1.8		1.8		1.9		2.1		2.4		
PIPE SIZE (mm) & CLASS		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 4 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		
GRADE (%)		0.3%		0.3%		0.3%		0.3%		0.3%		0.3%		
DATUM R.L		-6.00												
PIT LID / GRATE LEVEL		3.318		3.312		3.313		3.124		3.290		2.278		1.756
EXISTING SURFACE		3.323		3.319		3.294		3.147		3.290		2.278		1.756
10 YR ARI HYDRAULIC GRADE LEVEL	2.473	2.439	2.389	2.312	2.242	2.207	2.070	1.648	1.564	1.269	1.050	1.050	0.952	0.952
INVERT LEVEL	0.727	0.727	0.692	0.692	0.648	0.648	0.564	0.564	0.519	0.519	0.405	0.405	0.380	0.380
DEPTH TO INVERT		2.591		2.620		2.664		2.560		2.771		1.873		1.376
CHAINAGE		183.536	L=11.678	195.214	L=14.515	209.729	L=28.266	237.995	L=14.963	252.958	L=37.915	290.873	L=8.338	299.211

LINE D01

10 YR ARI FLOW (m3/s)	0.05		
10 YR ARI VELOCITY (m/s)	0.5		
PIPE SIZE (mm) & CLASS	Ø375 RCP CLASS 3 MARINE GRADE		
GRADE (%)	5%		
DATUM R.L	-6.00		
PIT LID / GRATE LEVEL	3.131		3.312
EXISTING SURFACE	3.120		3.319
10 YR ARI HYDRAULIC GRADE LEVEL	2.392	2.389	2.312
INVERT LEVEL	1.291	1.142	0.692
DEPTH TO INVERT	1.635	2.171	2.620
CHAINAGE	0.000	L=2.988	2.988

LINE E01

10 YR ARI FLOW (m3/s)			
10 YR ARI VELOCITY (m/s)			
PIPE SIZE (mm) & CLASS	Ø(2x)150 PVC-U		
GRADE (%)	5%		
DATUM R.L	-4.00		
PIT LID / GRATE LEVEL	4.752		4.382
EXISTING SURFACE	4.752		4.254
10 YR ARI HYDRAULIC GRADE LEVEL			3.704
INVERT LEVEL	3.511	3.364	2.593
DEPTH TO INVERT	1.241	1.018	1.789
CHAINAGE	0.000	L=2.936	2.936

LINE F01

10 YR ARI FLOW (m3/s)	0.02		
10 YR ARI VELOCITY (m/s)	1.1		
PIPE SIZE (mm) & CLASS	Ø225 PVC-U		
GRADE (%)	5%		
DATUM R.L	-2.00		
PIT LID / GRATE LEVEL	6.490		6.294
EXISTING SURFACE	6.483		6.089
10 YR ARI HYDRAULIC GRADE LEVEL	6.224	5.978	5.598
INVERT LEVEL	5.661	5.396	4.993
DEPTH TO INVERT	0.828	0.898	1.301
CHAINAGE	21.188	L=5.305	-15.882

LINE G01

CHECK PRINT

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003003.DWG

DESIGN LOT CODE

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:15:00 PM — PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER LONG SECTIONS

A3

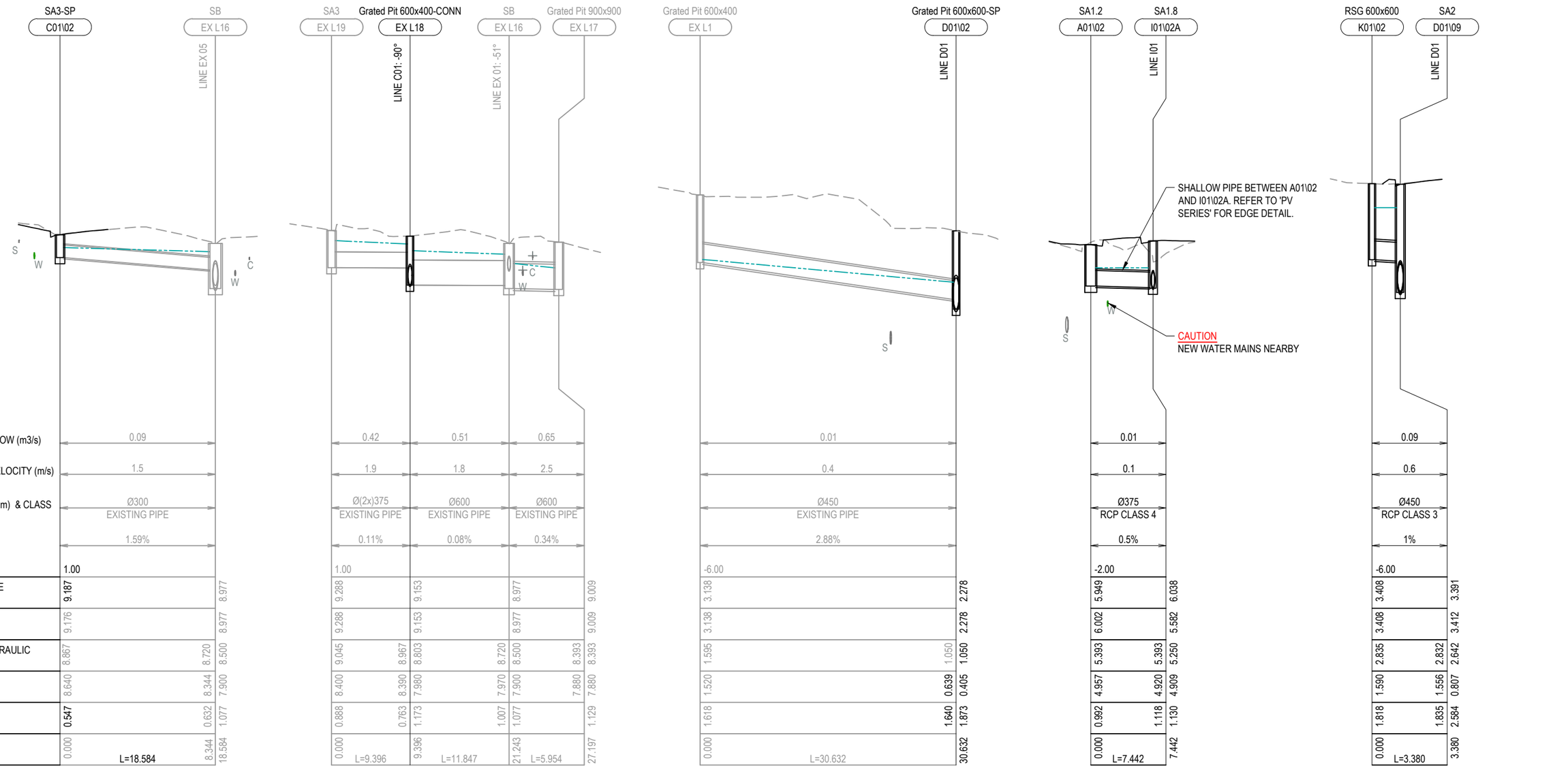
SHEET 3 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN — EDMS No.: - — SHEET No.: SHT-SM-003003 — ISSUE: 1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- $0_x +_x$ — UTILITY (NEW)
- $0_x +_x$ — UTILITY (EXISTING RETAINED)



	LINE EX 01			LINE EX 05			LINE EX 08		LINE A01		LINE K01	
10 YR ARI FLOW (m3/s)	0.09			0.42	0.51	0.65	0.01		0.01		0.09	
10 YR ARI VELOCITY (m/s)	1.5			1.9	1.8	2.5	0.4		0.1		0.6	
PIPE SIZE (mm) & CLASS	Ø300 EXISTING PIPE			Ø(2x)375 EXISTING PIPE	Ø600 EXISTING PIPE	Ø600 EXISTING PIPE	Ø450 EXISTING PIPE		Ø375 RCP CLASS 4		Ø450 RCP CLASS 3	
GRADE (%)	1.59%			0.11%	0.08%	0.34%	2.88%		0.5%		1%	
DATUM R.L	1.00			1.00			-6.00		-2.00		-6.00	
PIT LID / GRATE LEVEL	9.187		8.977	9.288	9.153	8.977	3.138	2.278	5.949	6.038	3.408	3.391
EXISTING SURFACE	9.176	8.977	8.977	9.288	9.153	8.977	3.138	2.278	6.002	5.582	3.408	3.412
10 YR ARI HYDRAULIC GRADE LEVEL	8.867	8.720	8.500	9.045	8.967	8.803	8.720	8.500	8.393	1.595	1.050	5.393	5.250	2.835	2.832	2.642
INVERT LEVEL	8.640	8.344	7.900	8.400	8.390	7.980	7.970	7.900	7.880	1.520	0.639	4.957	4.920	4.909	1.590	1.556	0.807
DEPTH TO INVERT	0.547	0.632	1.077	0.888	0.763	1.173	1.007	1.077	1.129	1.618	1.640	1.873	0.992	1.118	1.130	1.818	1.835	2.584
CHAINAGE	0.000	L=18.584	8.344	18.584	0.000	L=9.396	9.396	L=11.847	21.243	L=5.954	27.197	0.000	L=30.632	30.632	0.000	L=7.442	7.442	0.000	L=3.380	3.380

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
PW:/P0043031-SHT-SM-003004.DWG	-	-	23-Nov-20 / 9:14:28 PM	MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER LONG SECTIONS

A3

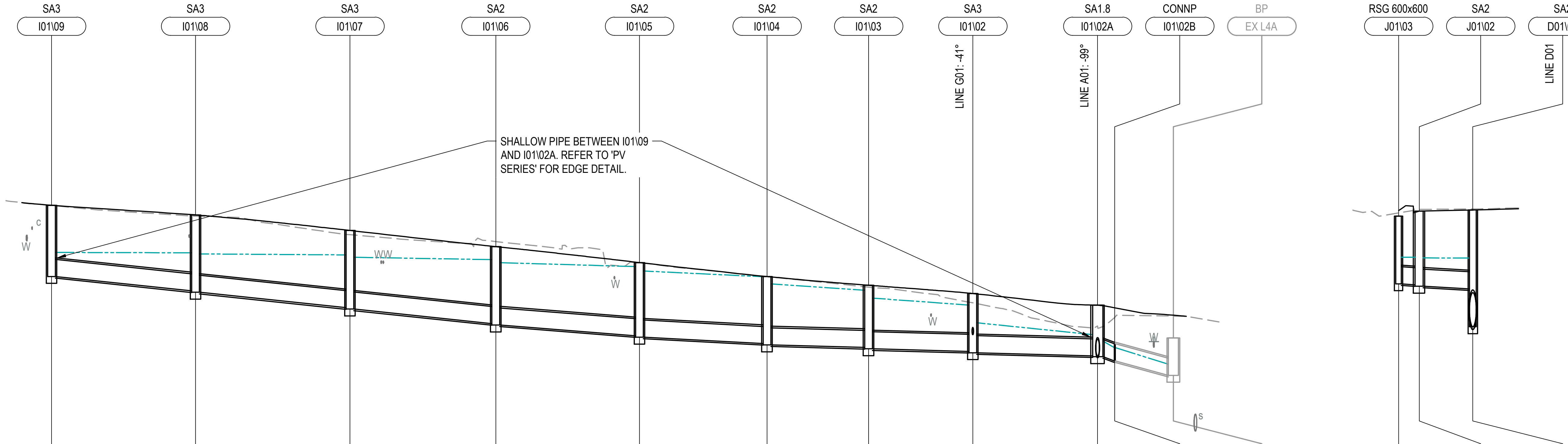
SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-003004	1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- 0_x $+_x$ — UTILITY (NEW)
- 0_x $+_x$ — UTILITY (EXISTING RETAINED)



LINE I01

DATUM R.L -1.00

PIT	PIT LID / GRATE LEVEL	EXISTING SURFACE	CHAINAGE
SA3 I01\09	8.229	8.225	0.000
SA3 I01\08	8.015	7.989	15.787
SA3 I01\07	7.675	7.582	32.710
SA2 I01\06	7.322	7.433	48.707
SA2 I01\05	6.972	6.972	64.463
SA2 I01\04	6.665	6.665	78.445
SA2 I01\03	6.475	6.434	89.579
SA3 I01\02	6.294	6.089	101.013
SA1.8 I01\02A	6.038	5.582	114.700
CONNP I01\02B	5.981	5.767	116.577
BP EX L4A	5.819	5.799	123.008

PIPE	10 YR ARI FLOW (m3/s)	10 YR ARI VELOCITY (m/s)	PIPE SIZE (mm) & CLASS	GRADE (%)	LENGTH	10 YR ARI HYDRAULIC GRADE LEVEL (start / end)	INVERT LEVEL (start / end)	DEPTH TO INVERT (start / end)
I01\09 – I01\08	0.05	0.4	Ø375 RCP CLASS 3	2%	L=15.787	7.194 / 7.186	6.667 / 6.351	1.562 / 1.664
I01\08 – I01\07	0.07	0.6	Ø375 RCP CLASS 3	2%	L=16.924	7.162 / 7.140	6.321 / 5.982	1.694 / 1.693
I01\07 – I01\06	0.1	0.9	Ø375 RCP CLASS 3	2%	L=15.996	7.089 / 7.036	5.952 / 5.632	1.723 / 1.689
I01\06 – I01\05	0.13	1.2	Ø375 RCP CLASS 3	1.5%	L=15.756	6.970 / 6.884	5.602 / 5.366	1.719 / 1.606
I01\05 – I01\04	0.17	1.5	Ø375 RCP CLASS 3	1%	L=13.982	6.787 / 6.662	5.336 / 5.196	1.636 / 1.469
I01\04 – I01\03	0.19	1.8	Ø375 RCP CLASS 3	0.5%	L=11.134	6.506 / 6.367	5.166 / 5.111	1.499 / 1.364
I01\03 – I01\02	0.2	1.8	Ø375 RCP CLASS 3	0.5%	L=11.434	6.193 / 6.040	5.081 / 5.023	1.394 / 1.271
I01\02 – I01\02A	0.24	2.2	Ø375 RCP CLASS 3	0.5%	L=13.687	5.652 / 5.393	4.993 / 4.925	1.301 / 1.113
I01\02A – I01\02B	0.25	2.7	Ø375 RCP CLASS 4	4.92%	L=1.877	5.250 / 5.109	4.909 / 4.816	1.130 /
I01\02B – EX L4A	0.25	3.3	Ø375 EXISTING PIPE	4.92%	L=6.431	5.109 / 4.742	4.816 / 4.500	0.375 /
EX L4A						4.742	4.500	1.319

LINE J01

DATUM R.L -6.00

PIT	PIT LID / GRATE LEVEL	EXISTING SURFACE	CHAINAGE
RSG 600x600 J01\03	3.114	3.059	0.000
SA2 J01\02	3.102	3.138	2.281
SA2 D01\04	3.124	3.147	8.143

PIPE	10 YR ARI FLOW (m3/s)	10 YR ARI VELOCITY (m/s)	PIPE SIZE (mm) & CLASS	GRADE (%)	LENGTH	10 YR ARI HYDRAULIC GRADE LEVEL (start / end)	INVERT LEVEL (start / end)	DEPTH TO INVERT (start / end)
J01\03 – J01\02	0.04	0.4	Ø375 RCP CLASS 3	1%	L=2.281	2.089 / 2.088	1.506 / 1.483	1.483 / 1.619
J01\02 – D01\04	0.05	0.4	Ø375 RCP CLASS 3	1%	L=5.863	2.074 / 2.070	1.453 / 1.395	1.649 / 1.729
D01\04						1.648	0.564	2.560

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003005.DWG
DESIGN LOT CODE
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:04:13 PM — PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	PRE-AFC		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

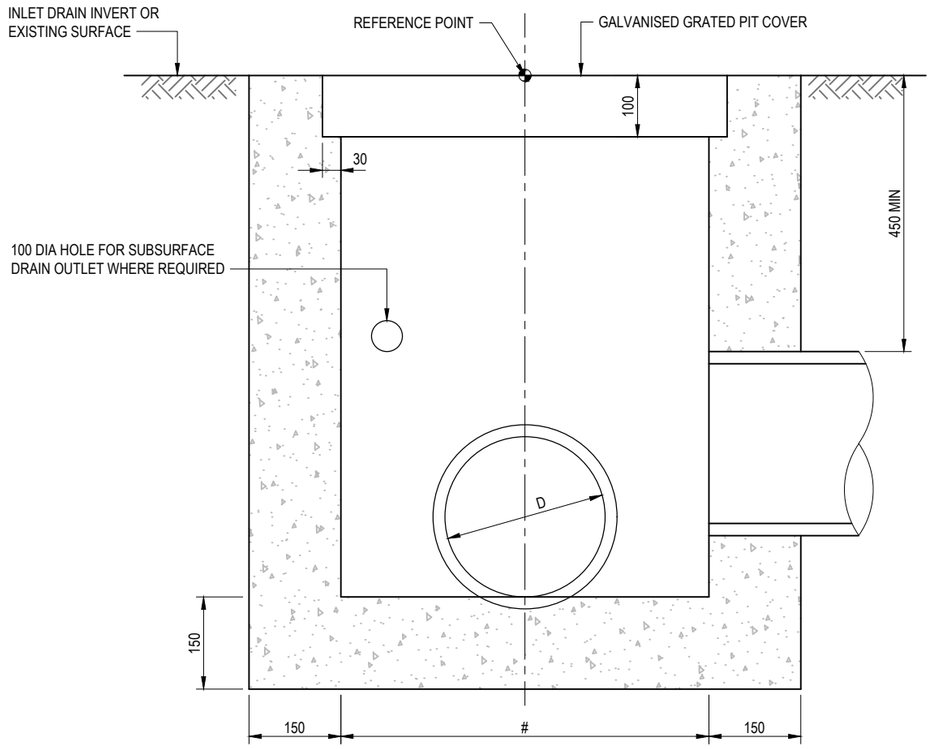
SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE
DISCIPLINE
DISCIPLINE
DISCIPLINE
DISCIPLINE
BACKDRAFTED/CORRECTED
CONFIRMED

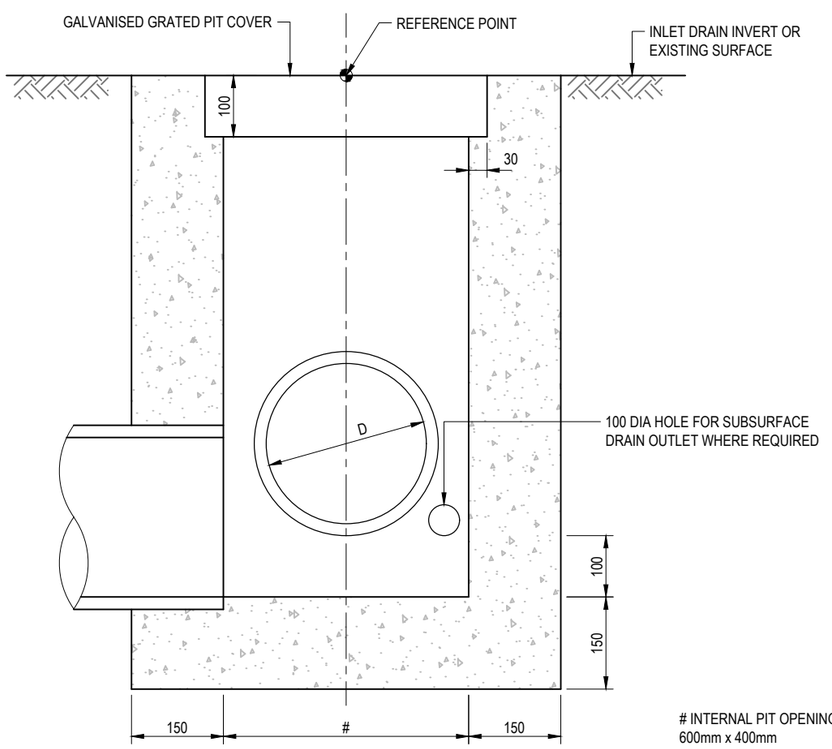
CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER LONG SECTIONS

A3
SHEET 5 OF 5
TfNSW REGISTRATION No. DS2020/000130 — PART 1
ISSUE STATUS: DETAILED DESIGN — EDMS No. - — SHEET No. SHT-SM-003005 — ISSUE 1

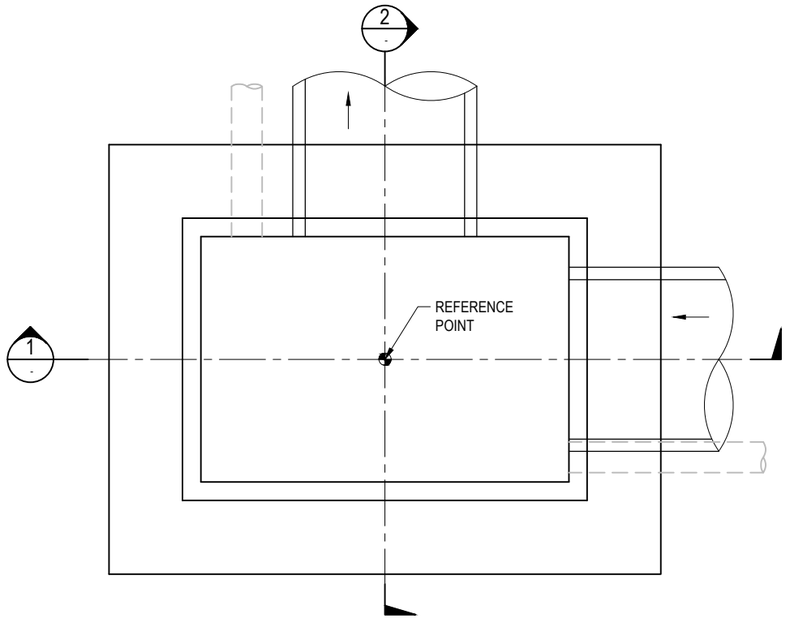


SECTION 1
SCALE 1:10

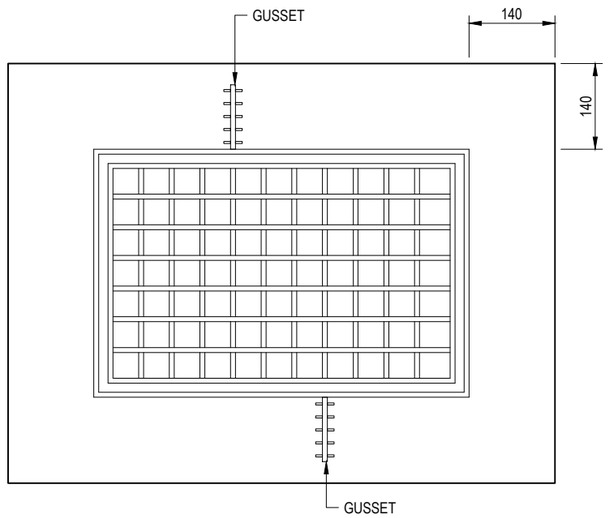


SECTION 2
SCALE 1:10

INTERNAL PIT OPENING SIZE
600mm x 400mm
600mm x 600mm
600mm x 900mm
900mm x 900mm
1200mm x 1200mm



PLAN (GRATE NOT SHOWN)
SCALE 1:10



GRATE
SCALE 1:10

NOTES:

1. CONCRETE GRADE N25.
2. LOCATION AND LEVEL OF INLET SUMP SHOWN IN THE DRAWINGS REFER TO THIS POINT:
3. SIDE WALLS OF ALL PITS DEEPER THAN 1500 TO BE REINFORCED WITH ONE LAYER OF F82 MESH RETURNED 300 INTO BASE.
4. DEPTH OF JUNCTION BOX NOT TO EXCEED 3500.
5. MINIMUM COVER OF REINFORCEMENT SHALL BE 50 UNLESS SHOWN OTHERWISE.
6. STEEL GRATES AND FRAMES ARE TO BE FABRICATED FROM MILD STEEL AND HOT DIP GALVANISED.
7. GRATING PATTERN AND BAR SIZES MAY VARY BUT SHALL BE CLASS D AND BICYCLE SAFE IN ACCORDANCE WITH AS 3996 UNLESS OTHERWISE STATED.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000501.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:24:20 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.05 0 0.05 0.1 0.15 0.2m — 1 : 10 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

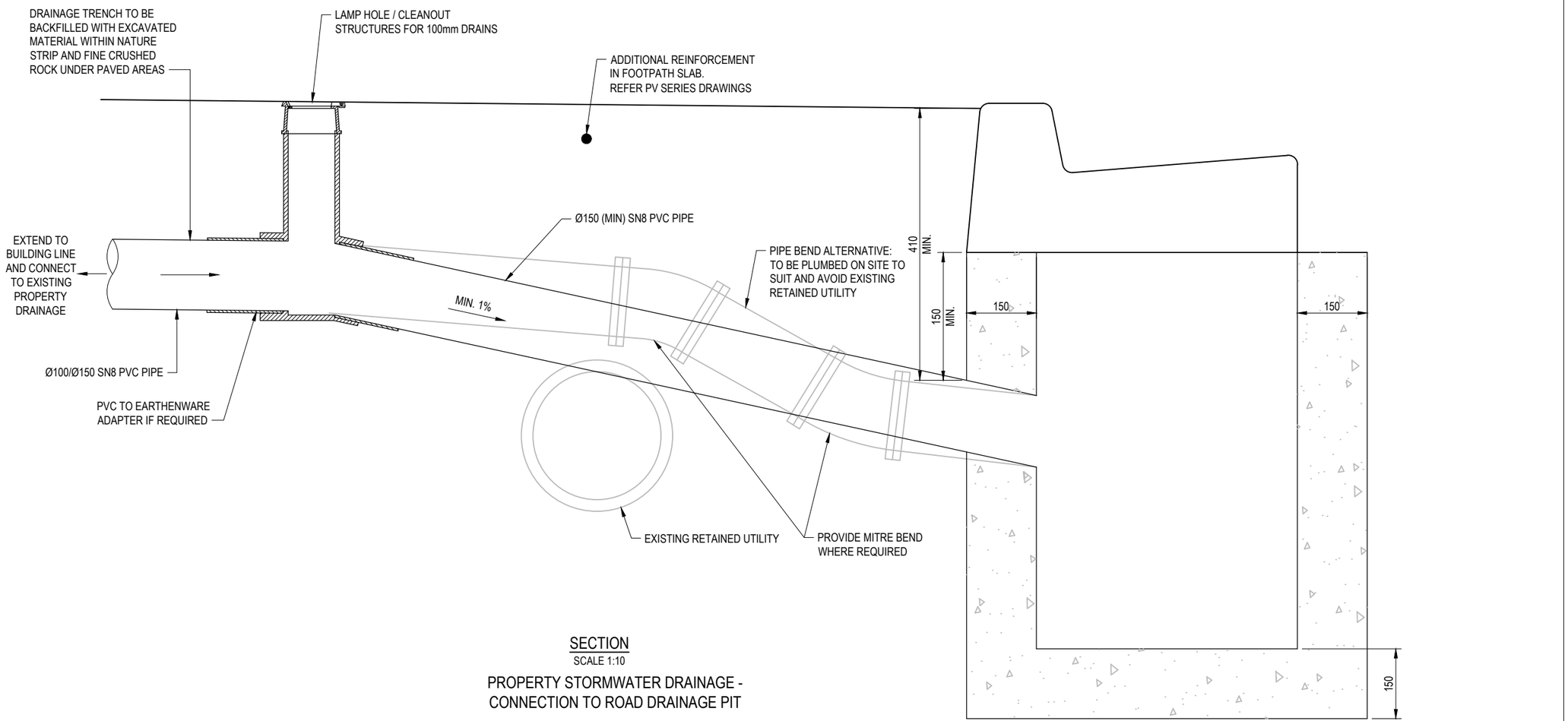
PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS

A3
SHEET 1 OF 7

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000501	1



SECTION
SCALE 1:10

PROPERTY STORMWATER DRAINAGE - CONNECTION TO ROAD DRAINAGE PIT

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000502.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:13:20 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.05 0 0.05 0.1 0.15 0.2m — 1 : 10 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

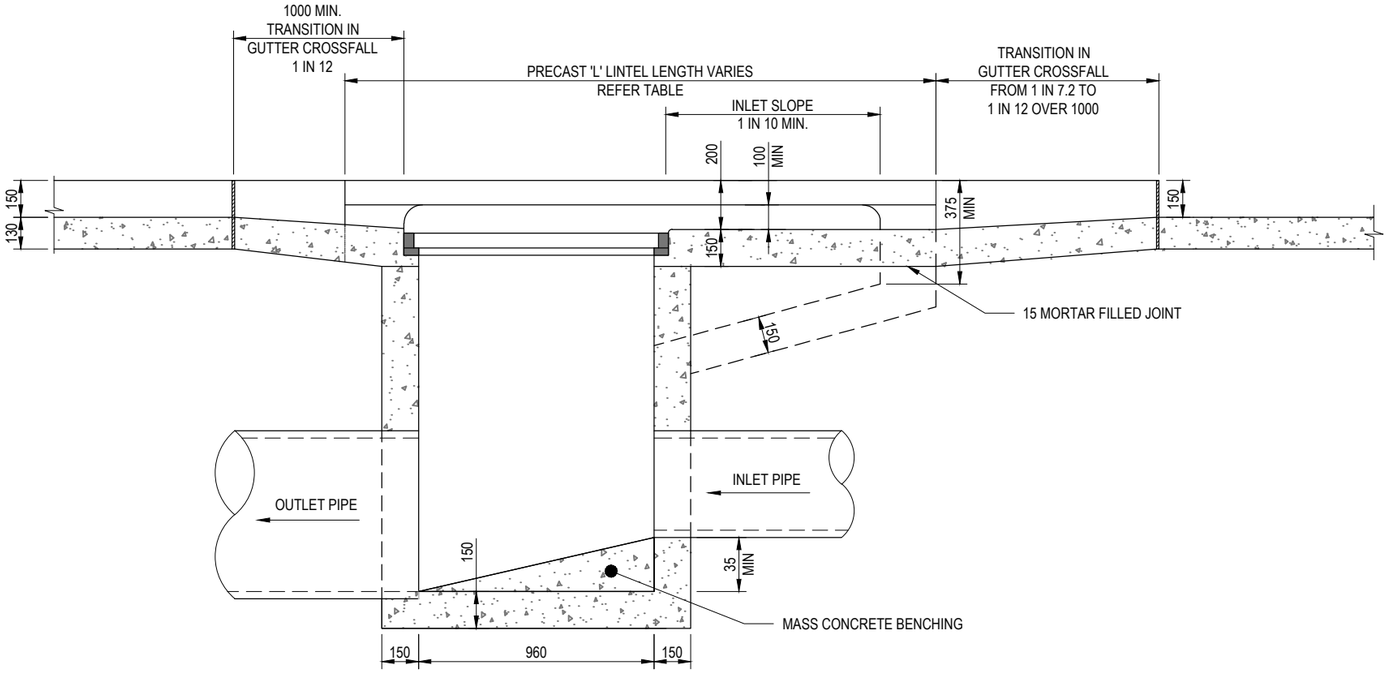
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER DETAILS

A3

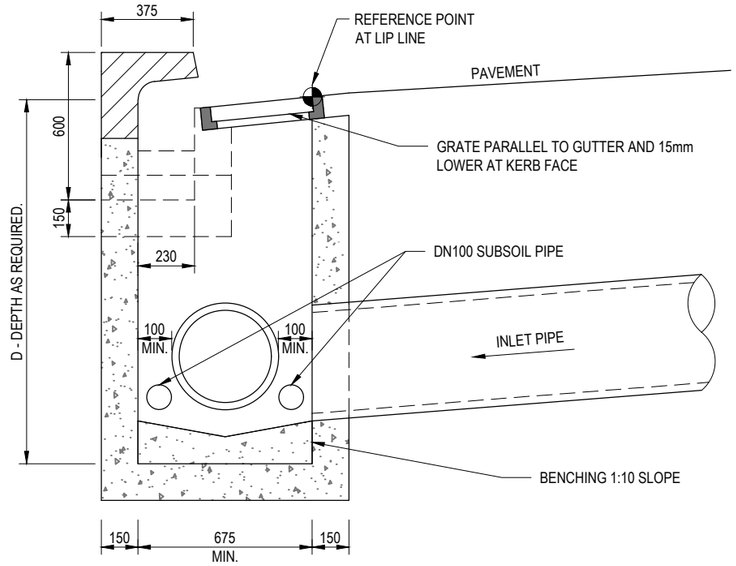
SHEET 2 OF 7

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

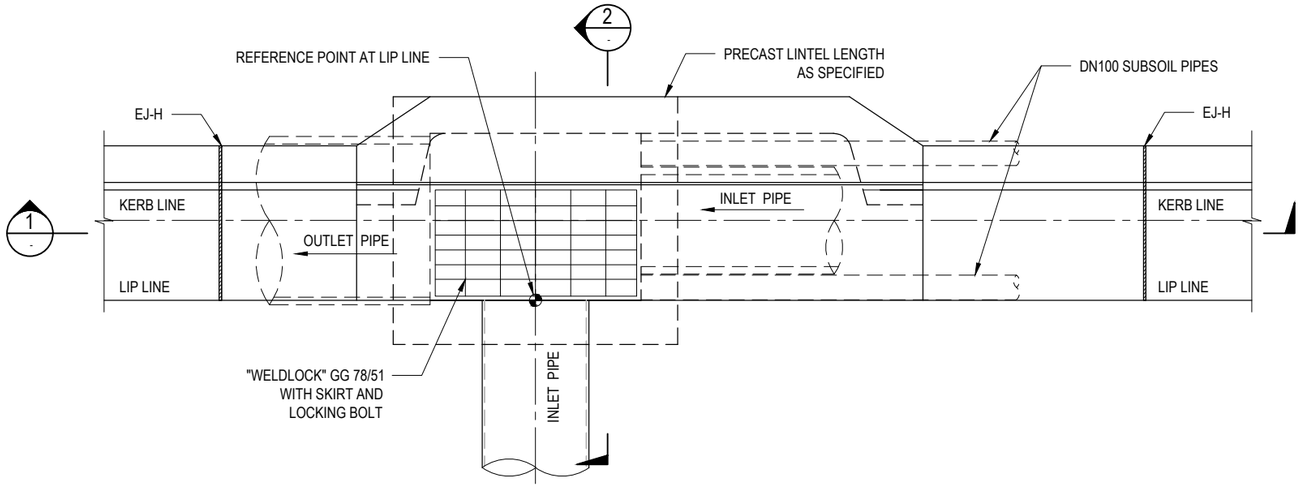
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000502	1



SECTION 1
SCALE 1:25



SECTION 2
SCALE 1:25



PLAN - TYPE SA PIT TO SUIT COUNCIL GUTTER (ON GRADE)
SCALE 1:25

PRECAST LINTEL SIZES	
NOMINAL OPENING SIZE (m)	OVERALL LENGTH 'L' (mm)
1.2	1825
1.8	2438
2.4	3048
3.0	3657
3.6	4267

NOTES

1. REFER TO GENERAL NOTES.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. LOCATION AND LEVEL OF PIT SHOWN IN DRAWINGS REFER TO THIS POINT.
4. FOR PIPE DIAMETERS GREATER THAN 450 OR MULTIPLE PIPES REFER TO RMS DRAWING R0220-28 OR OTHER SPECIFIED HAUNCH DETAIL.
5. DEPTH OF PIT TO NOT EXCEED 3500.
6. PITS DEEPER THAN 1200 TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH RMS DRAWING R0220-45.
7. MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 32 MPa U.N.O.
8. NOMINAL CLEAR COVER TO REINFORCEMENT NEAREST TO CAST INSITU CONCRETE SURFACES FOR:
   a. SURFACE IN CONTACT WITH SOIL = 75
   b. SURFACE IN CONTACT WITH AIR = 40
9. EDGES SHALL BE CHAMFERED 20 x 20.
10. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671.
11. ALL BARS SHALL BE GRADE D500N DEFORMED RIBBED BAR U.N.O.
12. ALL EXPOSED STEEL TO BE GALVANISED IN ACCORDANCE WITH AS1214 AND TO BE 375 g/m².
13. LAPS NOT SHOWN ON THE DRAWINGS SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY CROSS SECTION.
14. ALL LAPPED PORTIONS OF BARS SHALL BE IN CONTACT REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
15. ALL PIT GRATES AND FRAMES TO BE "MEDIUM / HEAVY TRAFFICABLE" BIKE SAFE CLASS "D" GRATES AND FRAMES TO AS3996.
16. DESIGN LOADS TO AS5100.2 AND PITS DESIGNED TO AS3600.
17. SIDE WALLS OF PITS DEEPER THAN 1500 ARE TO BE REINFORCED WITH ONE LAYER OF RL1218 MESH RETURNED 300 INTO BASE.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000503.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:13:32 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.125 0 0.125 0.25 0.375m; 1 : 25 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

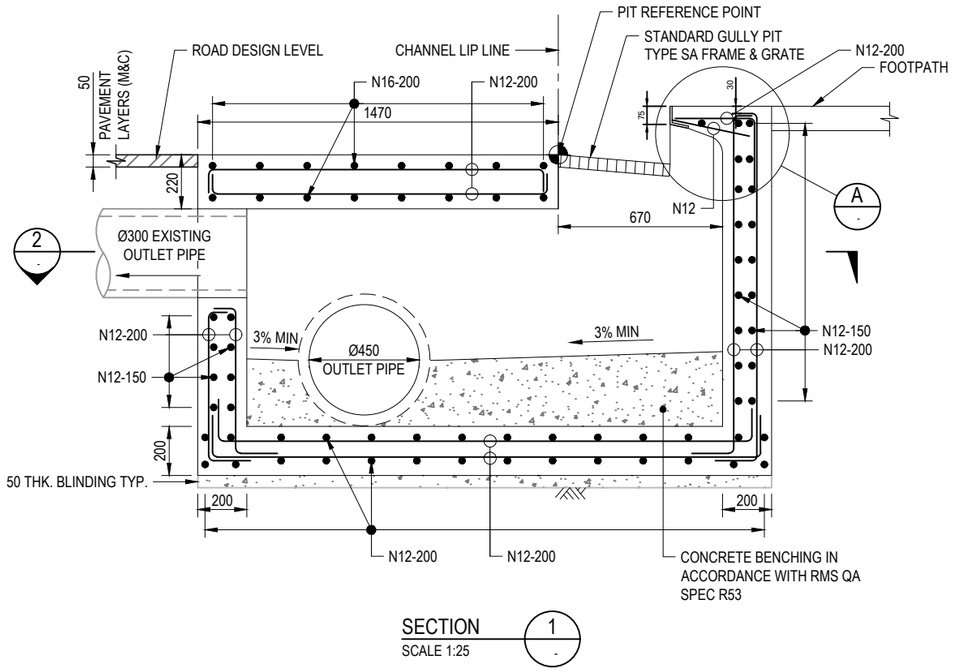
PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

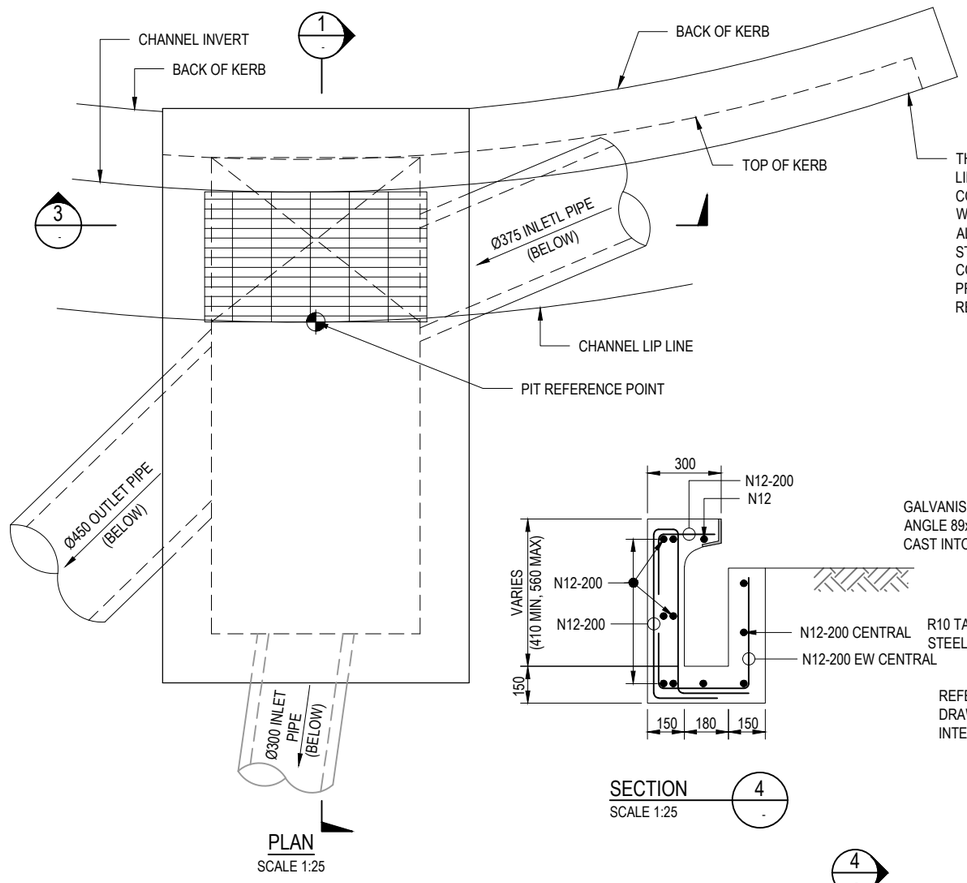
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER DETAILS

A3
SHEET 3 OF 7

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-000503
ISSUE: 1



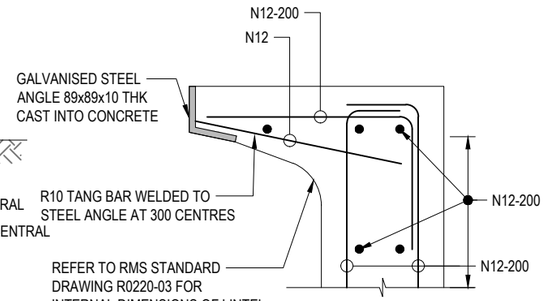
SECTION 1
SCALE 1:25



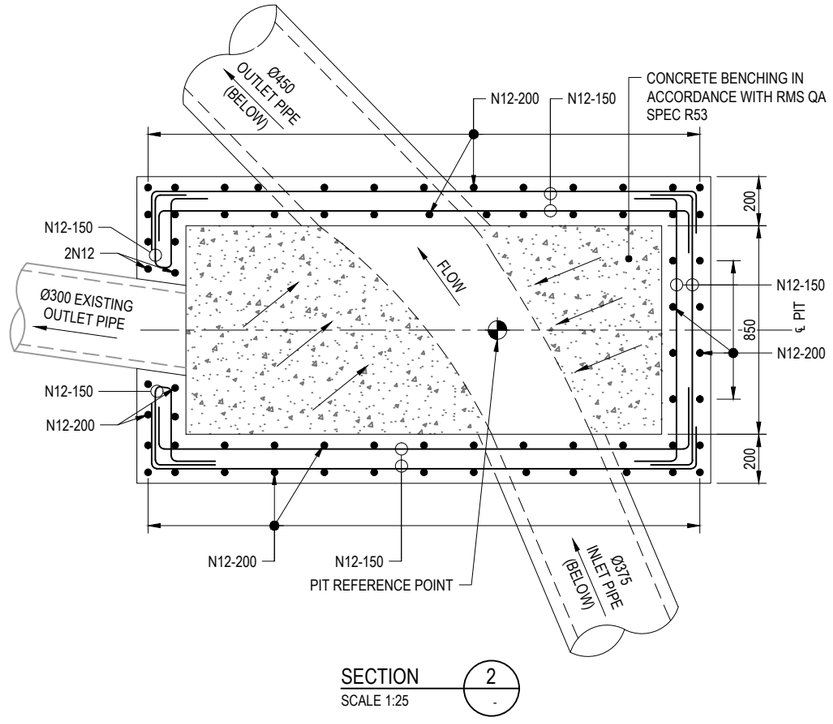
PLAN
SCALE 1:25

THE CONTRACTOR MAY PROPOSE THE USE OF A PRECAST LINTEL INSTEAD OF THE DESIGNED IN-SITU LINTEL. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE PRINCIPAL WITH DOCUMENTATION SHOWING THE PROPOSED ALTERNATIVE LINTEL AND MODIFICATIONS TO THE PIT STRUCTURE TO ACCOMMODATE THE PRECAST LINTEL. THIS CONTRACTOR MUST ALSO PROVIDE CERTIFICATION THAT THE PROPOSED ALTERNATIVE DESIGN IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT DESIGN STANDARDS.

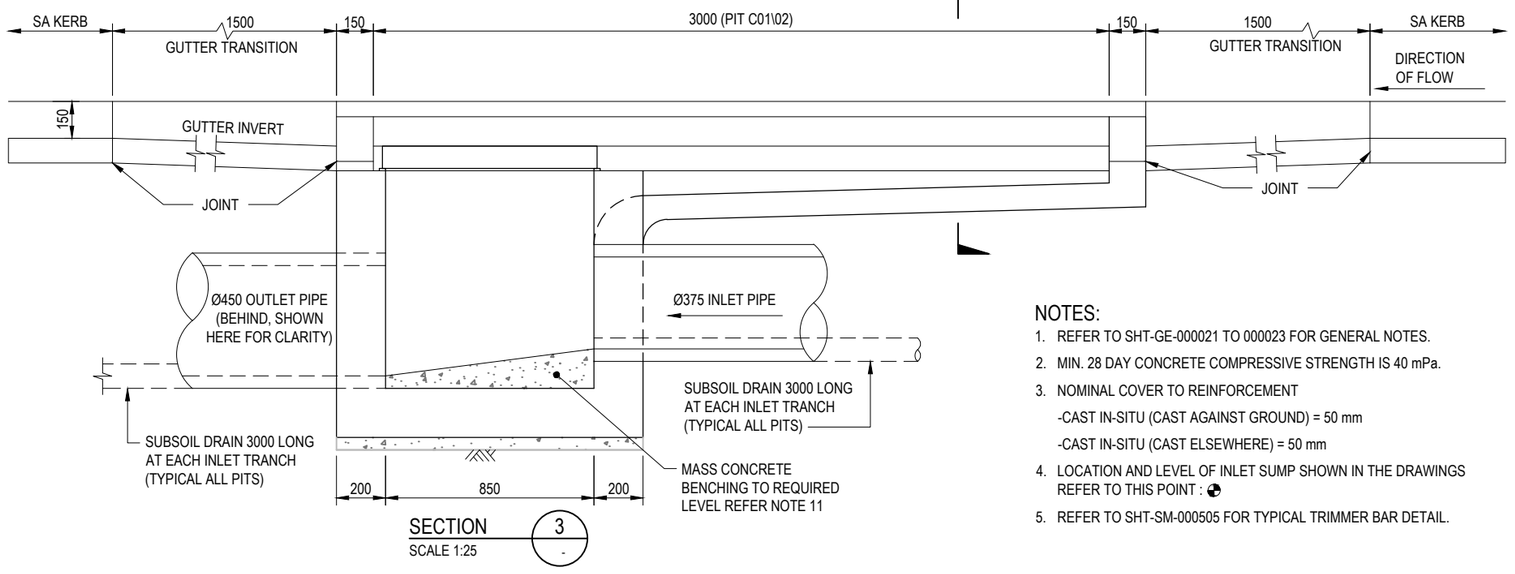
SECTION 4
SCALE 1:25



DETAIL A
SCALE 1:10



SECTION 2
SCALE 1:25



SECTION 3
SCALE 1:25

NOTES:

1. REFER TO SHT-GE-000021 TO 000023 FOR GENERAL NOTES.
2. MIN. 28 DAY CONCRETE COMPRESSIVE STRENGTH IS 40 mPa.
3. NOMINAL COVER TO REINFORCEMENT
   -CAST IN-SITU (CAST AGAINST GROUND) = 50 mm
   -CAST IN-SITU (CAST ELSEWHERE) = 50 mm
4. LOCATION AND LEVEL OF INLET SUMP SHOWN IN THE DRAWINGS REFER TO THIS POINT : ⊕
5. REFER TO SHT-SM-000505 FOR TYPICAL TRIMMER BAR DETAIL.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000504.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:03:23 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.05 0 0.05 0.1 0.15 0.2m — 1 : 10 FULL SIZE A3; 0.125 0 0.125 0.25 0.375m — 1 : 25 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

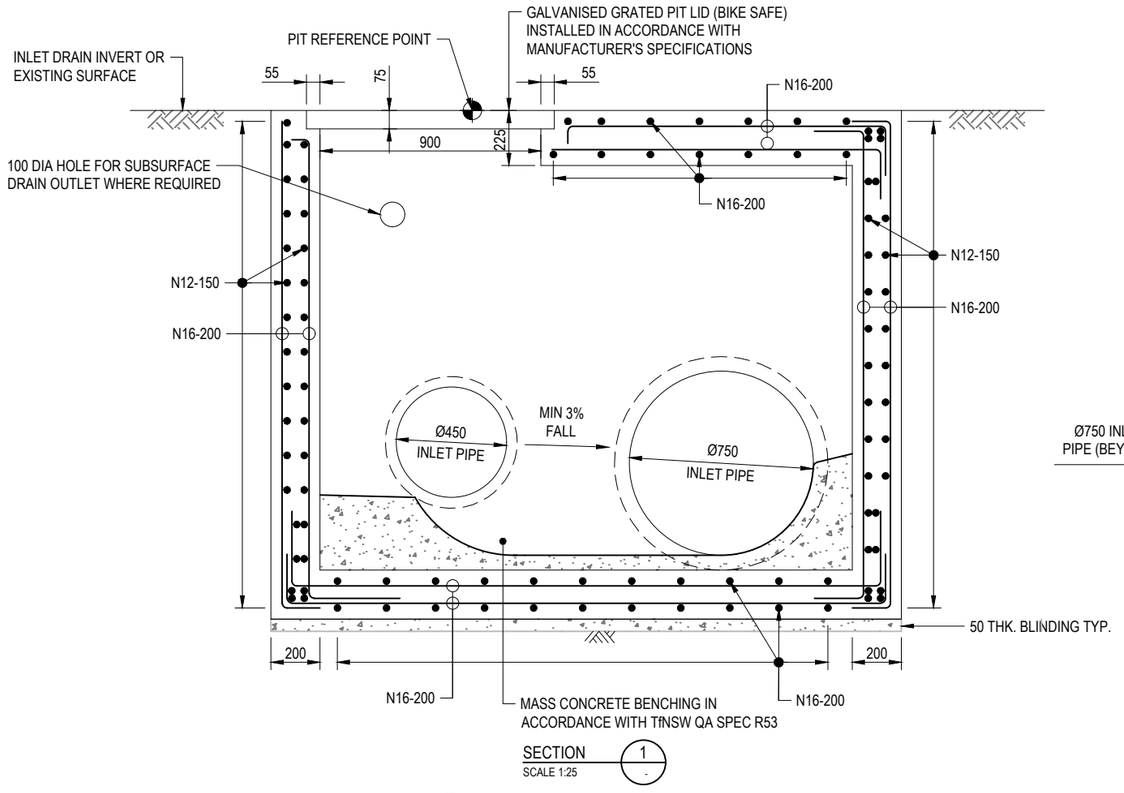
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS

A3
SHEET 4 OF 7

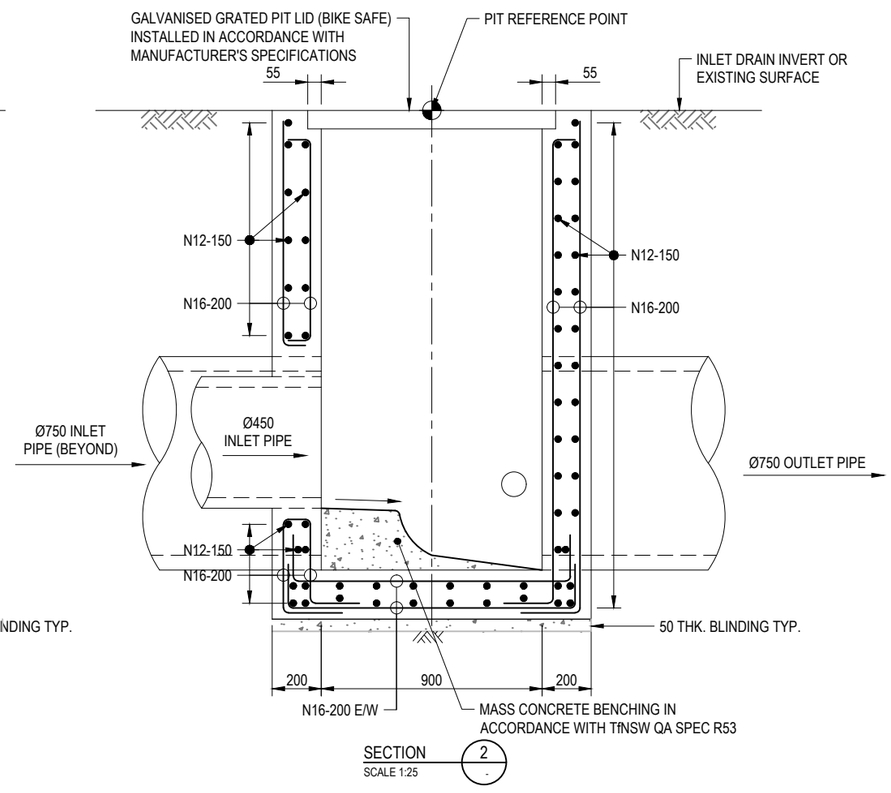
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

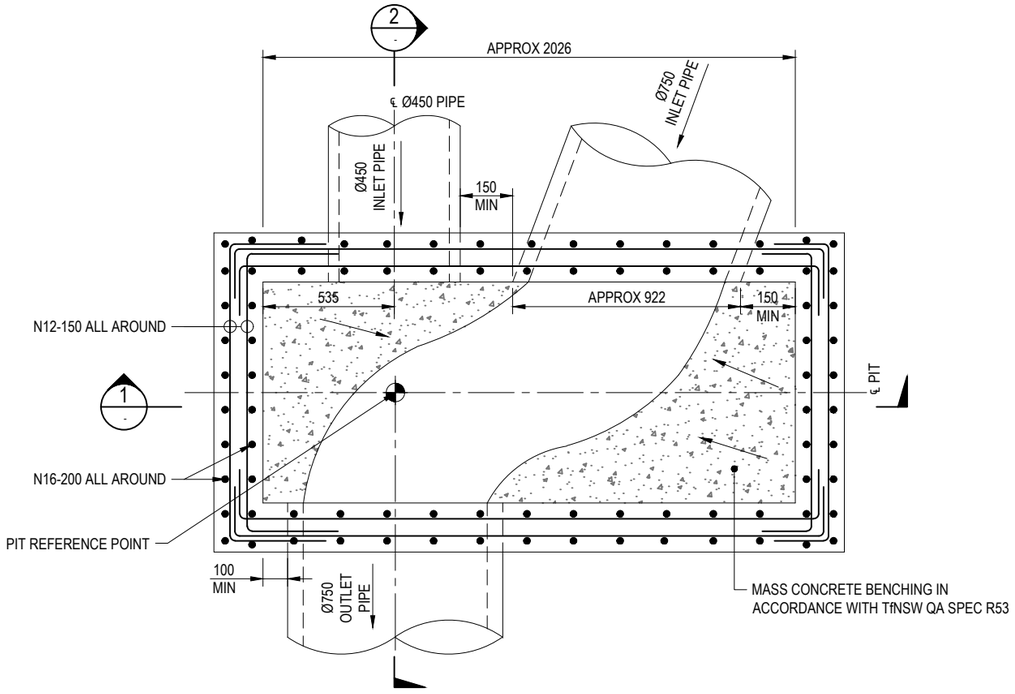
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-000504
ISSUE: 1



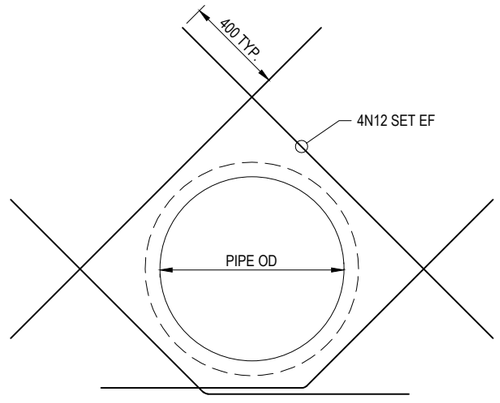
SECTION 1
SCALE 1:25



SECTION 2
SCALE 1:25



PLAN (GRATE NOT SHOWN)-D01/02
SCALE 1:25



TYPICAL TRIMMER BAR DETAIL
SCALE 1:25

NOTES:
1. REFER TO SHT-SM-000504 FOR DRAWING NOTES.

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED | 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000505.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:03:42 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	06.11.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.125 0 0.125 0.25 0.375m; 1 : 25 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
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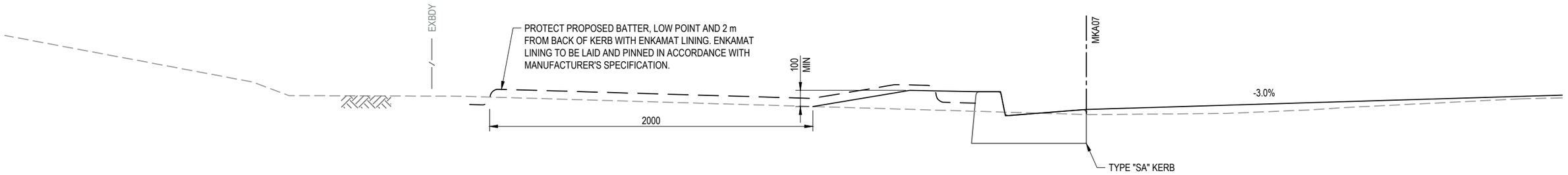
CLIENT: NSW GOVERNMENT Transport for NSW

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS
A3
SHEET 5 OF 7

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST
TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-000505
ISSUE: 0



TYPICAL BATTER PROTECTION

SCALE 1:25

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DRAWING FILE LOCATION / NAME				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	
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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	06.11.2020	PRE-AFC		A. PEREZ	0.125 0 0.125 0.25 0.375m 1 : 25 FULL SIZE A3	
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD	-

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:03:59 PM	MEGHWARB

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NSW GOVERNMENT Transport for NSW

PREPARED FOR
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PINCH POINTS
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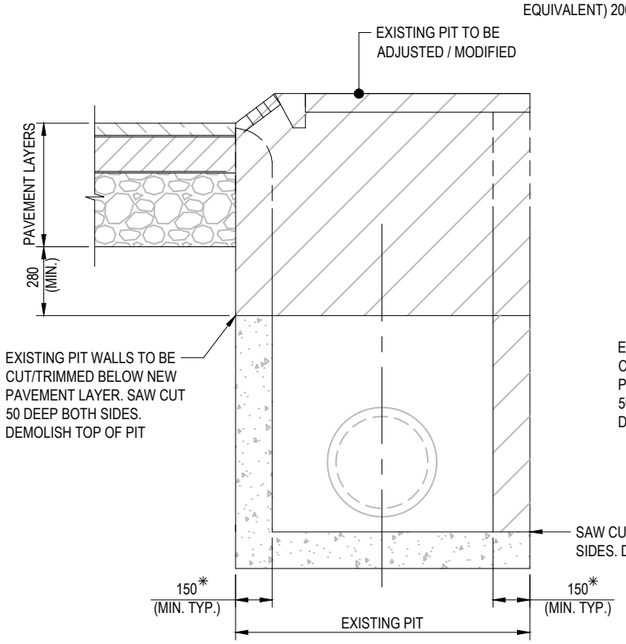
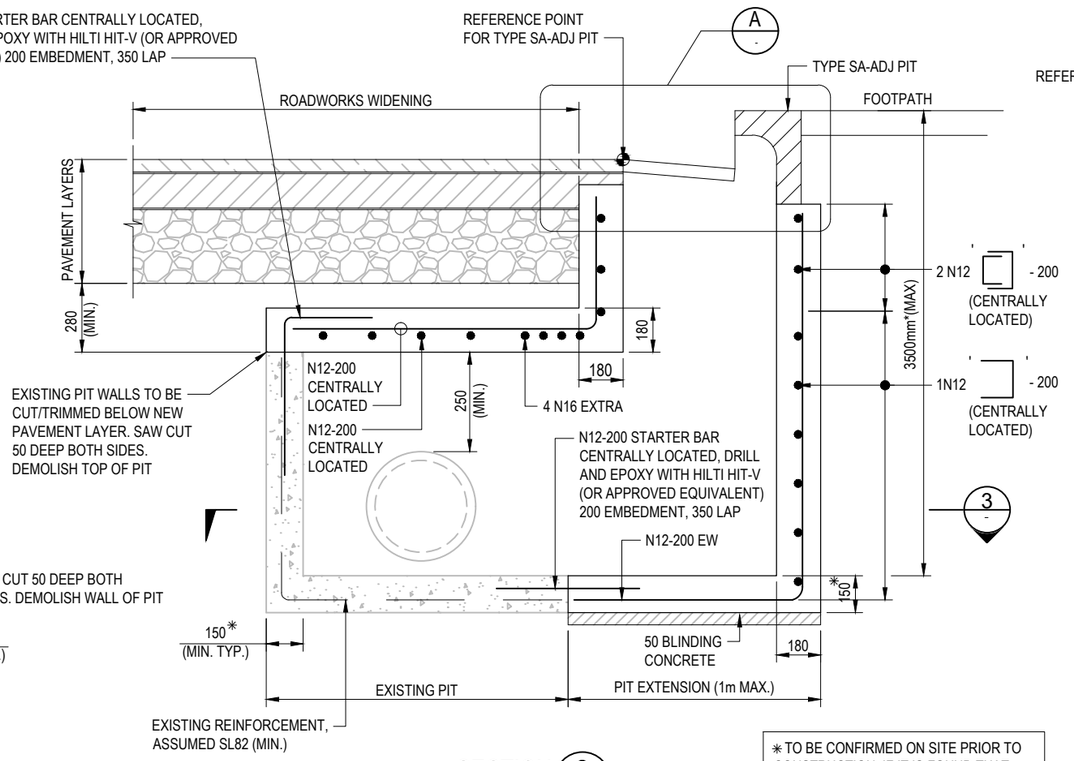
SHEET 6 OF 7

TfNSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000506	0



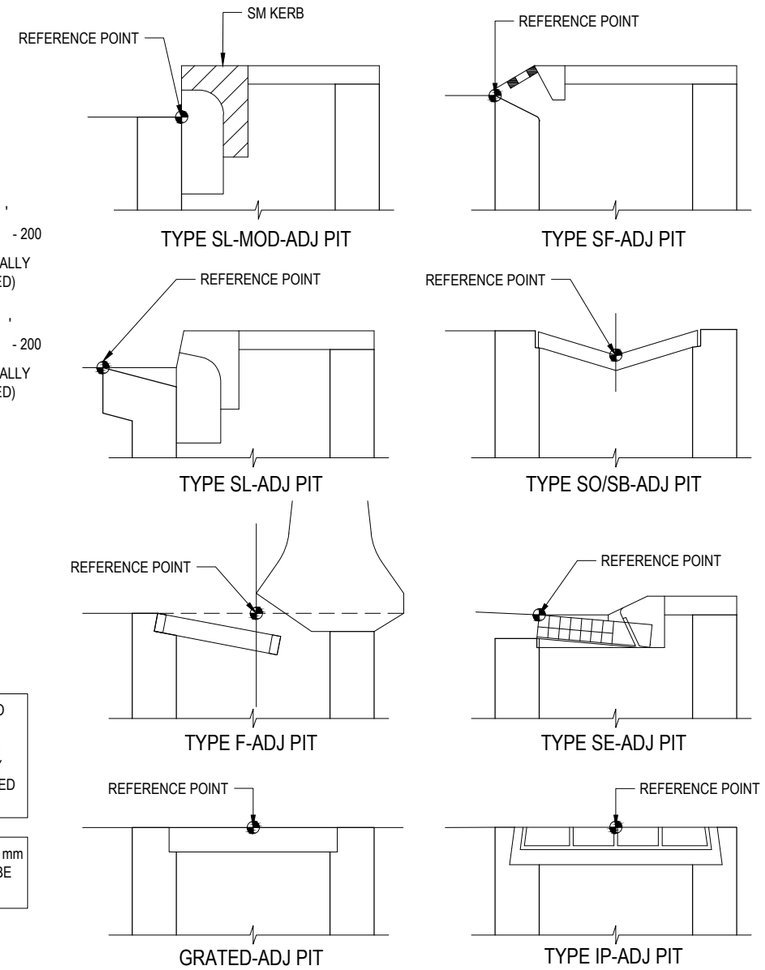
SECTION 1
SCALE 1:25



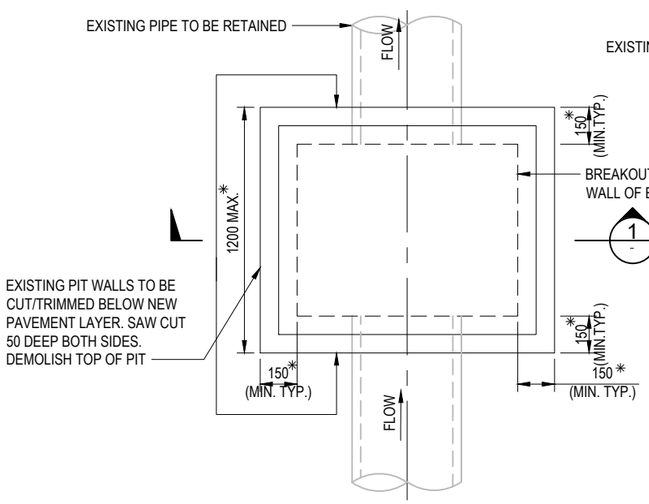
SECTION 2
SCALE 1:25

* TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION. IF IT IS FOUND THAT EXISTING PIT DOES NOT COMPLY WITH THESE CONDITIONS, EXISTING PIT MAY NOT BE MODIFIED, AND TO BE REPLACED WITH NEW PIT

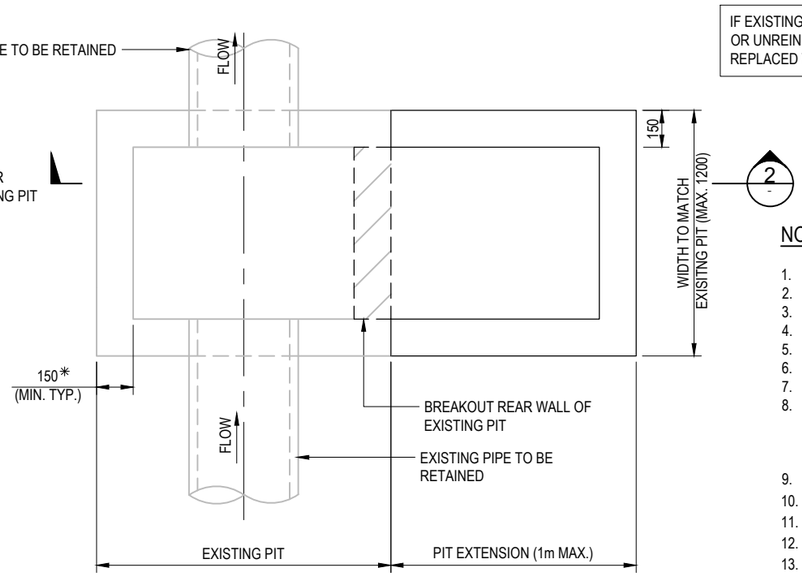
IF EXISTING PIT WALL THICKNESS <150 mm OR UNREINFORCED, EXISTING PIT TO BE REPLACED WITH NEW PIT



DETAIL A REFERENCE POINTS FOR xx-ADJ PITS
SCALE 1:25



PLAN - EXISTING PIT TO BE ADJUSTED (xx - ADJ)
SCALE 1:25



SECTION 3 PLAN - PROPOSED PIT EXTENSION
SCALE 1:25

NOTES

1. REFER TO GENERAL NOTES.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. LOCATION AND LEVEL OF PIT SHOWN IN DRAWINGS REFER TO THIS POINT◔.
4. FOR PIPE DIAMETERS GREATER THAN 450 OR MULTIPLE PIPES REFER TO RMS DRAWING R0220-28 OR OTHER SPECIFIED HAUNCH DETAIL.
5. DEPTH OF PIT TO NOT EXCEED 3500.
6. PITS DEEPER THAN 1200 TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH RMS DRAWING R0220-45.
7. MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 32 MPa U.N.O.
8. NOMINAL CLEAR COVER TO REINFORCEMENT NEAREST TO CAST INSITU CONCRETE SURFACES FOR:
   a. SURFACE IN CONTACT WITH SOIL = 75
   b. SURFACE IN CONTACT WITH AIR = 40
9. EDGES SHALL BE CHAMFERED 20 x 20.
10. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671.
11. ALL BARS SHALL BE GRADE D500N DEFORMED RIBBED BAR U.N.O.
12. ALL EXPOSED STEEL TO BE GALVANISED IN ACCORDANCE WITH AS1214 AND TO BE 375 g/m².
13. LAPS NOT SHOWN ON THE DRAWINGS SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY CROSS SECTION.
14. ALL LAPPED PORTIONS OF BARS SHALL BE IN CONTACT REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
15. ALL PIT GRATES AND FRAMES TO BE "MEDIUM / HEAVY TRAFFICABLE" BIKE SAFE CLASS "D" GRATES AND FRAMES TO AS3996.
16. DESIGN LOADS TO AS5100.2 AND PITS DESIGNED TO AS3600.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000507.DWG				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:03:06 PM; PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING: 0.125 0 0.125 0.25 0.375m; 1 : 25 FULL SIZE A3	DRAWINGS / DESIGN PREPARED BY
	0	06.11.2020	PRE-AFC		A. PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER DETAILS

A3

SHEET 7 OF 7

TfNSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000507	0

LEGEND

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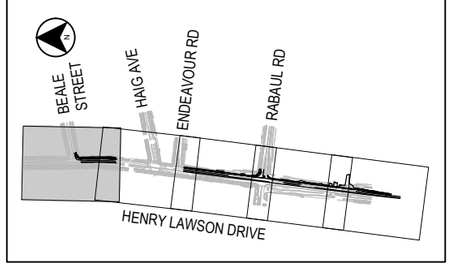
KEYPLAN



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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:24:06 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
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BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

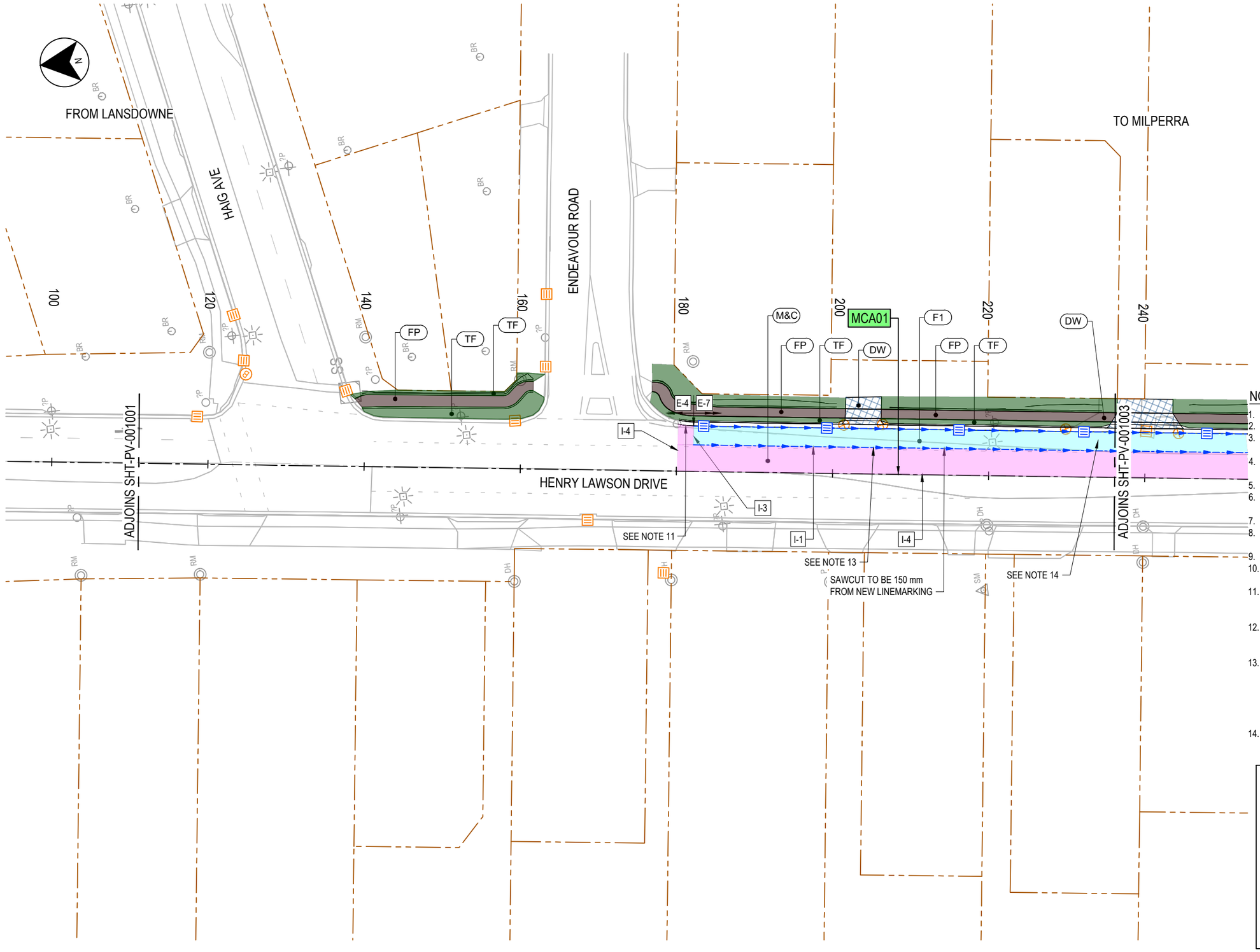
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL PAVEMENT PLAN

A3

SHEET 1 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-PV-001001 | ISSUE 1



LEGEND

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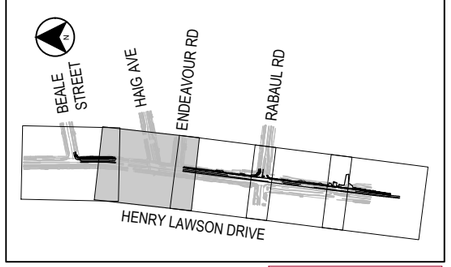

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PLOT DATE / TIME: 23-Nov-20 / 9:23:47 PM

PLOT BY: MEGHWARB

CLIENT: NSW GOVERNMENT Transport for NSW

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

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PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

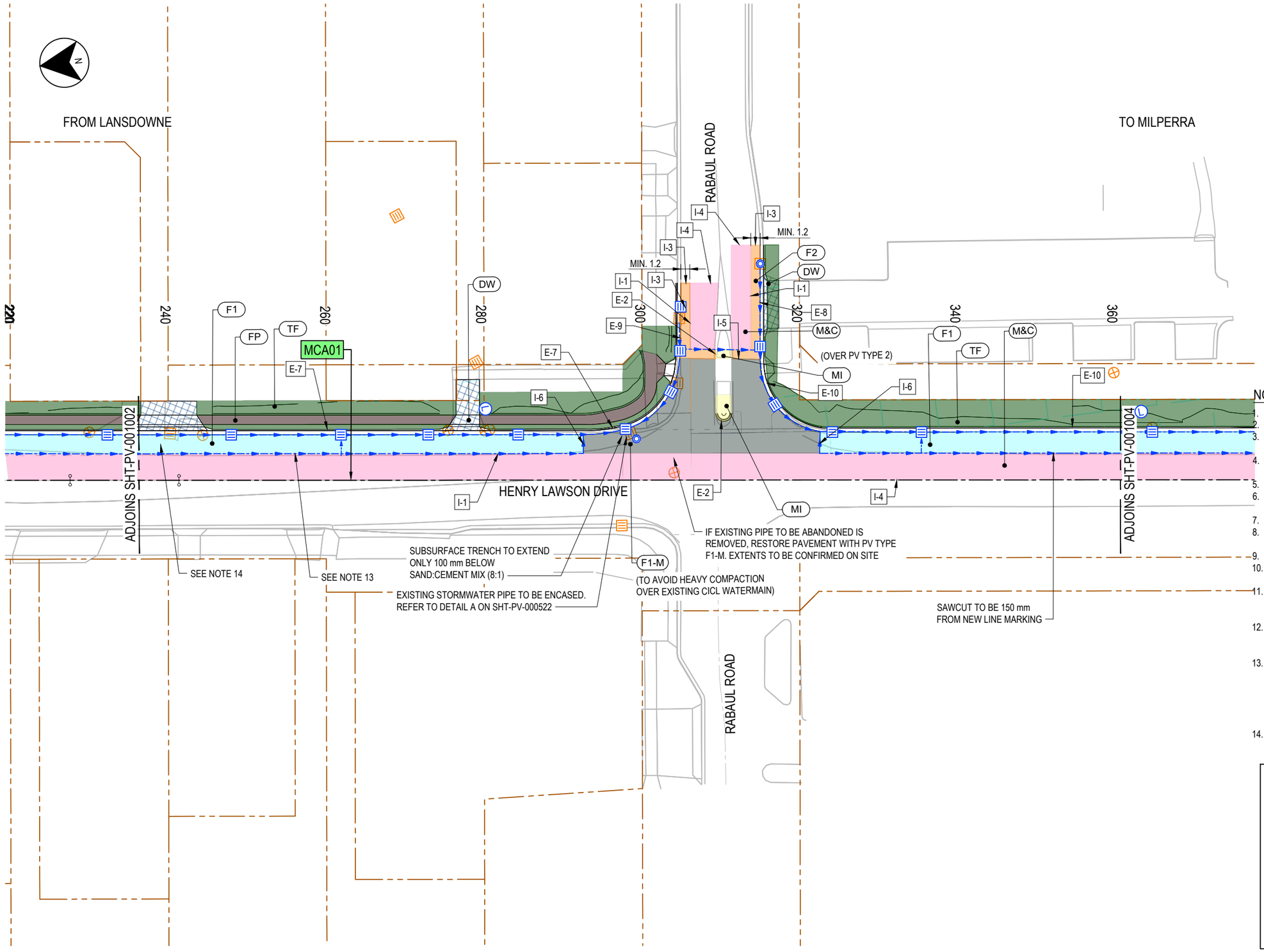
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL PAVEMENT PLAN

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-PV-001002 | ISSUE 1



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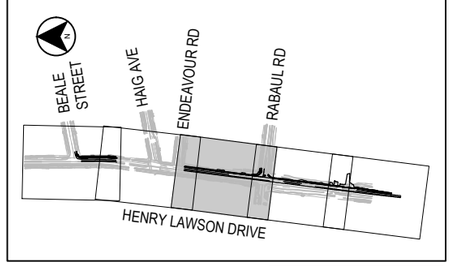

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:21:21 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
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HEIGHT DATUM: AHD
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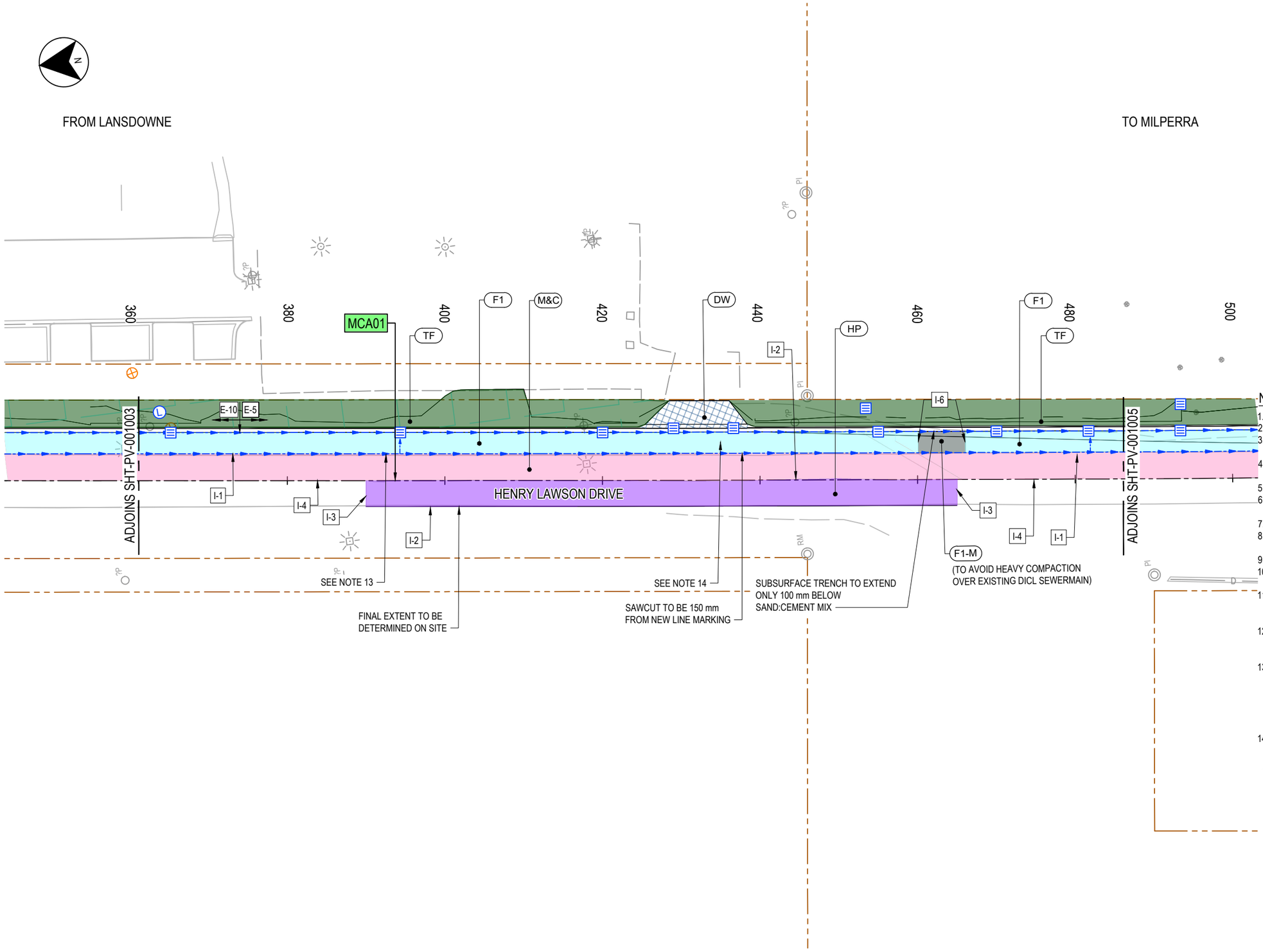
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL PAVEMENT PLAN

A3
SHEET 3 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-PV-001003
ISSUE: 1

FROM LANSDOWNE

TO MILPERRA



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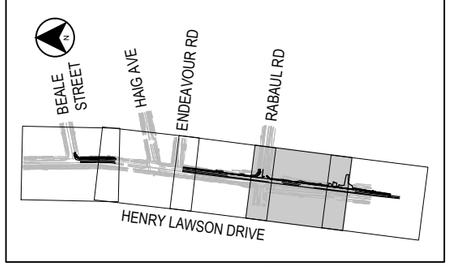

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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:21:05 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
PAVEMENT PLAN

A3

SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

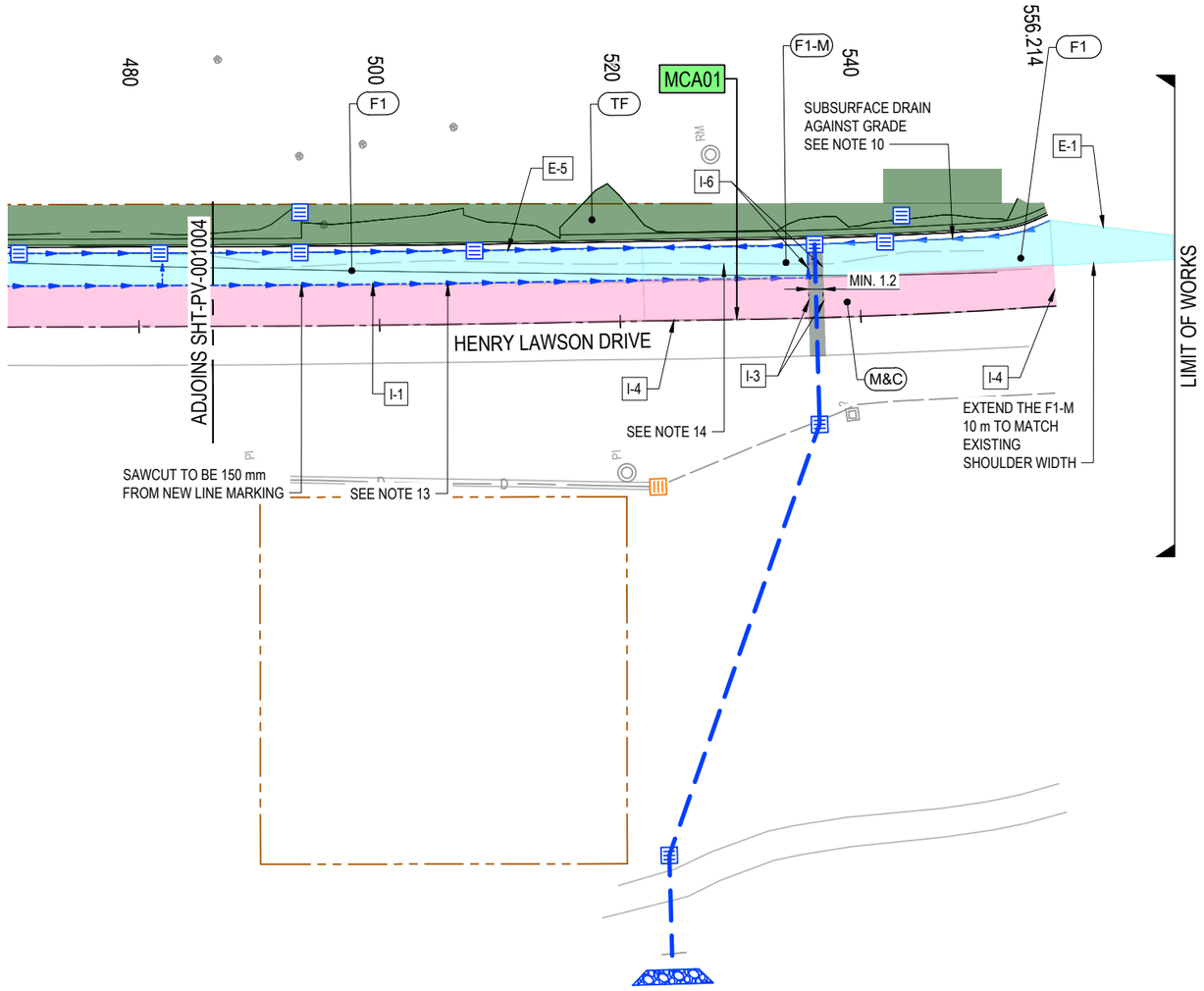
EDMS No.: -

SHEET No.: SHT-PV-001004

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA



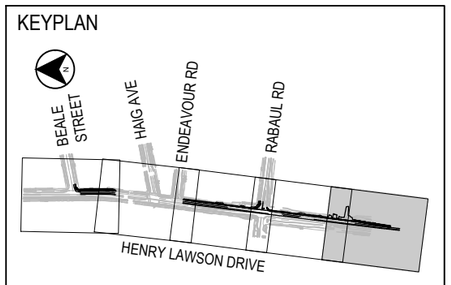
LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PEDESTRIAN FENCE
- F1, F1-M, F2, M&C, HP, DW, MI, FP, TF
- XXXX — PAVEMENT TAG
- I-1 OR E-1 — INTERFACE OR EDGE DETAILS
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- SUBSURFACE DRAINAGE

NOTES

1. ALL DIMENSIONS SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. REFER TO SHT-GE-000021 TO SHT-GE-000024 FOR GENERAL NOTES.
3. REFER TO SHT-PV-000501 AND SHT-PV-000502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SHT-PV-000521 AND SHT-PV-000522 FOR INTERFACE DETAILS.
5. REFER TO SHT-PV-000531 TO 000533 FOR EDGE DETAILS.
6. MINIMUM PAVING WIDTH SHALL BE 1.2 m TO ENABLE MACHINE COMPACTION.
7. REFER TO SHT-RD SERIES FOR KERB TYPES AND SET OUT DETAILS.
8. SUBSURFACE DRAINS SHALL BE CONNECTED EITHER TO EXISTING PITS OR PROPOSED PITS U.N.O.
9. REFER TO SHT-RF-001601 FOR KERB RAMP SETOUT DETAILS.
10. FOR SUBSURFACE DRAINS AGAINST GRADE, MINIMUM GRADE SHALL BE 0.5%.
11. SAW-CUT THE EDGE WITHOUT DISTURBING THE EXISTING ASPHALT BASE AND SUBBASE SO THAT SHALLOW TELSTRA CONDUIT IS NOT AFFECTED DURING THE CONSTRUCTION OF NEW KERB.
12. CONTRACTOR SHALL CONFIRM PAVEMENT STRUCTURE (BELOW EXISTING MEDIANS BY COREHOLING AT 5 m SPACING. IF ASPHALT OR CONCRETE IS ENCOUNTERED CONSULT THE PRINCIPAL.
13. FOR ALL INTERFACE DETAIL I-1, AFTER SAWCUTTING AND EXCAVATION TO FOUNDATION LEVEL, THE VERTICAL FACE SHALL BE INSPECTED WITH THE PRINCIPAL AND THE CONTRACTOR SHALL SEEK INSTRUCTIONS AS TO THE SUITABILITY OF EXCAVATION. TRENCH DRAIN MAY NOT BE REQUIRED AFTER PRINCIPAL'S INSTRUCTION.
14. ANY LONGITUDINAL CONSTRUCTION JOINTS REQUIRED IN PAVEMENT TYPE F1 TO ENABLE TRAFFIC STAGING ARE TO BE LOCATED UNDER NEW ROAD MARKING OR UNDER MIDDLE OF NEW LANE.

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-001005.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:20:30 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
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DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

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PINCH POINTS
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MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
PAVEMENT PLAN

A3

SHEET 5 OF 5

TNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-PV-001005

ISSUE 1

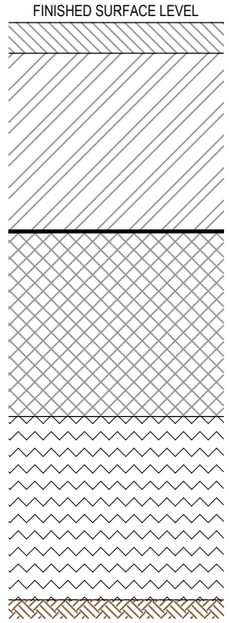
NOTES

1. ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. MATERIAL SUPPLY AND CONSTRUCTION:
   a. ALL ASPHALT TO CONFORM TO SPECIFICATION R116.
   b. PRIME, PRIMER SEALS AND SPRAY SEALS TO CONFORM TO SPECIFICATION R106.
   c. CONCRETE FOR FOOTPATHS, DRIVEWAYS AND MEDIANS TO CONFORM TO SPECIFICATION R54.
   d. ALL EARTHWORKS TO BE IN ACCORDANCE WITH SPECIFICATION R44, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   e. JOINT FILLER TO COMPLY WITH SPECIFICATION 3204.
3. THE THICKNESS OF SEAL SHALL BE TAKEN INTO ACCOUNT IN THE DESIGN MILLING DEPTH AND SHALL APPROXIMATELY BE EQUIVALENT TO THE AVERAGE LEAST DIMENSION (ALD) OF THE AGGREGATE. UNTIL SUCH TIME ALD TESTS ARE CONDUCTED ON THE AGGREGATES, AN ALD OF 4 mm MAY BE ASSUMED FOR A 7 mm NOMINAL SIZE AGGREGATE.
4. LOW CUTTER SEAL (C170 BINDER WITH MAXIMUM 2% CUTTER) SHALL BE APPLIED UNDERNEATH ASPHALT BASE COURSE. NOMINAL AGGREGATE SPREAD RATE AND RESIDUAL BINDER APPLICATION RATE SHALL BE BETWEEN 200 AND 250 m²/m³ AND 0.80 L/m² RESPECTIVELY.
5. ALL PROFILING OPERATIONS SHALL BE IN ACCORDANCE WITH R101.
6. MILL AND CORRECT: AFTER MILLING THE TOP 50 mm OF THE EXISTING PAVEMENT, THE EXPOSED SURFACE MAY REQUIRE A CORRECTIVE LAYER IF DEPTH TO FINISHED SURFACE LEVEL IS GREATER THAN 70 mm. CORRECTIVE LAYER SHALL BE A MINIMUM 20 mm AC7 (A15E). ASPHALT TYPES SHOULD COMPLY WITH SPECIFICATION R116.
7. ON COMPLETION OF THE MILLING OPERATION FOR THE PAVEMENT TYPE M&C, THE REMAINING ASPHALT LAYER SHALL BE INSPECTED. IF IT IS CRACKED, STRIPPED OR DELAMINATED AND IF THE REMAINING LAYER IS LESS THAN 30 mm THICK SHALL BE REMOVED AS WELL. CRACKS WIDER THAN 3 mm SHALL BE SEALED IN ACCORDANCE WITH SPECIFICATION TfNSW M211, PRIOR TO CONSTRUCTION OF THE NEW ASPHALT LAYERS.
8. ALL LAYERS INCLUDING THE CORRECTIVE COURSE SHALL BE WITHIN THE RANGE OF THE ALLOWABLE ASPHALT LAYER THICKNESS LISTED IN TABLE 1.

TABLE 1 : ALLOWABLE ASPHALT LAYER THICKNESS

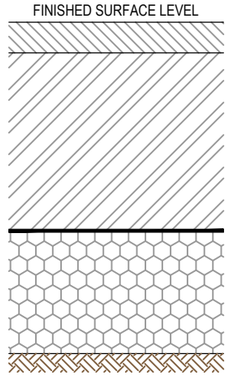
ASPHALT TYPE	ALLOWABLE ASPHALT LAYER THICKNESS FOR DIFFERENT NOMINAL ASPHALT SIZE (mm)				
	5	7	10	14	20
DENSE GRADED ASPHALT (DGA)	15 - 25	21 - 35	30 - 50	42 - 70	60 - 100

9. FOUNDATION TREATMENTS FOR PAVEMENT TYPE F1-M AND F2:
   - EXCAVATE TO FOUNDATION LEVEL
   - TRIM THE FLOOR OF THE CUTTING TO CONFORM TO THE TOLERANCES STATED IN 7.7 (TfNSW R44)
   - COMPACT THE MATERIAL EXPOSED WITH NO LESS THAN 6 PASSES OF A VIBRATING ROLLER
   - PROOF ROLLING TO TfNSW T198
   - IF UNSUITABLE MATERIAL IS ENCOUNTERED , REMOVE AND REPLACE WITH SUITABLE MATERIAL IN ACCORDANCE WITH CLAUSE 5.1 OF TfNSW R44
   - PLACE SAND:CEMENT MIX (8:1) AND COMPACT TO REQUIREMENTS OF M258.
10. FOR PAVEMENT TYPES FP, DW AND MI THE SURFACE OF THE COMPACTED UNBOUND GRANULAR MATERIAL SHALL BE MOISTENED PRIOR TO PLACING THE CONCRETE TO MINIMISE MOISTURE LOSS.
11. AC14 AND AC20 WARM MIX SHALL BE COMPACTED AT TEMPERATURES APPROXIMATELY AROUND 125°C. COMPACTION TEMPERATURES SHALL BE CONFIRMED AFTER FOLLOWING METHODOLOGY INCLUDED IN APPENDIX B OF AS2891.2.2.
12. FOR PV TYPE F2 AND F1-M SAND:CEMENT MIX (8:1) SHALL BE COMPACTED IN MAXIMUM 100 mm THICK LAYERS.
13. PAVEMENT TYPE FP AND DW TO BE CONSTRUCTED AS PER CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-027 AND S-008.
14. FOUNDATION TREATMENT FOR PAVEMENT TYPE F1:
   - EXCAVATE TO DESIGNED FLOOR LEVEL.
   - WHERE CBR AT THE DESIGNED FLOOR LEVEL IS LESS THAN 5%, OR PI GREATER THAN 25% PROVIDE TREATMENT TYPE C3-I TO RMS R44 CONSISTING OF 300 mm IN-SITU STABILISATION (TfNSW R50) WITH 4% HYDRATED LIME TO ACHIEVE MINIMUM CBR 8%.
   - ACTUAL PERCENTAGE OF LIME SHALL BE CONFIRMED BY LABORATORY TESTING (T143 AND T117).
     FOR AREAS WITH REDUCED WORKING WIDTH (I.E. LESS THAN 2.5 m), PROVIDE 300 mm MODIFIED MATERIALS SUBBASE TO TfNSW R71. MATERIAL TO NOT EXCEED 1.0 MPa UCS (TfNSW T116 AFTER 7 DAYS ACCELERATED CURING)
   - IF CBR AT DESIGNED FLOOR LEVEL IS GREATER THAN 5%, PROVIDE FOUNDATION TREATMENT C1 TO RMS R44.



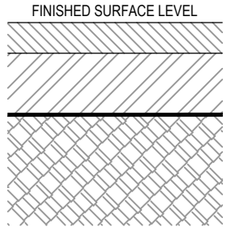
50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
290	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
4	7 mm LOW CUTTER SEAL (TfNSW R106) (SEE NOTES 3 AND 4) OR TACK COAT FOR OVERNIGHT WORK
300	SELECTED MATERIAL ZONE (TfNSW 3071)
	DESIGNED FLOOR LEVEL. SEE NOTE 14
300	FOUNDATION TREATMENT C3-I OR C3-11. SEE NOTE 14
	FOUNDATION LEVEL

PAVEMENT TYPE - F1
FULL DEPTH ASPHALT



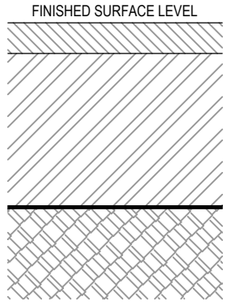
50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
290	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
4	7 mm LOW CUTTER SEAL (TfNSW R106) (SEE NOTES 3 AND 4) OR TACK COAT FOR OVERNIGHT WORK
200	SAND:CEMENT MIX (8:1) (TfNSW M258) (SEE NOTE 12)
	FOUNDATION LEVEL. SEE NOTE 9

PAVEMENT TYPE - F1-M
FULL DEPTH ASPHALT



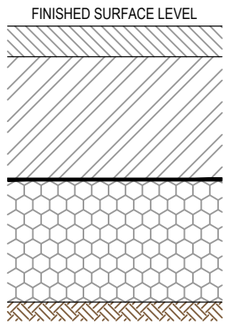
50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTES 6 TO 8 AND 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
VARIES	CORRECTIVE LAYER (TfNSW R116) IF REQUIRED
	TACK COAT (IF ASPHALT EXPOSED)
VARIES	EXISTING PAVEMENT

PAVEMENT TYPE - M&C
MILL AND CORRECTION



50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
250	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
	TACK COAT (IF ASPHALT EXPOSED)
VARIES	EXISTING PAVEMENT (IF UNSUITABLE OR CLAYEY SUBGRADE IS ENCOUNTERED, 150 mm SAND:CEMENT MIX (8:1) SHALL BE APPLIED)

PAVEMENT TYPE - HP
HEAVY PATCHING



50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
200	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
4	7 mm LOW CUTTER SEAL (TfNSW R106) (SEE NOTES 3 AND 4) OR TACK COAT FOR OVERNIGHT WORK
200	SAND:CEMENT MIX (8:1) (TfNSW M258) (SEE NOTE 12)
	FOUNDATION LEVEL. SEE NOTE 9

PAVEMENT TYPE - F2
FULL DEPTH ASPHALT

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000501.DWG
DESIGN LOT CODE:
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:23:16 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
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CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
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PAVEMENT PROFILES

A3
SHEET 1 OF 2

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-PV-000501
ISSUE: 1

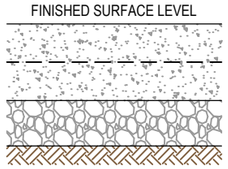
NOTES

1. ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. MATERIAL SUPPLY AND CONSTRUCTION:
   a. ALL ASPHALT TO CONFORM TO SPECIFICATION R116.
   b. PRIME, PRIMER SEALS AND SPRAY SEALS TO CONFORM TO SPECIFICATION R106.
   c. CONCRETE FOR FOOTPATHS, DRIVEWAYS AND MEDIANS TO CONFORM TO SPECIFICATION R54.
   d. ALL EARTHWORKS TO BE IN ACCORDANCE WITH SPECIFICATION R44, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   e. JOINT FILLER TO COMPLY WITH SPECIFICATION 3204.
3. THE THICKNESS OF SEAL SHALL BE TAKEN INTO ACCOUNT IN THE DESIGN MILLING DEPTH AND SHALL APPROXIMATELY BE EQUIVALENT TO THE AVERAGE LEAST DIMENSION (ALD) OF THE AGGREGATE. UNTIL SUCH TIME ALD TESTS ARE CONDUCTED ON THE AGGREGATES, AN ALD OF 4 mm MAY BE ASSUMED FOR A 7 mm NOMINAL SIZE AGGREGATE.
4. LOW CUTTER SEAL (C170 BINDER WITH MAXIMUM 2% CUTTER) SHALL BE APPLIED UNDERNEATH ASPHALT BASE COURSE. NOMINAL AGGREGATE SPREAD RATE AND RESIDUAL BINDER APPLICATION RATE SHALL BE BETWEEN 200 AND 250 m^2/m^3 AND 0.80 L/m^2 RESPECTIVELY.
5. ALL PROFILING OPERATIONS SHALL BE IN ACCORDANCE WITH R101.
6. MILL AND CORRECT: AFTER MILLING THE TOP 50 mm OF THE EXISTING PAVEMENT, THE EXPOSED SURFACE MAY REQUIRE A CORRECTIVE LAYER IF DEPTH TO FINISHED SURFACE LEVEL IS GREATER THAN 70 mm. CORRECTIVE LAYER SHALL BE A MINIMUM 20 mm AC7 (A15E). ASPHALT TYPES SHOULD COMPLY WITH SPECIFICATION R116.
7. ON COMPLETION OF THE MILLING OPERATION FOR THE PAVEMENT TYPE M&C, THE REMAINING ASPHALT LAYER SHALL BE INSPECTED. IF IT IS CRACKED, STRIPPED OR DELAMINATED AND IF THE REMAINING LAYER IS LESS THAN 30 mm THICK SHALL BE REMOVED AS WELL. CRACKS WIDER THAN 3 mm SHALL BE SEALED IN ACCORDANCE WITH SPECIFICATION TfNSW M211, PRIOR TO CONSTRUCTION OF THE NEW ASPHALT LAYERS.
8. ALL LAYERS INCLUDING THE CORRECTIVE COURSE SHALL BE WITHIN THE RANGE OF THE ALLOWABLE ASPHALT LAYER THICKNESS LISTED IN TABLE 1.

TABLE 1 : ALLOWABLE ASPHALT LAYER THICKNESS

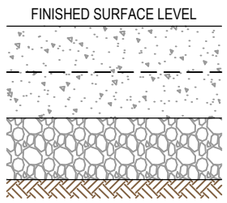
ASPHALT TYPE	ALLOWABLE ASPHALT LAYER THICKNESS FOR DIFFERENT NOMINAL ASPHALT SIZE (mm)				
	5	7	10	14	20
DENSE GRADED ASPHALT (DGA)	15 - 25	21 - 35	30 - 50	42 - 70	60 - 100

9. FOUNDATION TREATMENTS FOR PAVEMENT TYPE F1-M AND F2:
   - EXCAVATE TO FOUNDATION LEVEL
   - TRIM THE FLOOR OF THE CUTTING TO CONFORM TO THE TOLERANCES STATED IN 7.7 (TfNSW R44)
   - COMPACT THE MATERIAL EXPOSED WITH NO LESS THAN 6 PASSES OF A VIBRATING ROLLER
   - PROOF ROLLING TO TfNSW T198
   - IF UNSUITABLE MATERIAL IS ENCOUNTERED , REMOVE AND REPLACE WITH SUITABLE MATERIAL IN ACCORDANCE WITH CLAUSE 5.1 OF TfNSW R44
   - PLACE SAND:CEMENT MIX (8:1) AND COMPACT TO REQUIREMENTS OF M258.
10. FOR PAVEMENT TYPES FP, DW AND MI THE SURFACE OF THE COMPACTED UNBOUND GRANULAR MATERIAL SHALL BE MOISTENED PRIOR TO PLACING THE CONCRETE TO MINIMISE MOISTURE LOSS.
11. AC14 AND AC20 WARM MIX SHALL BE COMPACTED AT TEMPERATURES APPROXIMATELY AROUND 125°C. COMPACTION TEMPERATURES SHALL BE CONFIRMED AFTER FOLLOWING METHODOLOGY INCLUDED IN APPENDIX B OF AS2891.2.2.
12. FOR PV TYPE F2 AND F1-M SAND:CEMENT MIX (8:1) SHALL BE COMPACTED IN MAXIMUM 100 mm THICK LAYERS.
13. PAVEMENT TYPE FP AND DW TO BE CONSTRUCTED AS PER CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-027 AND S-008.
14. FOUNDATION TREATMENT FOR PAVEMENT TYPE F1:
   - EXCAVATE TO DESIGNED FLOOR LEVEL.
   - WHERE CBR AT THE DESIGNED FLOOR LEVEL IS LESS THAN 5%, OR PI GREATER THAN 25% PROVIDE TREATMENT TYPE C3-I TO RMS R44 CONSISTING OF 300 mm IN-SITU STABILISATION (RMS R50) WITH 4% HYDRATED LIME TO ACHIEVE MINIMUM CBR 8%.
   - ACTUAL PERCENTAGE OF LIME SHALL BE CONFIRMED BY LABORATORY TESTING (T143 AND T117). FOR AREAS WITH REDUCED WORKING WIDTH (I.E. LESS THAN 2.5 m), PROVIDE 300 mm MODIFIED MATERIALS SUBBASE TO TfNSW R71. MATERIAL TO NOT EXCEED 1.0 MPa UCS (TfNSW T116 AFTER 7 DAYS ACCELERATED CURING)
   - IF CBR AT DESIGNED FLOOR LEVEL IS GREATER THAN 5%, PROVIDE FOUNDATION TREATMENT C1 TO RMS R44.



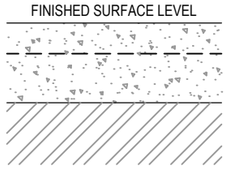
125	25 MPa CONCRETE WITH SL72 MESH (TfNSW R54)
75	DGB20 (TfNSW 3051) (SEE NOTE 10)
	SUBGRADE CBR 2.5%

PAVEMENT TYPE - FP
FOOTPATH
(SEE NOTE 10)



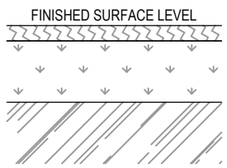
150	32 MPa CONCRETE WITH SL72 MESH (TfNSW R54)
100	DGB20 (TfNSW 3051) (SEE NOTE 10)
	SUBGRADE CBR 2.5%

PAVEMENT TYPE - DW
DRIVEWAYS
(SEE NOTE 13)



MIN. 130	25 MPa CONCRETE WITH SL72 MESH (TfNSW R54)
	AC20 WARM MIX (PLACE AS A PART OF PV TYPE F2) OR EXISTING AC

PAVEMENT TYPE - MI
MEDIAN INFILL



25	TURF (TfNSW R179)
100	TURF UNDERLAY (TfNSW R179)
VARIES	RECOMPACTED EXISTING MATERIALS

PAVEMENT TYPE - TF
LANDSCAPING

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000502.DWG
EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
SCALES ON A3 SIZE DRAWING
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:14:17 PM
PLOT BY: MEGHWARB

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

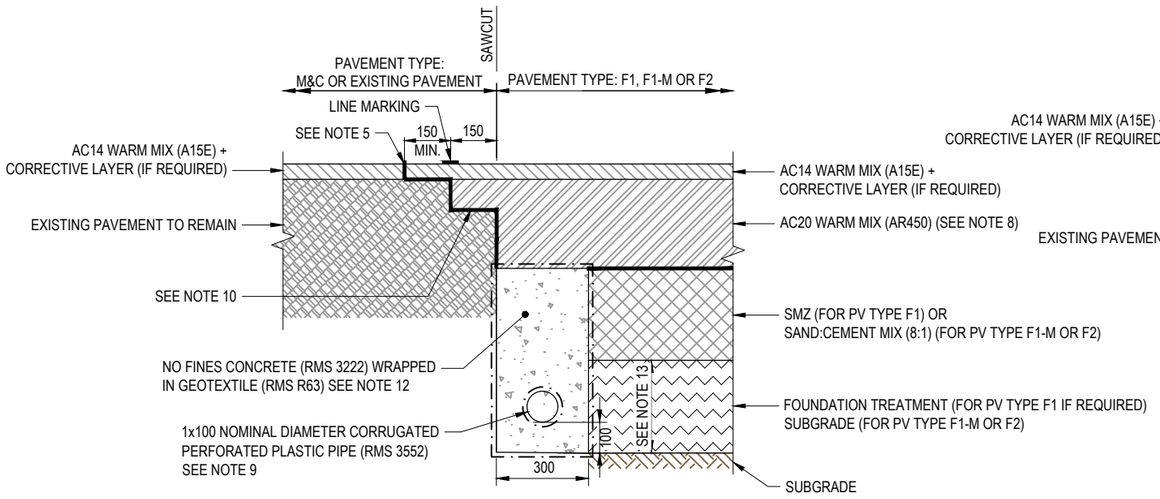
CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

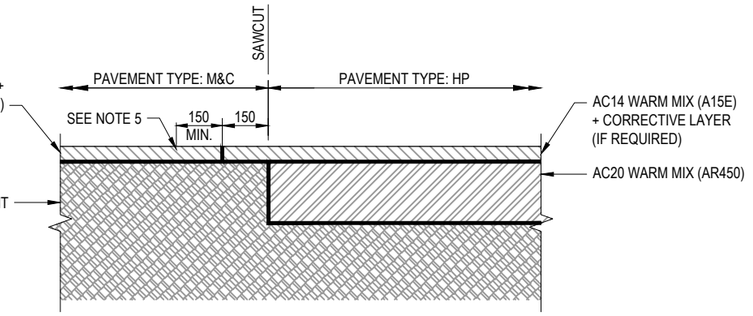
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
PAVEMENT PROFILES

A3
SHEET 2 OF 2

TfNSW REGISTRATION No. DS2020/000130 | PART 1
ISSUE STATUS: DETAILED DESIGN | EDMS No. - | SHEET No. SHT-PV-000502 | ISSUE 1



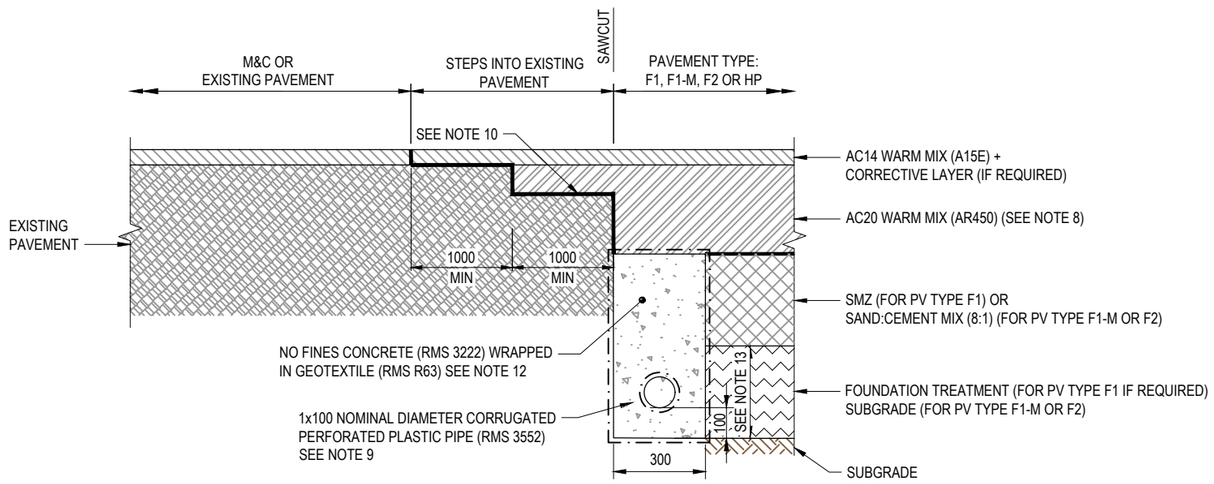
INTERFACE DETAIL I-1
PAVEMENT TYPE M&C OR EXISTING PAVEMENT AND PAVEMENT TYPE F1, F1-M OR F2
NTS



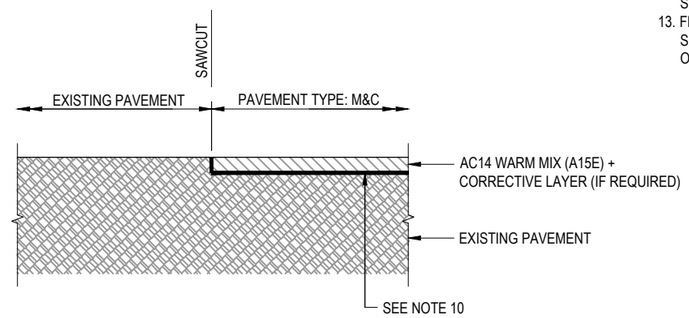
INTERFACE DETAIL I-2
PAVEMENT TYPE M&C AND PAVEMENT TYPE HP
NTS

NOTES:

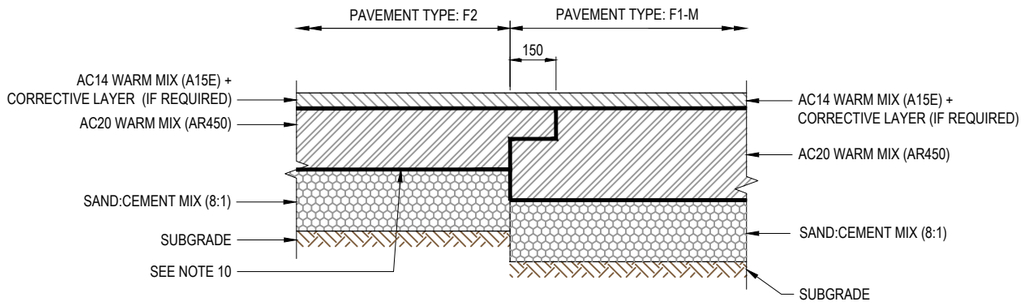
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYER; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.



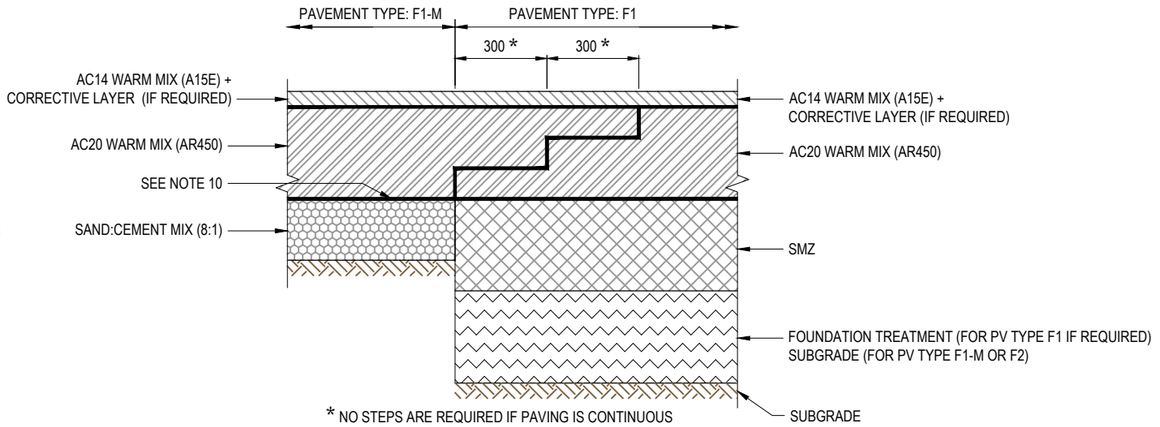
INTERFACE DETAIL I-3
TRANSVERSE CONSTRUCTION DETAIL
NTS



INTERFACE DETAIL I-4
EXISTING PAVEMENT AND PAVEMENT TYPE M&C
NTS



INTERFACE DETAIL I-5
PAVEMENT TYPE F2 OR HP AND PAVEMENT TYPE F1 OR F1-M
NTS



* NO STEPS ARE REQUIRED IF PAVING IS CONTINUOUS

INTERFACE DETAIL I-6
PAVEMENT TYPE F1-M AND PAVEMENT TYPE F1
NTS

CHECK PRINT

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY	CLIENT
PW:/P0043031-SHT-PV-000521.DWG		-	23-Nov-20 / 9:23:28 PM	MEGHWARB	NSW GOVERNMENT Transport for NSW

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

PREPARED FOR
EASING SYDNEY'S CONGESTION
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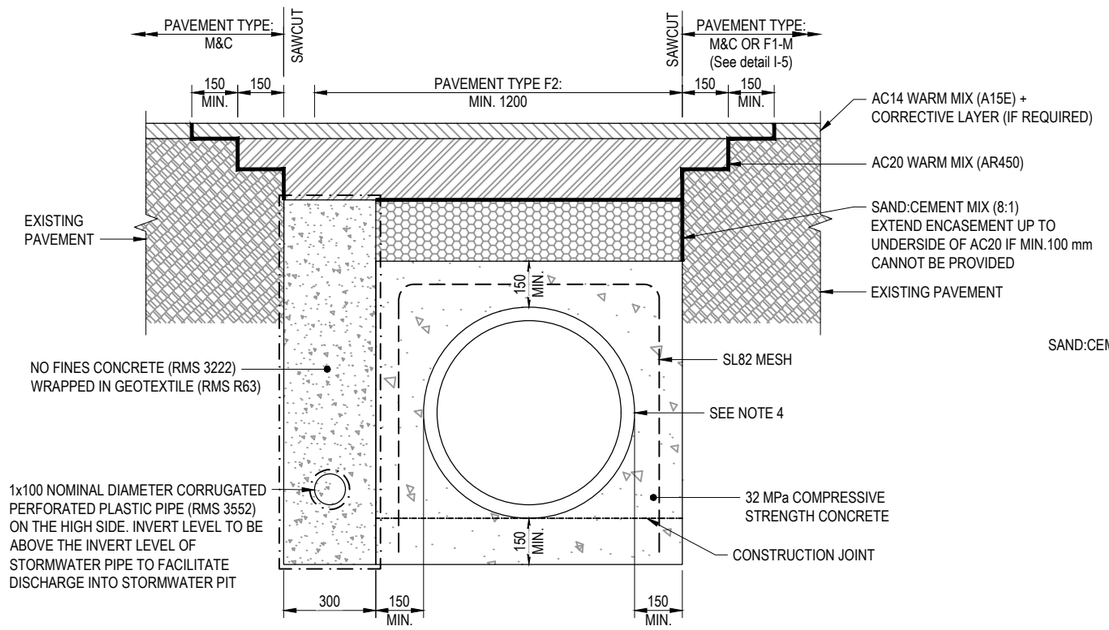
GEORGES HALL
PAVEMENT DETAILS

A3

SHEET 1 OF 2

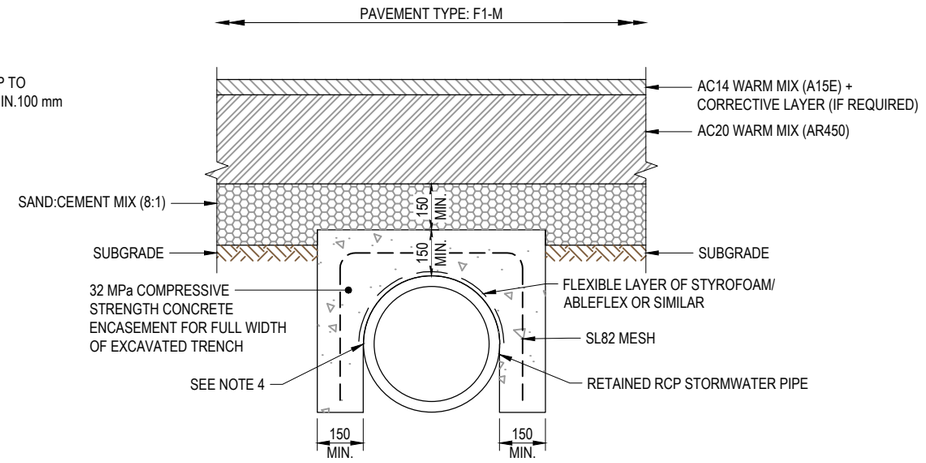
TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000521	1



INTERFACE DETAIL I-7

PAVEMENT TYPE F2 AND EXISTING PAVEMENT WITH STORMWATER PIPE ENCASEMENT
NTS



INTERFACE DETAIL A

PAVEMENT TYPE F1-M AND EXISTING PAVEMENT WITH ENCASEMENT OF EXISTING STORMWATER PIPE
NTS

NOTES:

1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYER; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000522.DWG				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	
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	1	06.11.2020	PRE-AFC		A.PEREZ		
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:13:56 PM	MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

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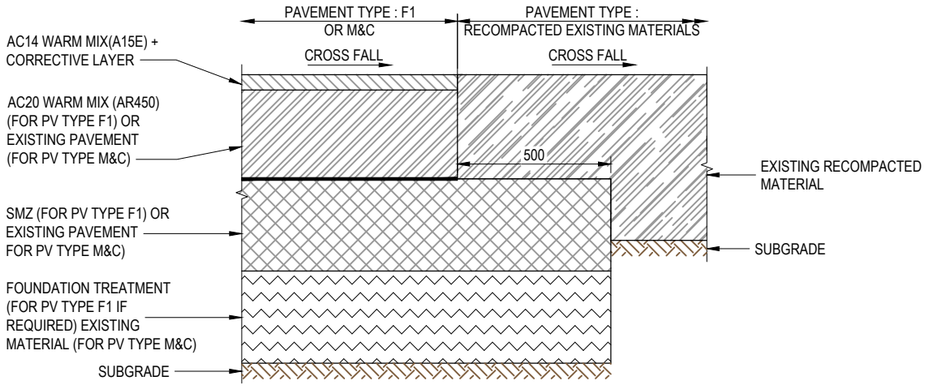
A3

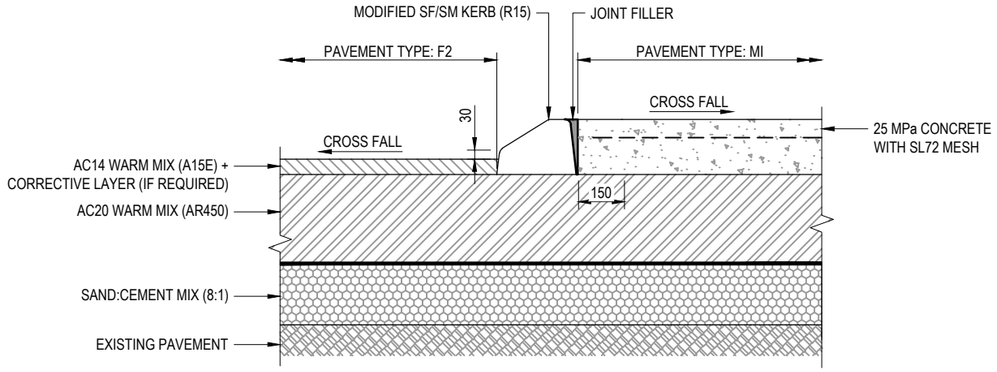
SHEET 2 OF 2

TfNSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000522	1



EDGE DETAIL E-1

PAVEMENT TYPE F1 OR M&C WITH EXISTING RECOMPACTED MATERIALS
SCALE 1 : 20



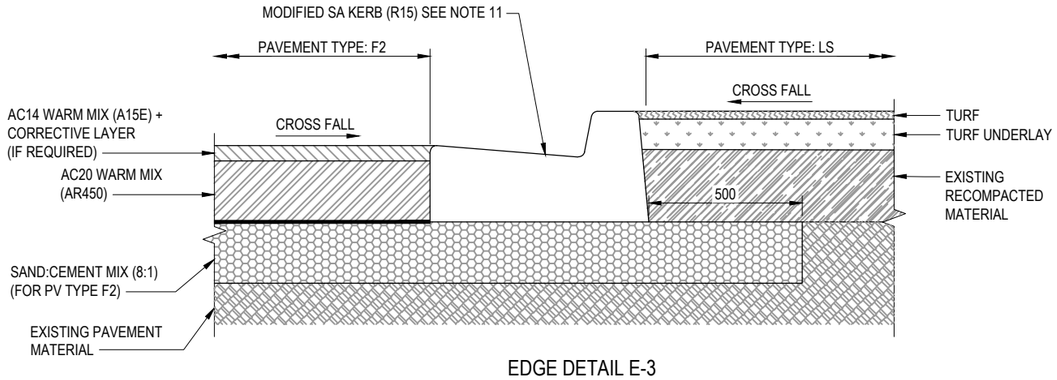
EDGE DETAIL E-2

PAVEMENT TYPE F1-M WITH MODIFIED SF/SM KERB AND PAVEMENT TYPE MI

SCALE 1 : 20

NOTES:

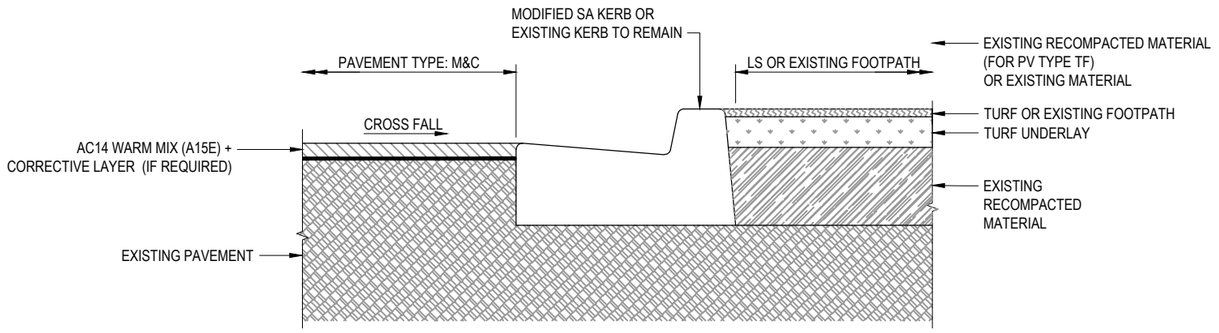
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYERS; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.



EDGE DETAIL E-3

PAVEMENT TYPE F2 WITH MODIFIED SA KERB AND PAVEMENT TYPE LS

SCALE 1 : 20



EDGE DETAIL E-4

PAVEMENT TYPE M&C WITH MODIFIED SA KERB OR EXISTING KERB AND PAVEMENT TYPE LS OR EXISTING FOOTPATH

SCALE 1 : 20

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000531.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
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	1	06.11.2020	PRE-AFC		A.PEREZ	1 : 20 FULL SIZE A3	
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:22:42 PM	MEGHWARB

CHECK PRINT (PRELIM. INITIAL / FINAL DATE)

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
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UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
PAVEMENT EDGE DETAILS

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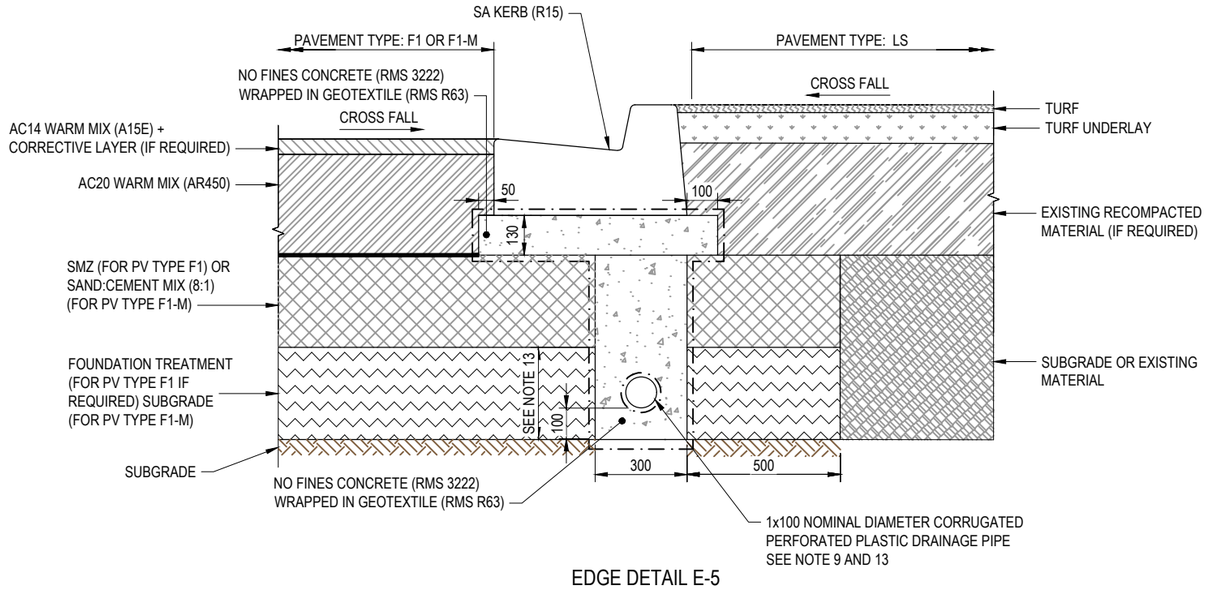
TNSW REGISTRATION No.	PART
DS2020/000130	1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000531	1



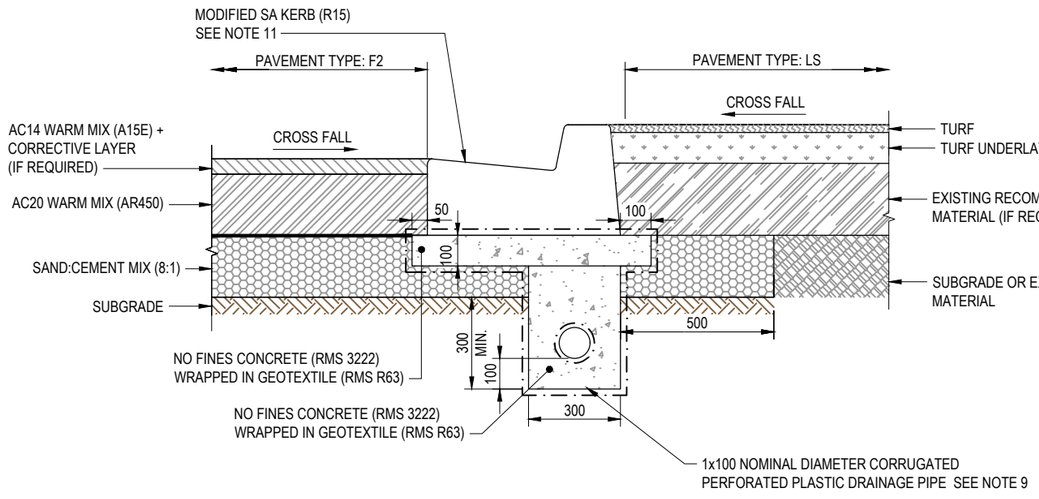
EDGE DETAIL E-5

PAVEMENT TYPE F1 OR F1-M WITH SA KERB AND PAVEMENT TYPE LS

SCALE 1 : 20

NOTES:

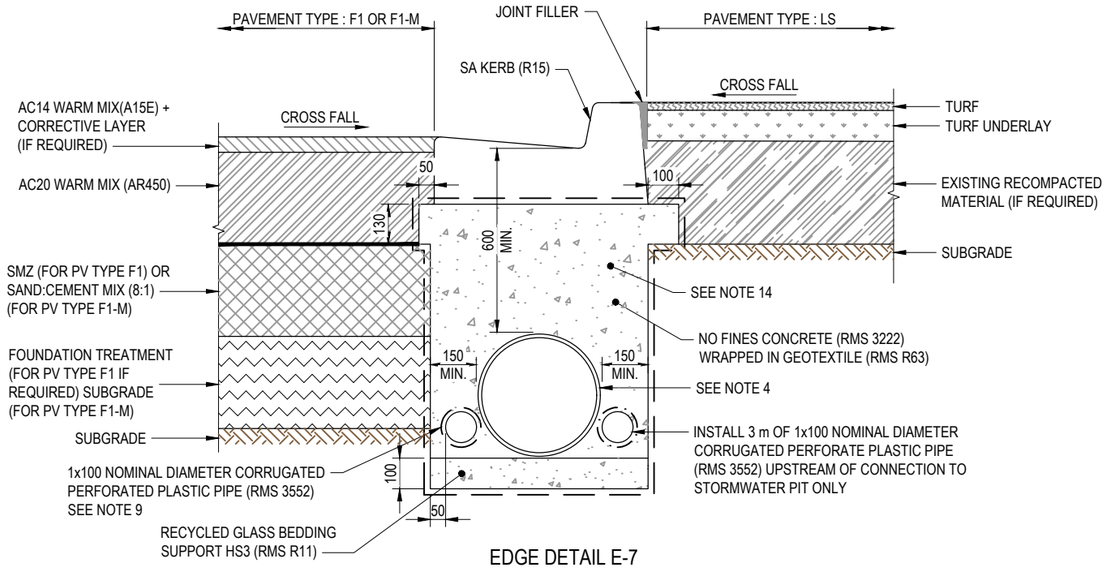
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYERS; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.
14. FOR DETAIL E-7 TO E-10, IF DEPTH TO OBVERT EXCEEDS 1200 mm, SUBJECT TO PRINCIPAL'S APPROVAL REPLACE DETAIL WITH E-5 OR E-6 AND STANDARD R11 BACKFILL.



EDGE DETAIL E-6

PAVEMENT TYPE F2 WITH SA KERB AND PAVEMENT TYPE LS

SCALE 1 : 20



EDGE DETAIL E-7

PAVEMENT TYPE F1 OR F1-M WITH COMBINED STORMWATER/SUBSURFACE TRENCH AND PAVEMENT TYPE LS

SCALE 1 : 20

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000532.DWG				DESIGN LOT CODE: -		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		PLOT DATE / TIME: 23-Nov-20 / 9:15:22 PM; PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY	CHECK PRINT PRELIM. INITIAL / FINAL DATE
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	1	06.11.2020	PRE-AFC		A.PEREZ	1 : 20 FULL SIZE A3		DISCIPLINE
			REVISION IN PROGRESS					DISCIPLINE
								DISCIPLINE
						CO-ORDINATE SYSTEM: MGA ZONE 56	HEIGHT DATUM: AHD	BACKDRAFTED/CORRECTED
								CONFIRMED

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

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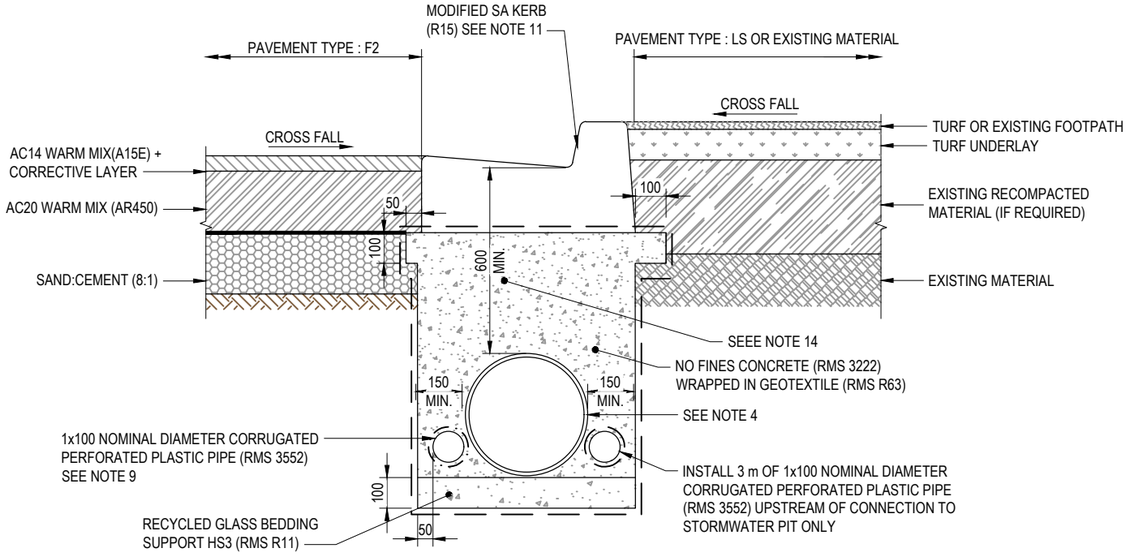
GEORGES HALL
PAVEMENT EDGE DETAILS

A3

SHEET 2 OF 3

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000532	1



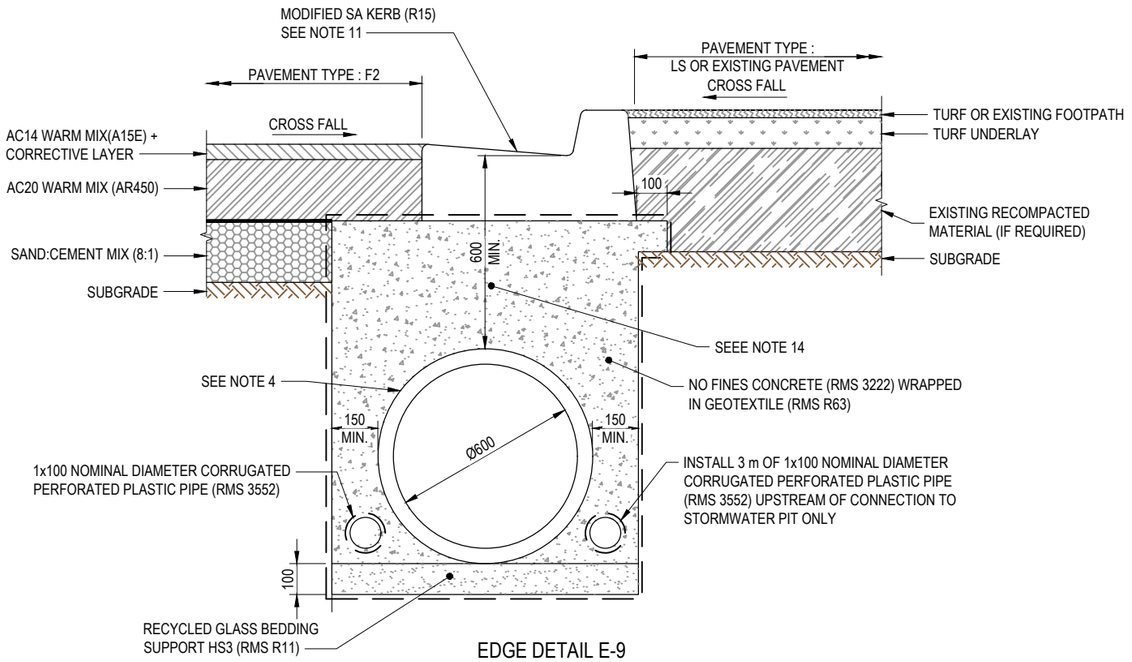
EDGE DETAIL E-8

PAVEMENT TYPE F2 WITH COMBINED STORMWATER/SUBSURFACE TRENCH AND PAVEMENT TYPE LS OR EXISTING MATERIAL

SCALE 1 : 20

NOTES:

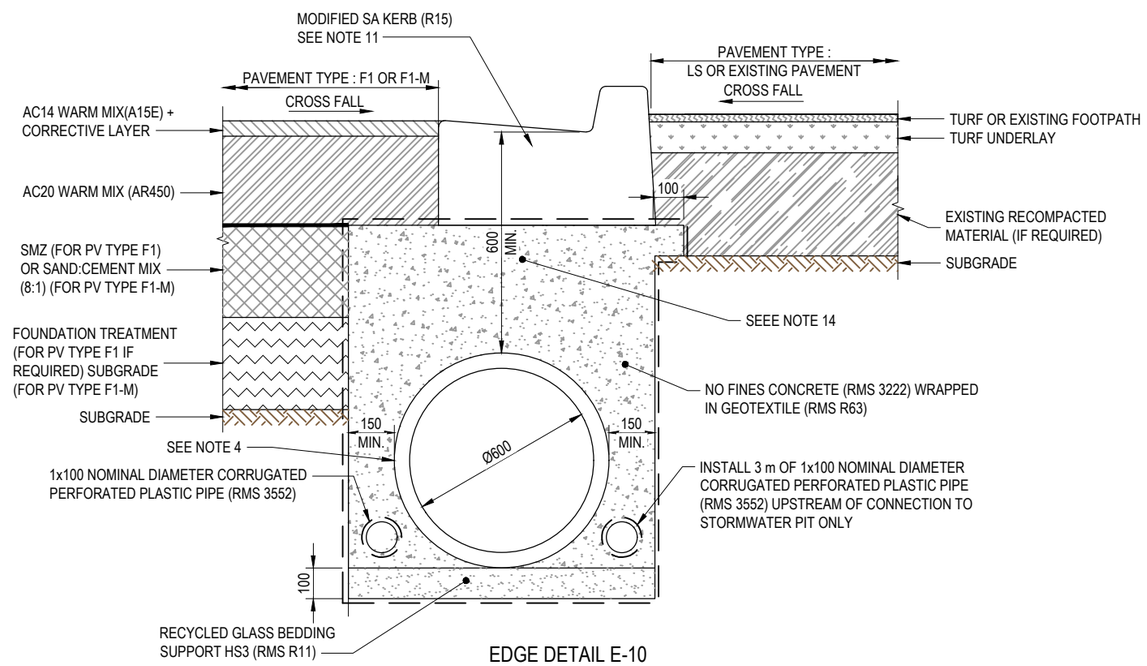
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYERS; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.
14. FOR DETAIL E-7 TO E-10, IF DEPTH TO OBVERT EXCEEDS 1200 mm, SUBJECT TO PRINCIPAL'S APPROVAL REPLACE DETAIL WITH E-5 OR E-6 AND STANDARD R11 BACKFILL.



EDGE DETAIL E-9

PAVEMENT TYPE F2 WITH COMBINED STORMWATER /SUBSURFACE TRENCH WITH PAVEMENT TYPE LS OR EXISTING MATERIAL

SCALE 1 : 20



EDGE DETAIL E-10

PAVEMENT TYPE F1 OR F1-M WITH COMBINED STORMWATER /SUBSURFACE TRENCH WITH PAVEMENT TYPE LS OR EXISTING MATERIAL

SCALE 1 : 20

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000533.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:13:07 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0,1 0 0,1 0,2 0,3 0,4m; 1 : 20 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
PAVEMENT EDGE DETAILS

A3

SHEET 3 OF 3

TfNSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-PV-000533

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA

BEALE STREET

HAIG AVE

HENRY LAWSON DRIVE

LIMIT OF WORKS

ADJOINS SHT-RF-001002

MCA01

VEHICULAR CROSSING TO BE PROVIDED PER CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-008A

REMOVE EXISTING PAVEMENT ARROWS WITH HIGH PRESSURE WATER BLASTING

KR01

N01

R1-2

GIVE WAY

R2-9

X8

R5-400(R)

N02

X10

N15 & N16

N13 & N14

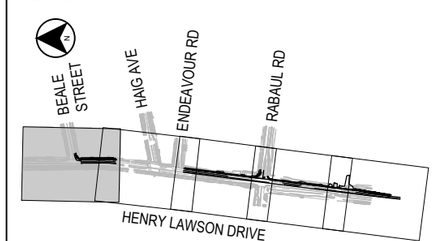
LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- Nxx — NEW SIGN ID
- Xxx — EXISTING SIGN ID
- AR3(R) — PAVEMENT ARROW LABEL
- XX — LINEMARKING / PAVEMENT LABEL
- NEW SINGLE FACE SIGNPOST
- NEW SIGNS
- SIGNS TO BE REMOVED
- SIGNS TO BE RELOCATED
- NEW BUS SHELTER
- TCS 1225 — TCS NUMBER

NOTES

1. ALL REGULATORY SIGNPOSTING AND LINEMARKING SHOWN ON THESE DRAWINGS WILL NEED TO BE APPROVED BY WRITTEN AUTHORISATION FROM AN OFFICER AUTHORISED UNDER SECTION 5.9 OF THE RMS DELEGATIONS MANUAL.
2. REFER TO DWGs SHT-RF-001101 AND SHT-RF-001102 FOR SIGN SCHEDULE.
3. UNLESS OTHERWISE INDICATED, ALL SIGN FACES TO BE SIZE TYPE A IN ACCORDANCE WITH AS1742.
4. POST TYPE: 60.3 x 3.6 CHS AS/NZS 1163-C250L0.
5. TYPICAL SIGN MOUNTING
   - MOUNTING HEIGHT: 2.5 m ON VERGES AND 1.5 m MINIMUM ON ISLANDS
   - KERB OFFSET: 0.3 m ON VERGES AND 0.5 m MINIMUM ON ISLANDS
5. SIGN POSITIONS TO BE CONFIRMED WITH PRINCIPAL PRIOR TO MOUNTING.

KEYPLAN



CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001001.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME: 23-Nov-20 / 9:22:59 PM — PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3

SHEET 1 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN — EDMS No.: - — SHEET No.: SHT-RF-001001 — ISSUE 1

FROM LANSDOWNE

TO MILPERRA

HAIG AVE

ENDEAVOUR ROAD

HENRY LAWSON DRIVE

ADJOINS SHT-RF-001001

ADJOINS SHT-RF-001003

100 120 140 160 180 200 220 240

X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38

R2-6 MERGE RIGHT LANE KEEP LEFT

W8-15(R) MERGE RIGHT

W4-9 LEFT LANE ENDS

G9-15 FORM LANE

NO STOPPING R5-400(LR) N03

NO STOPPING R5-400(LR) N04

NO RIGHT TURN R2-6N(R)

NO STOPPING R5-400(L)

RELOCATE TO NEW POST

MCA01

R4-1 60

N15 &N16 N13 & N14 R9-225 VEHICLES OVER 4.5 T EXCEPTED R2-6(L) NO LEFT TURN

R5-400(L) X43

L1 E5

VEHICULAR CROSSING TO BE PROVIDED PER CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-008A

LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- Nxx — NEW SIGN ID
- Xxx — EXISTING SIGN ID
- AR3(R) — PAVEMENT ARROW LABEL
- XX — LINEMARKING / PAVEMENT LABEL
- NEW SINGLE FACE SIGNPOST
- NEW SIGNS
- SIGNS TO BE REMOVED
- SIGNS TO BE RELOCATED
- NEW BUS SHELTER
- TCS 1225 — TCS NUMBER

NOTES

1. ALL REGULATORY SIGNPOSTING AND LINEMARKING SHOWN ON THESE DRAWINGS WILL NEED TO BE APPROVED BY WRITTEN AUTHORISATION FROM AN OFFICER AUTHORISED UNDER SECTION 5.9 OF THE RMS DELEGATIONS MANUAL.
2. REFER TO DWGs SHT-RF-001101 AND SHT-RF-001102 FOR SIGN SCHEDULE.
3. UNLESS OTHERWISE INDICATED, ALL SIGN FACES TO BE SIZE TYPE A IN ACCORDANCE WITH AS1742.
4. POST TYPE: 60.3 x 3.6 CHS AS/NZS 1163-C250L0.
5. TYPICAL SIGN MOUNTING
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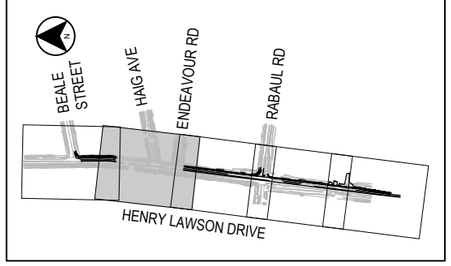
   - KERB OFFSET: 0.3 m ON VERGES AND 0.5 m MINIMUM ON ISLANDS
5. SIGN POSITIONS TO BE CONFIRMED WITH PRINCIPAL PRIOR TO MOUNTING.

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001002.DWG

DESIGN LOT CODE: WVR No. | APPROVAL

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:22:28 PM — PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

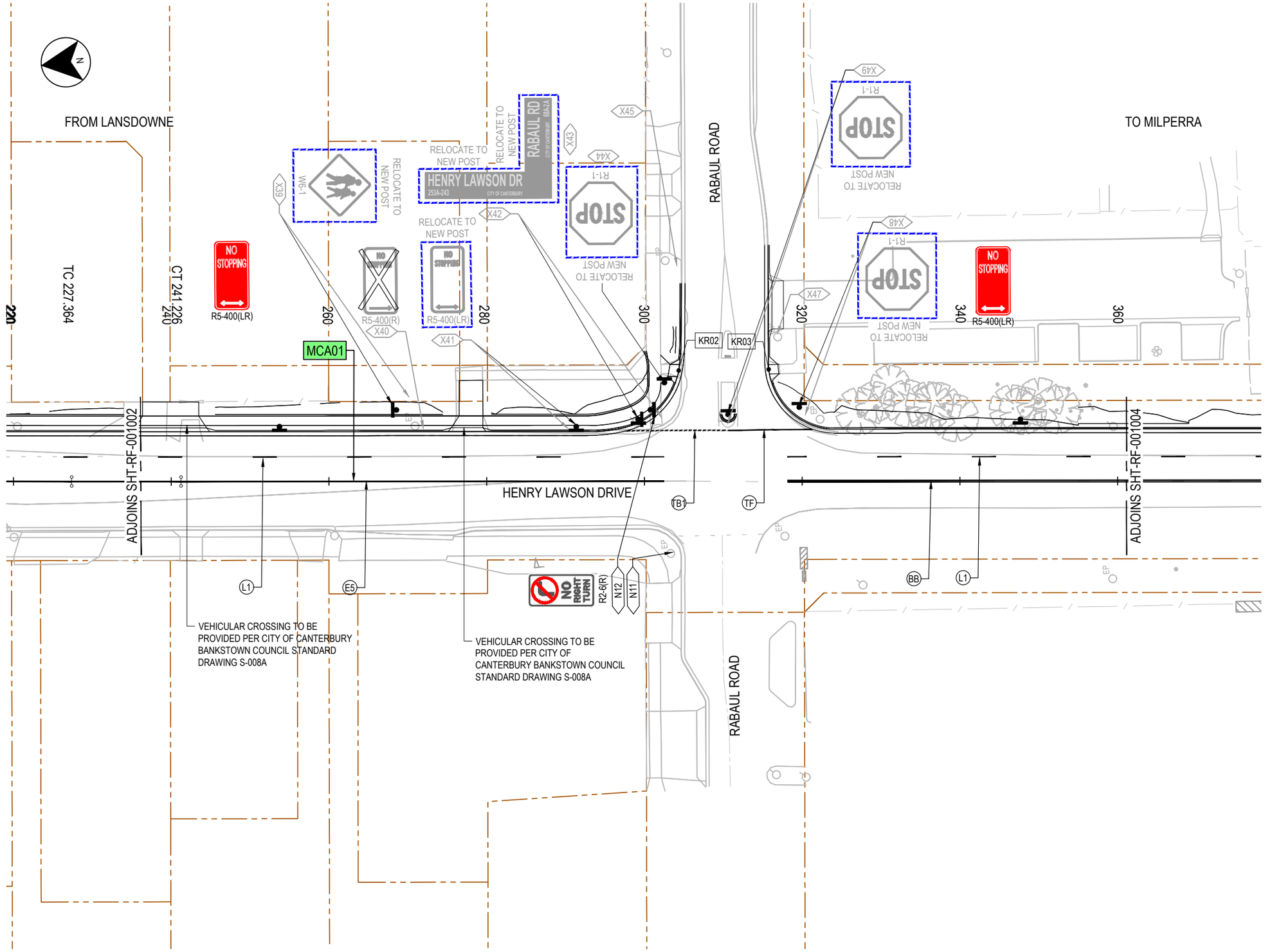
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN — EDMS No.: - — SHEET No.: SHT-RF-001002 — ISSUE 1



LEGEND

- 0.000
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- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
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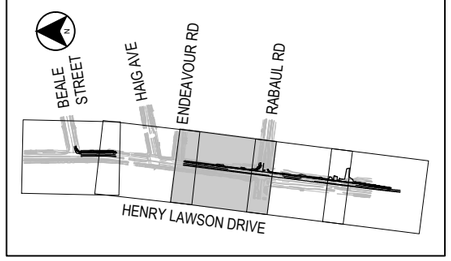

CHECK PRINT

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DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:20:50 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES: -

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

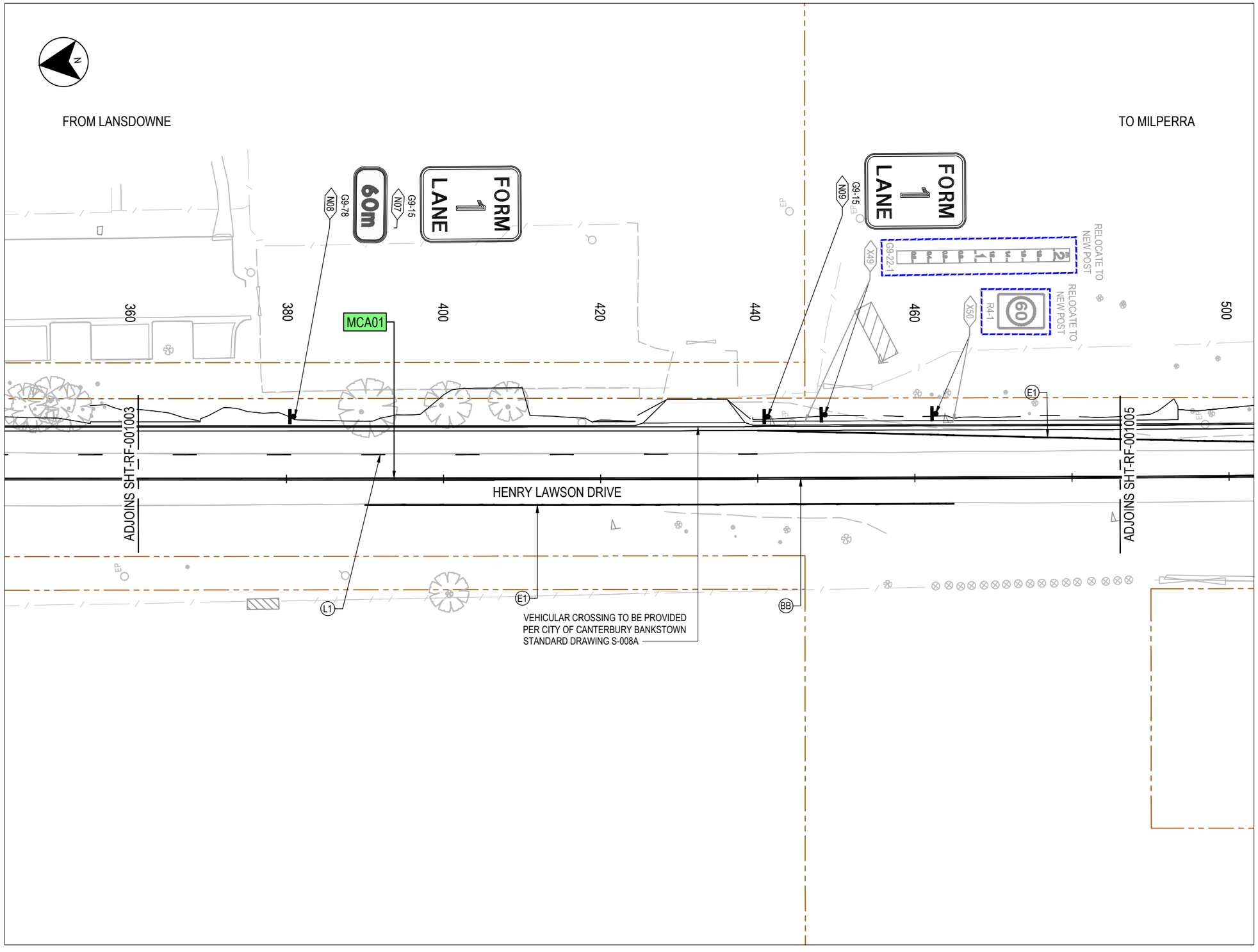
PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3
SHEET 3 OF 5

TINSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RF-001003
ISSUE 1



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
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- MXXX — ROAD CONTROL LINE LABEL
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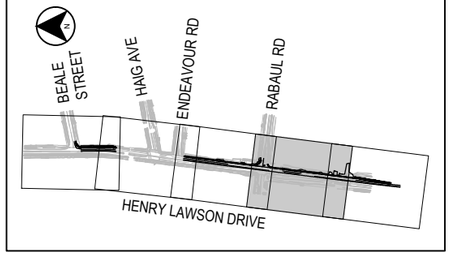

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001004.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME: 23-Nov-20 / 9:20:13 PM — PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL LINEMARKING AND SIGNAGE PLAN

A3

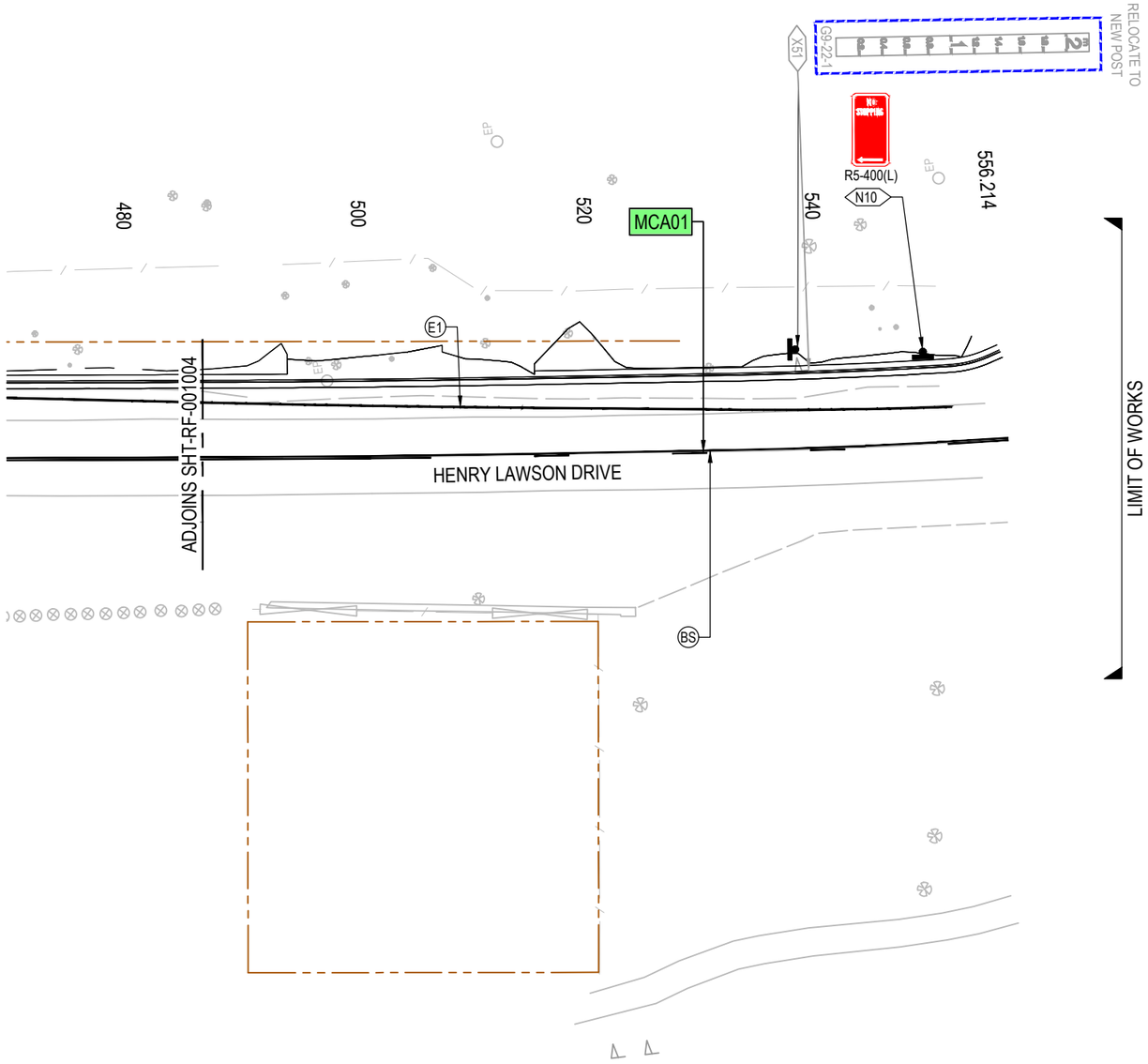
SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RF-001004	1

FROM LANSDOWNE

TO MILPERRA



LEGEND

0.000

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
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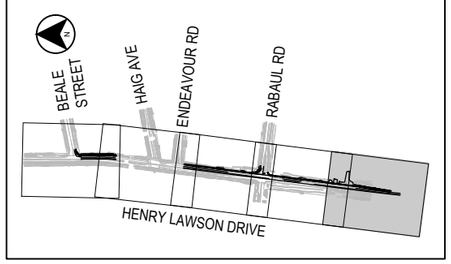
KEYPLAN



CHECK PRINT

DRAWING FILE LOCATION / NAME				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	
PW:/P0043031-SHT-RF-001005.DWG						-	
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:19:25 PM	MEGHWARB

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
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MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RF-001005 / 1

EXISTING SIGN SCHEDULE

SIGN TAG X - EXISTING R - RELOCATED	CONTROL	CHAINAGE	CODE	SIGN DESCRIPTION	TREATMENT	NEW LOCATION		MOUNTING	REMARKS
						CONTROL	CHAINAGE		
X1	MCA01	-24	G7-2-3	"BANKSTOWN AIRPORT/HAIG AVENUE" (LEFT)	RETAIN	-	-	-	
X2	MCA01	-24	G9-66	SUPPLEMENTARY DISTANCE PLATE x 150m	RETAIN	-	-	-	
X3	MCA01	-7	G5-13	"TO BABY HEALTH CENTRE"	RETAIN	-	-	-	
X4	MCA01	6	G5-14	"PRESCHOOL/CHRISTIAN SCHOOL"	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X5	MCA01	6	G5-14	"HOPE POINT CHURCH"	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X6	MCA01	6	-	"BEALE STREET" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X7	MCA01	6	-	"HENRY LAWSON DRIVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X8	MCA01	71	R2-9 (L)	LEFT LANE MUST TURN LEFT	REMOVE	-	-	-	
X9	MCA01	101	G7-2-3	"BANKSTOWN AIRPORT/HAIG AVENUE" (LEFT)	RETAIN	-	-	-	
X10	MCA01	101	R5-400 (R)	NO STOPPING	REMOVE	-	-	-	
X11	MCA01	114	R2-9 (L)	LEFT LANE MUST TURN LEFT	REMOVE	-	-	-	
X12	MCA01	122	G7-2-3	"BANKSTOWN AIRPORT/HAIG AVENUE" (RIGHT)	RETAIN	-	-	-	
X13	MCA01	123	G5-13	"TO SHOPPING CENTRE"	RETAIN	-	-	-	
X14	MCA01	123	G5-13	"TO POST OFFICE"	RETAIN	-	-	-	
X15	MCA01	138	R1-4	STOP	RETAIN	-	-	-	
X16	MCA01	138	R9-201	WHEN SIGNALS BLACKED OUT OR FLASHING	RETAIN	-	-	-	
X17	MCA01	142	-	"HAIG AVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RETAIN	-	-	-	
X18	MCA01	142	G5-13	"TO SHOPPING CENTRE"	RETAIN	-	-	-	
X19	MCA01	142	G5-13	"TO POST OFFICE"	RETAIN	-	-	-	
X20	MCA01	142	G5-13	"CATHOLIC CHURCH"	RETAIN	-	-	-	
X21	MCA01	151	W4-9	LEFT LANE ENDS	REMOVE	-	-	-	
X22	MCA01	151	W8-15	MERGE RIGHT	REMOVE	-	-	-	
X23	MCA01	151	R5-400 (L+R)	NO STOPPING	REMOVE	-	-	-	
X24	MCA01	160	R2-6 (R)	NO RIGHT TURN	RETAIN	-	-	-	
X25	MCA01	162	R1-4	STOP	RETAIN	-	-	-	
X26	ENDEAVOUR ROAD	-	R4-10	SPEED LIMIT 50 AREA	RETAIN	-	-	-	
X27	ENDEAVOUR ROAD	-	R5-400 (R)	NO STOPPING	RETAIN	-	-	-	
X28	MCA01	168	R1-4	STOP	RETAIN	-	-	-	
X29	ENDEAVOUR ROAD	-	R4-11	END SPEED LIMIT 50 AREA	RETAIN	-	-	-	
X30	ENDEAVOUR ROAD	-	R5-400 (L)	NO STOPPING	RETAIN	-	-	-	
X31	ENDEAVOUR ROAD	-	G9-13	ALL TRAFFIC LEFT	RETAIN	-	-	-	
X32	MCA01	175	R1-4	STOP	RETAIN	-	-	-	
X33	MCA01	178	-	"ENDEAVOUR RD" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RETAIN	-	-	-	
X34	MCA01	178	-	"HENRY LAWSON DRIVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RETAIN	-	-	-	
X35	MCA01	181	G9-15	FORM 1 LANE	REMOVE	-	-	-	
X36	MCA01	181	R5-400 (L)	NO STOPPING	REMOVE	-	-	-	
X37	MCA01	181	R2-6 (R)	NO RIGHT TURN	RELOCATE (R37)	MCA01	181	TYPICAL	
X38	MCA01	220	R4-1	SPEED LIMIT 60	RELOCATE (R38)	MCA01	222	TYPICAL	
X39	MCA01	268	W6-1	PEDESTRIAN	RELOCATE (R39)	MCA01	269	TYPICAL	

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001101.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:07:02 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
SIGNAGE SCHEDULE

A3

SHEET 1 OF 2

TfNSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-RF-001101

ISSUE: 0

EXISTING SIGN SCHEDULE

SIGN TAG X - EXISTING R - RELOCATED	CONTROL	CHAINAGE	CODE	SIGN DESCRIPTION	TREATMENT	NEW LOCATION		MOUNTING	REMARKS
						CONTROL	CHAINAGE		
X40	MCA01	275	R5-400 (R)	NO STOPPING	REMOVE			-	
X41	MCA01	291	R5-400 (L+R)	NO STOPPING	RELOCATE (R41)	MCA01	305	-	
X42	MCA01	303	-	"HENRY LAWSON DRIVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOCATE (R42)	MCA01	299	TYPICAL	
X43	MCA01	303	-	"RABAUL ROAD" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOCATE (R43)	MCA01	299	TYPICAL	
X44	MCA01	303	R1-4	STOP	RELOCATE (R44)	MCA01	303	TYPICAL	
X45	RABAUL ROAD	-	R4-10	SPEED LIMIT 50 AREA	RETAIN	-	-	-	
X46	MCA01	310	R1-4	STOP	RELOCATE (R46)	MCA01	310	TYPICAL	
X47	RABAUL ROAD	-	R4-11	END SPEED LIMIT 50 AREA	RETAIN				
X48	MCA01	319	R1-4	STOP	RELOCATE (R48)	MCA01	319	-	
X49	MCA01	443	G9-22-1	FLOOD DEPTH INDICATORS	RELOCATE	MCA01	448	TYPICAL	
X50	MCA01	465	R4-11	SPEED LIMIT 60 AREA	RELOCATE	MCA01	463	TYPICAL	
X51	MCA01	538	G9-22-1	FLOOD DEPTH INDICATORS	RELOCATE (R59)	MCA01	538	TYPICAL	

NEW SIGN SCHEDULE

SIGN TAG	CODE	LOCATION		SIGN DESCRIPTION	SIGN FACE			MOUNTING	REMARKS
		CONTROL	CHAINAGE		WIDTH A (mm)	HEIGHT B (mm)	AREA (m²)		
N01	R1-2	MCA01	9	GIVE WAY	375	375	0.07	TYPICAL	
N02	R5-400 (L+R)	MCA01	101	NO STOPPING	225	450	0.1	TYPICAL	
N03	R5-400 (L+R)	MCA01	151	NO STOPPING	225	450	0.1	TYPICAL	
N04	R5-400 (L+R)	MCA01	223	NO STOPPING	225	450	0.1	TYPICAL	
N05	R5-400 (L+R)	MCA01	253	NO STOPPING	225	450	0.1	TYPICAL	
N06	R5-400 (L+R)	MCA01	346	NO STOPPING	225	450	0.1	TYPICAL	
N07	G9-15	MCA01	380	FORM 1 LANE	600	800	0.48	TYPICAL	
N08	G9-78	MCA01	380	SUPPLEMENTARY DISTANCE PLATE 60m	600	200	0.12	TYPICAL	SAME POST AS N07
N09	G9-15	MCA01	441	FORM 1 LANE	600	800	0.48	TYPICAL	
N10	R5-400 (L+R)	MCA01	550	NO STOPPING	225	450	0.1	TYPICAL	
N11	R2-6 (R)	MCA01	303	NO RIGHT TURN	450	900	0.41	EXISTING LIGHT POLE	IN WESTERN VERGE
N12	R2-6 (R)	MCA01	302	NO RIGHT TURN	450	900	0.41	TYPICAL	
N13	R2-6 (L)	MCA01	116	NO LEFT TURN	450	900	0.41	TYPICAL	
N14	R9-225	MCA01	116	VEHICLES UNDER 9 m EXCEPTED	450	300	0.135	TYPICAL	
N15	R2-6 (L)	MCA01	116	NO LEFT TURN	450	900	0.41	TYPICAL	IN WESTERN VERGE
N16	R2-225	MCA01	116	VEHICLES UNDER 9 m EXCEPTED	450	300	0.135	TYPICAL	IN WESTERN VERGE

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001102.DWG

DESIGN LOT CODE:

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:06:28 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
SIGNAGE SCHEDULE

A3

SHEET 2 OF 2

TINSW REGISTRATION No. DS2020/000130

PART 1

ISSUE STATUS: DETAILED DESIGN

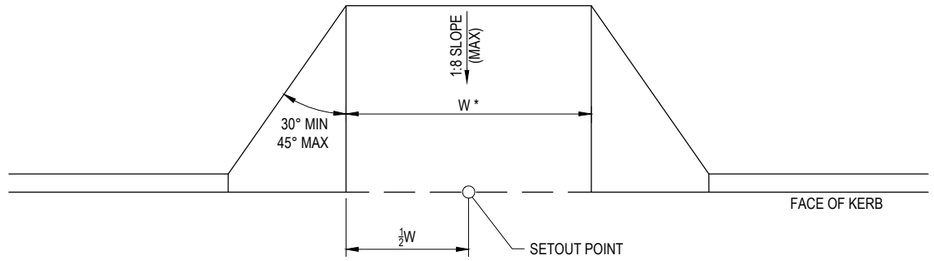
EDMS No.: -

SHEET No.: SHT-RF-001102

ISSUE: 0

ROAD FURNITURE - KERB RAMPS SCHEDULE

LABEL	SETOUT POINT		WIDTH (m) (MEASURED PERPENDICULAR)	PLAN REFERENCE
	EASTING	NORTHING		
KR01	312863.020	6245655.472	1.5	RF-001001
KR02	312835.392	6245355.873	1.2	RF-001003
KR03	312834.098	6245344.538	1.2	RF-001003



KERB RAMP SETOUT
NOT TO SCALE

NOTES:
1. FOR KERB RAMP DETAILS REFER TO CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-003.
2. * MEASURED PERPENDICULAR TO TRANSVERSE CROSSWALK LINES.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001601.DWG
DESIGN LOT CODE:
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:09:38 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

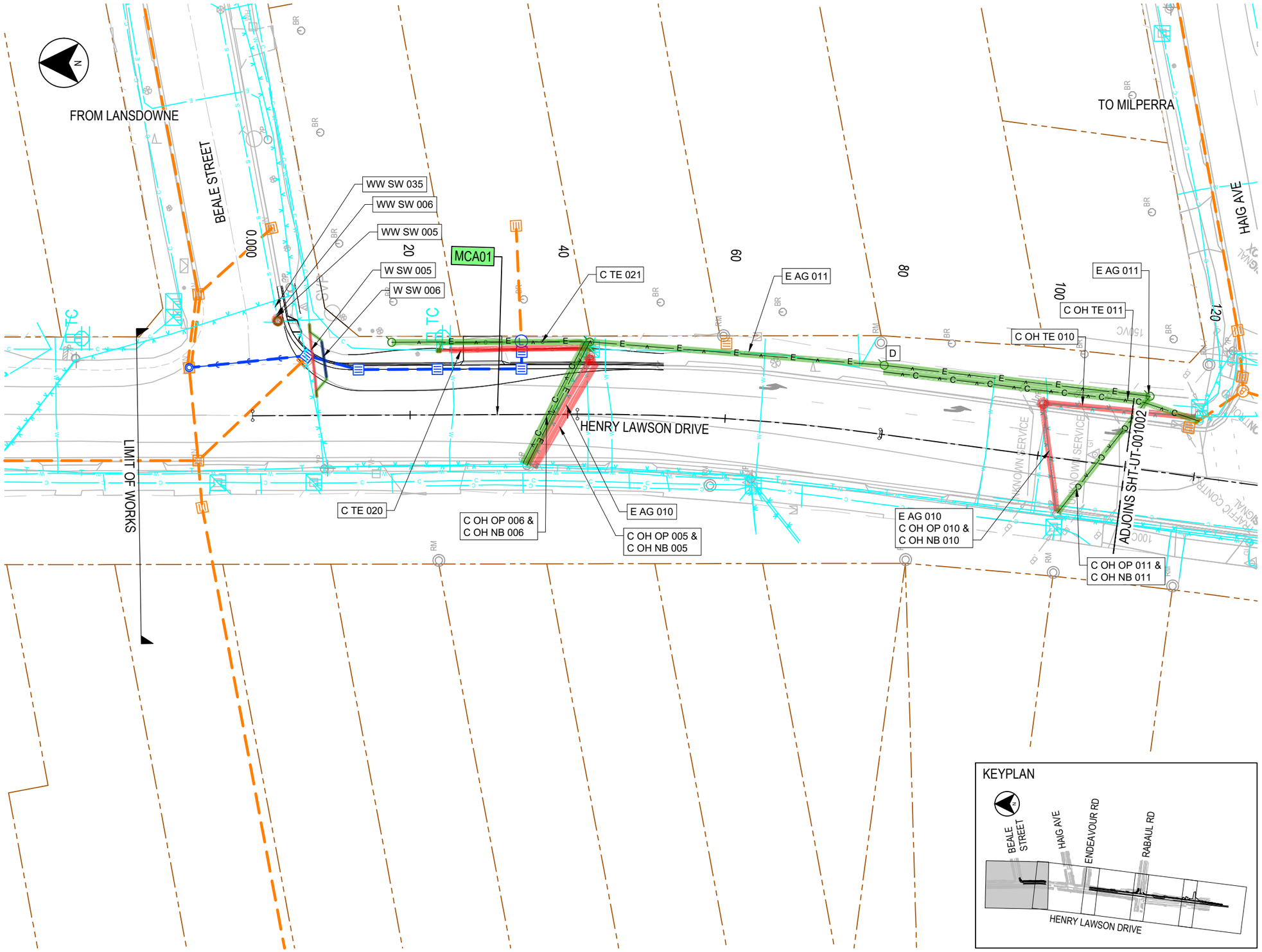
PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
KERB RAMP SETOUT DETAILS

A3
SHEET 1 OF 1

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RF-001601	0



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
2. REFER TO UTILITY TABLE ON SHT-UT-002001 AND SHT-UT-002002 FOR MORE INFORMATION AND SHT-GE-000021 TO SHT-GE-000023 FOR GENERAL NOTES.
3. UTILITIES DRAWINGS SUBJECT TO FURTHER COORDINATION WITH UTILITIES AUTHORITIES.
4. THE SHOWN PROPOSED UTILITY ROUTES AND STREET LIGHT COLUMNS ARE INDICATIVE ONLY. REFER RELEVANT UTILITIES DRAWING FOR DETAILS.
5. DOMESTIC AND OTHER INDIVIDUAL UTILITIES IMPACT ASSESSMENT IS NOT INCLUDED IN THE DRAWINGS.
6. TCS/ITS DESIGN NETWORK CONDUITS ARE NOT SHOWN IN THIS DRAWING.
7. DISCREPANCIES BETWEEN COMBINED UTILITY PLANS AND UTILITY AUTHORITY PLANS TO BE BROUGHT TO THE DESIGNERS ATTENTION.
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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-001001.DWG	DESIGN LOT CODE: -	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:19:41 PM; PLOT BY: MEGHWARB
CLIENT: NSW GOVERNMENT Transport for NSW	CANTERBURY BANKSTOWN COUNCIL MR508 HENRY LAWSON DRIVE UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL UTILITIES IMPACT ASSESSMENT PLAN	A3 SHEET 1 OF 5	

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

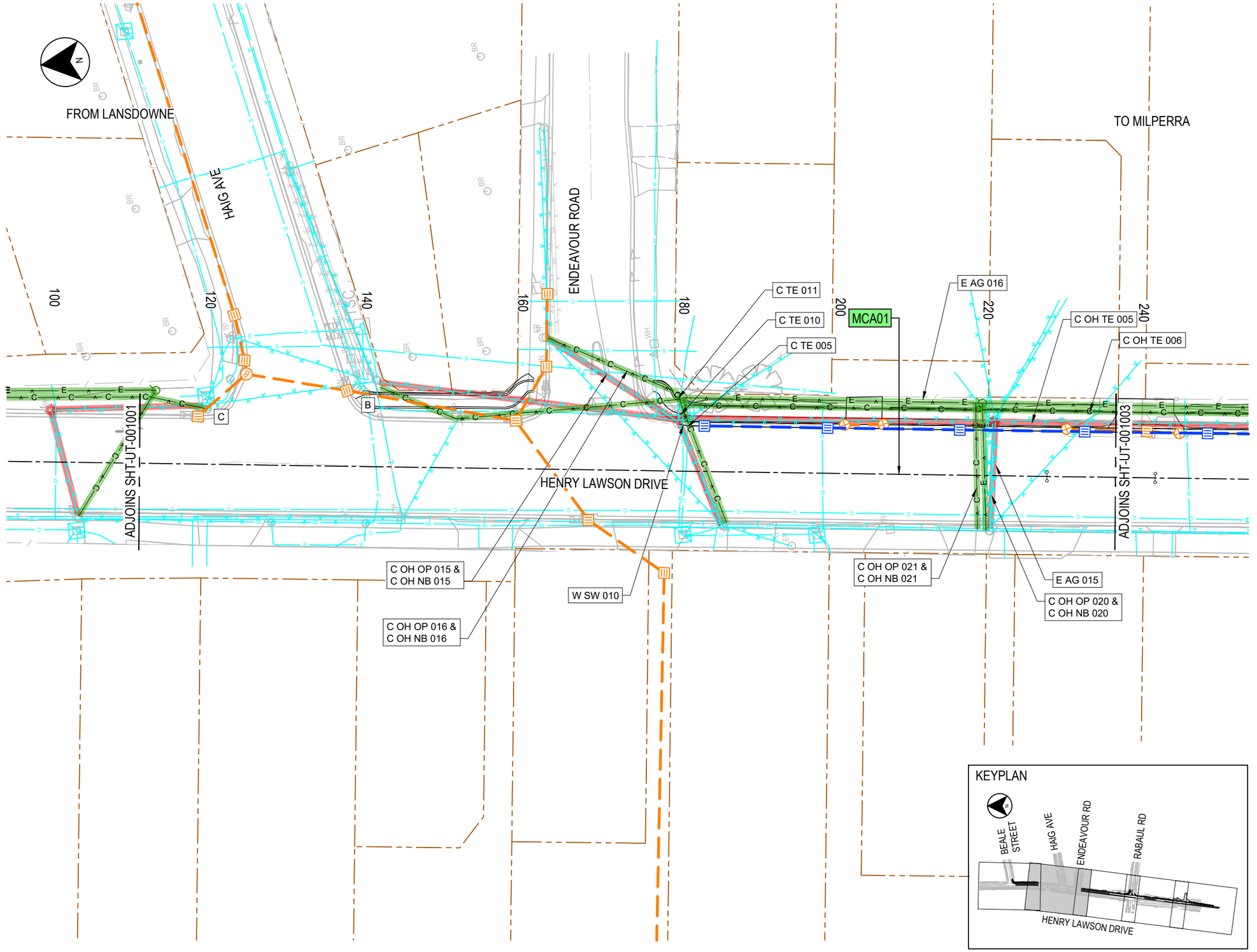
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-UT-001001	1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
2. REFER TO UTILITY TABLE ON SHT-UT-002001 AND SHT-UT-002002 FOR MORE INFORMATION AND SHT-GE-000021 TO SHT-GE-000023 FOR GENERAL NOTES.
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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-001002.DWG
EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION
0	10.08.2020	DRAFT ISSUE (DETAILED)
1	06.11.2020	PRE-AFC

REVISION IN PROGRESS

DESIGN LOT CODE: WVR No. | APPROVAL: A. PEREZ, A.PEREZ
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:19:58 PM | PLOT BY: MEGHWARB

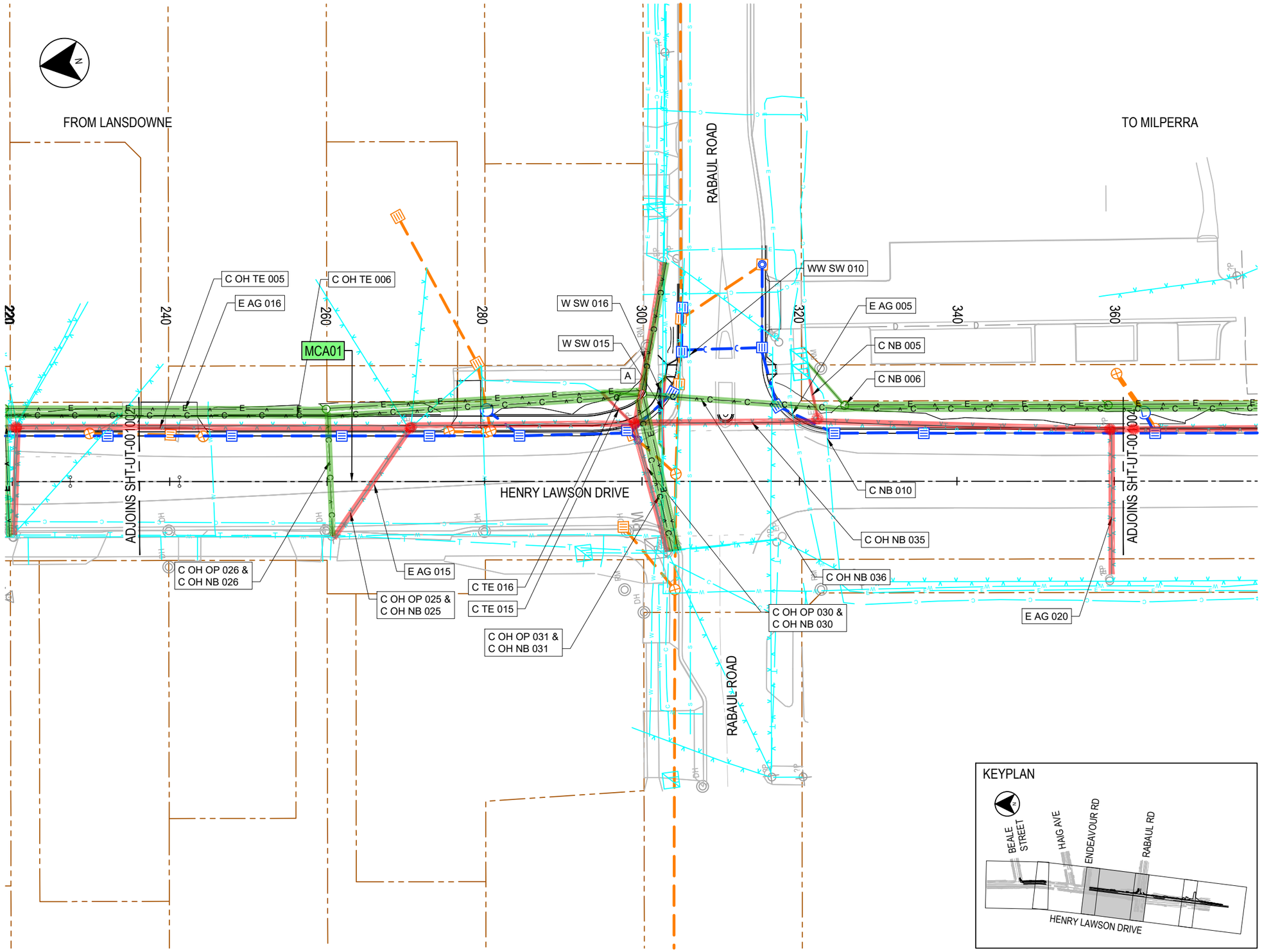
CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT PLAN

A3
SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-UT-001002 | ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
2. REFER TO UTILITY TABLE ON SHT-UT-002001 AND SHT-UT-002002 FOR MORE INFORMATION AND SHT-GE-000021 TO SHT-GE-000023 FOR GENERAL NOTES.
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10. ASSET ID: C TE 030
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    - 030 — SEQUENCIAL NUMBER

KEYPLAN

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-001003.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:18:51 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
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BACKDRAFTED/CORRECTED		
CONFIRMED		

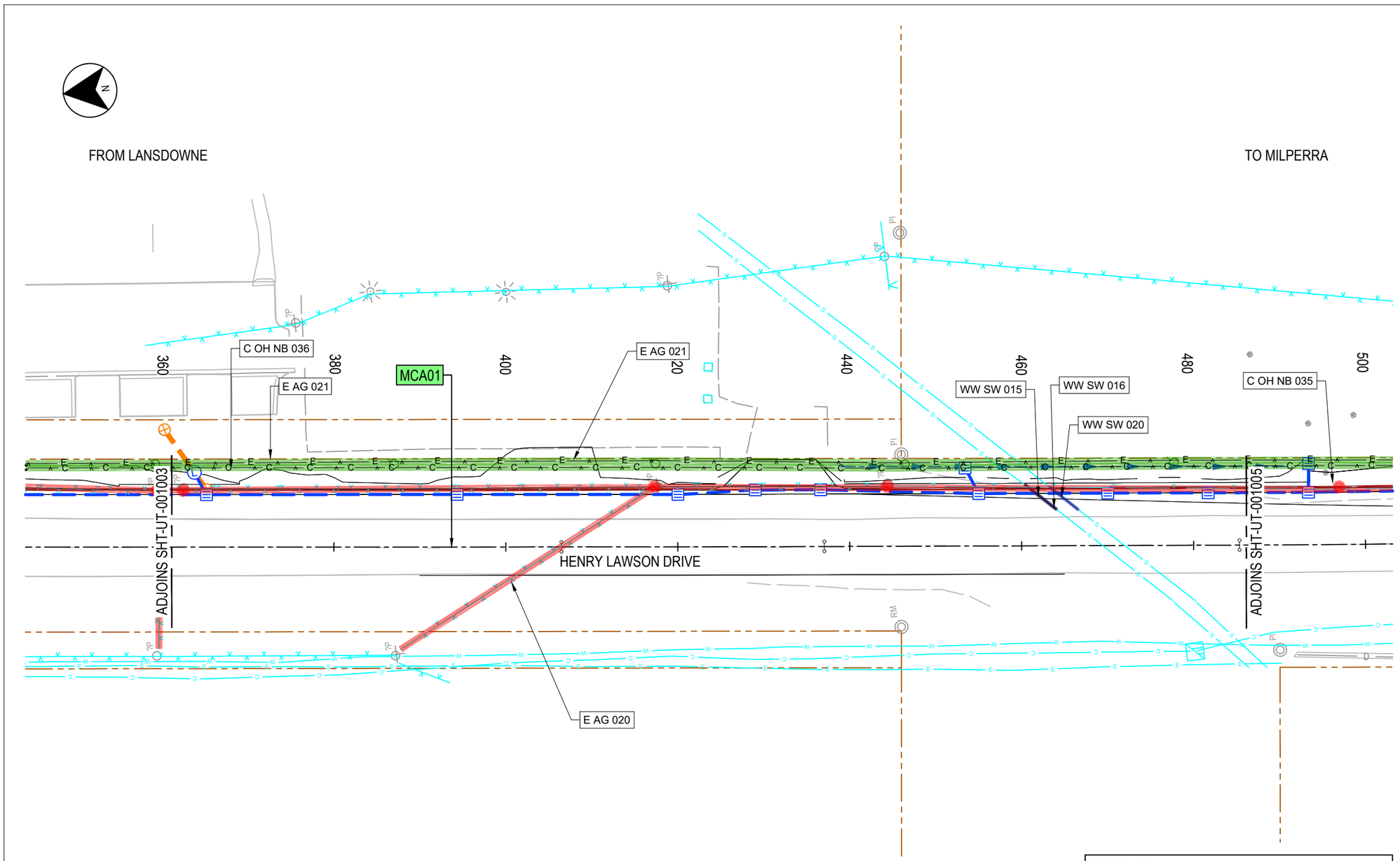
CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT PLAN

A3
SHEET 3 OF 5

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-UT-001003
ISSUE: 1



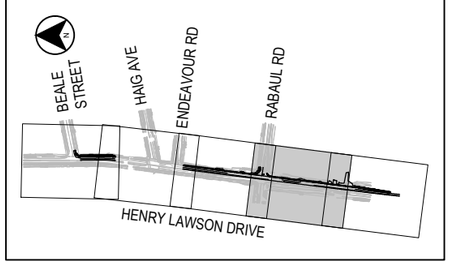
LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX UTILITIES TAG
- MXXX ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
2. REFER TO UTILITY TABLE ON SHT-UT-002001 AND SHT-UT-002002 FOR MORE INFORMATION AND SHT-GE-000021 TO SHT-GE-000023 FOR GENERAL NOTES.
3. UTILITIES DRAWINGS SUBJECT TO FURTHER COORDINATION WITH UTILITIES AUTHORITIES.
4. THE SHOWN PROPOSED UTILITY ROUTES AND STREET LIGHT COLUMNS ARE INDICATIVE ONLY. REFER RELEVANT UTILITIES DRAWING FOR DETAILS.
5. DOMESTIC AND OTHER INDIVIDUAL UTILITIES IMPACT ASSESSMENT IS NOT INCLUDED IN THE DRAWINGS.
6. TCS/ITS DESIGN NETWORK CONDUITS ARE NOT SHOWN IN THIS DRAWING.
7. DISCREPANCIES BETWEEN COMBINED UTILITY PLANS AND UTILITY AUTHORITY PLANS TO BE BROUGHT TO THE DESIGNERS ATTENTION.
8. DRAINAGE AND TCS ARE SHOWN ON PLANS FOR REFERENCE ONLY.
9. NOT AFFECTED = UTILITY IDENTIFIED WITH NO AUTHORITY REQUIREMENTS. PROTECTED = UTILITY OWNER HAS APPROVED PROTECTION (ie. ENCASE SLAB) THAT DOES NOT REQUIRE RELOCATION. ABANDON = WILL BE OUT OF SERVICE, ABANDON, DECOMMISSIONED AS PER AS5488 AFTER 'NEW' IS LIVE. NEW = NEW UTILITY ROUTE.
10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:19:10 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL UTILITIES IMPACT ASSESSMENT PLAN

A3

SHEET 4 OF 5

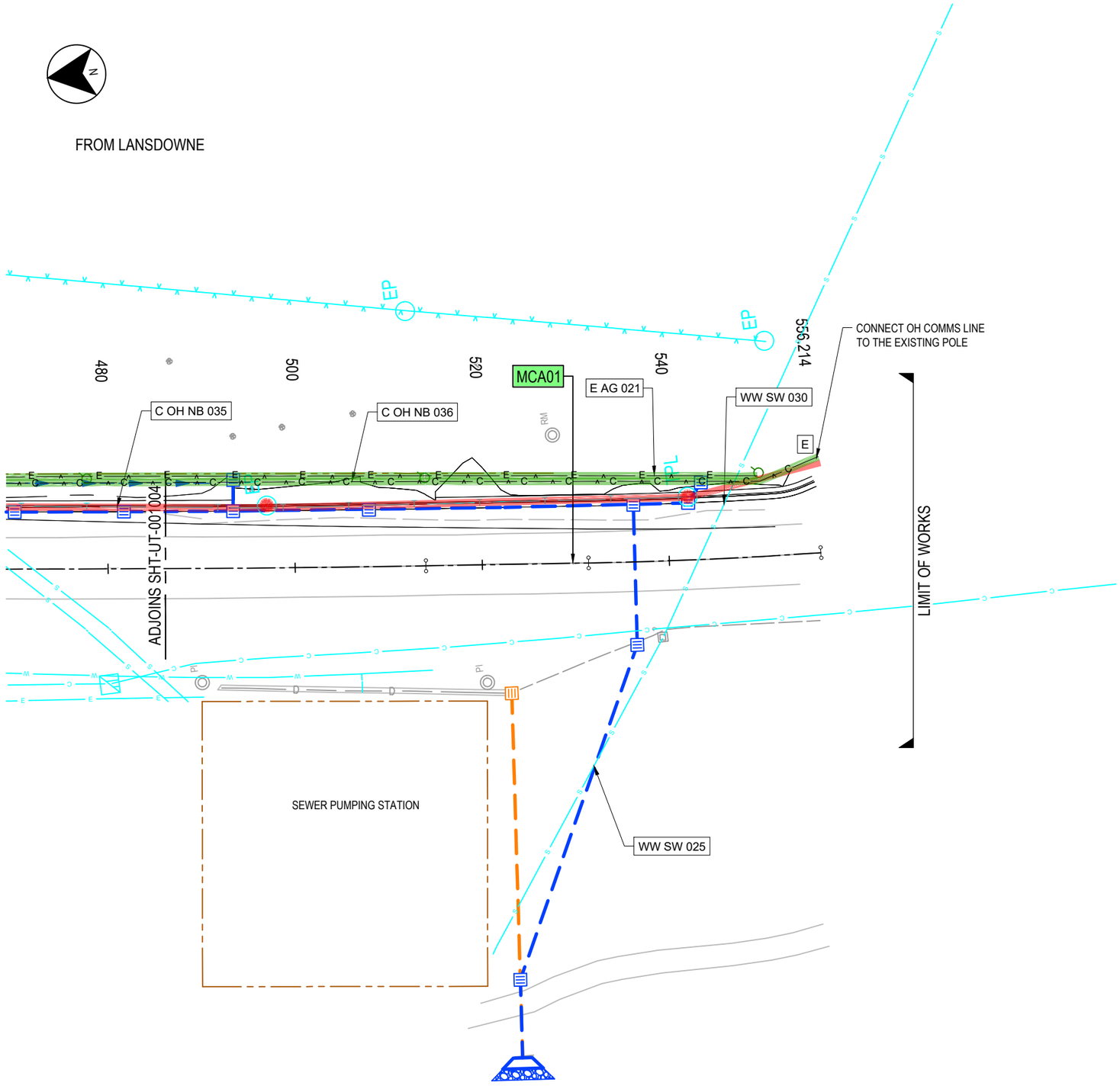
TfNSW REGISTRATION No.: DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-001004

ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

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    - C — UTILITY TYPE
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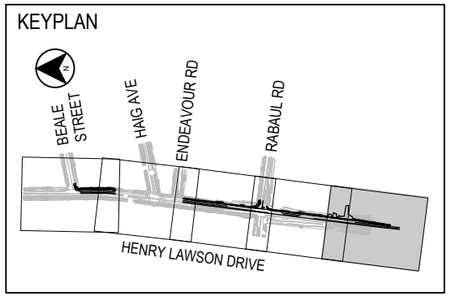
KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:18:31 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-001005

ISSUE: 1

S.No	Street 1	Street 2	Utility type	Service Provider	Existing Asset ID.	Service Size & Type	Why modifing asset ? (ie clash with new pavement, new SWD etc)	Treatment Not Affected Protect Abandon	Design route Asset ID	Proposed Scope (ie lower, new route etc)	Remarks / Comments
1	Henry Lawson Drive	Beale Street	SW Water	Sydney Water	W SW 005	100mm dia CICL Water main	Impacted by road widening	ABANDON	W SW 006	Abandon / Remove approximately 12m of water main and lay new with concrete encasement. Refer Sydney Water design drawings CN185892 for details.	
2	Henry Lawson Drive	Endeavour Road	SW Water	Sydney Water	W SW 010	100mm dia CICL Water main	New pavement construction	NOT AFFECTED	-	Water main has approximately 800mm cover and it is within Mill & Correction pavement construction zone. BOA Conditions case CN 185894 to be followed during construction.	
3	Henry Lawson Drive	Rabhul Road	SW Water	Sydney Water	W SW 015	100mm dia CICL Water main	Impacted by road widening	ABANDON	W SW 016	Abandon / Remove approximately 11m of water main and lay new with concrete encasement. Refer Sydney Water design drawings CN185892 for details.	
4	Henry Lawson Drive	Beale Street	WW Sewer	Sydney Water	WW SW 005	Sewer manhole	Within the pavement construction zone	ABANDON	WW SW 006	Remove the existing sewer manhole & construct new at same location. Refer Sydney Water approved drawings CN185893 for details.	
5	Henry Lawson Drive	Rabhul Road	WW Sewer	Sydney Water	WW SW 010	Sewer 300mm dia VC main	Drainage main crossing & New pavement construction.	NOT AFFECTED	-	Drainage main crossing existing sewer main. BOA conditions CN 185894 to be followed during construction.	
6	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 015	Sewer pressure main - 600mm dia CICL	Impacted by road widening & Drainage main crossing	ABANDON	WW SW 016	Sewer main is approximately 850mm deep. Exhume and relay the section of sewer main and concrete encase. Refer Sydney Water design drawings CN185893 for details.	
7	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 020	Sewer pressure main - 600mm dia DICL	Impacted by road widening & Drainage main crossing	PROTECT	-	Sewer main has approximately 900mm cover. Protect the DICL Main by concrete encasement. Refer Sydney Water design drawings CN185893 for details.	
8	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 025	Sewer gravity main - 300mm dia VC	Drainage main crossing	NOT AFFECTED	-	Drainage main crossing, BOA conditions CN185894 to be followed during construction.	
9	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 030	Sewer gravity main - 300mm dia VC	Within the pavement construction zone	NOT AFFECTED	-	Sewer main is within New pavement construction zone, BOA conditions CN185894 to be followed during construction.	
10	Henry Lawson Drive	Beale Street	WW Sewer	Sydney Water	WW SW 035	Sewer gravity main	Within the pavement construction zone	NOT AFFECTED	-	Sewer main is within New pavement construction zone, BOA conditions CN185894 to be followed during construction.	
11	Henry Lawson Drive	Henry Lawson Drive	G Gas	Jemena	-	No Gas main within the project development area	-	NOT AFFECTED	-	No Gas main within the project development area	
12	Henry Lawson Drive	Endeavour Road	C Comms	Telstra	C TE 005	Telstra house connection network - 1x35mm Dia PVC conduit.	Within the pavement construction zone	NOT AFFECTED	-	Mill & Resheet is proposed, No impact to the Telstra road crossing conduit. Telstra DBYD conditions to be followed.	
13	Henry Lawson Drive	Endeavour Road	C Comms	Telstra	C TE 010	Telstra house connection network - 1x35mm Dia PVC conduit - UGOH Connection	Impacted by Electrical Pole relocation.	ABANDON	C TE 011	Abandon the existing connection to the pole and make new connection to proposed pole for Overhead Telstra network. Refer Telstra design drawings for details.	
14	Henry Lawson Drive	Rabhul Road	C Comms	Telstra	C TE 015	Telstra house connection network - 1x35mm Dia PVC conduit - UGOH Connection	Impacted by Electrical Pole relocation.	ABANDON	C TE 016	Abandon the existing connection to the pole and make new connection to proposed pole for Overhead Telstra network. Refer Telstra design drawings for details.	
15	Henry Lawson Drive	Beale Street	C Comms	Telstra	C TE 020	Telstra house connection network - 1x35mm Dia PVC conduit	Impacted by new drainage pit construction.	ABANDON	C TE 021	Abandon the existing Telstra network and place new. 2 No's of existing Telstra pits are to be replaced with new pits as same location. Refer Telstra design drawings for details.	
16	Henry Lawson Drive	Rabhul Road	C Comms	NBN	C NB 005	NBN Owned fibre optic network - 1x100mm dia PVC Conduit	Impacted by road widening works	ABANDON	C NB 006	Remove existing connection to the pole and connect to the new pole (UGOH). Refer NBN Design drawing for details.	
17	Henry Lawson Drive	Rabhul Road	C Comms	NBN	C NB 010	NBN Owned fibre optic network - 1x100mm dia PVC Conduit	Within new pavement construction zone	NOT AFFECTED	-	NBN Conduit has 1m cover. No impact by new pavement works. DBYD Conditions to be followed.	
18	Henry Lawson Drive	Endeavour Road	C Comms	Telstra	C OH TE 005	Telstra Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH TE 006	Reroute / lay new overhead comms cables between A to B (Rabual Rd to Haig Ave). The shown relocation route is indicative only. House connection details are excluded in the drawing. Refer Telstra design drawings for details.	
19	Henry Lawson Drive	Rabhul Road	C Comms	Telstra	C OH TE 010	Telstra Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH TE 011	Reroute / lay new overhead comms cables between C to D. The shown relocation route is indicative only. House connection details are excluded in the drawing. Refer Telstra design drawings for details.	
20	Henry Lawson Drive	Beale Street	C Comms	Optus	C OH OP 005	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 006	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
21	Henry Lawson Drive	Haig Avenue	C Comms	Optus	C OH OP 010	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 011	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
22	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 015	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 016	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-002001.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:15:42 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020 06.11.2020	DRAFT ISSUE (DETAILED) PRE-AFC		A. PEREZ A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION 0 PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT SCHEDULE

A3

SHEET 1 OF 2

TINSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-002001

ISSUE: 0

S.No	Street 1	Street 2	Utility type	Service Provider	Existing Asset ID.	Service Size & Type	Why modifing asset ? (ie clash with new pavement, new SWD etc)	Treatment Not Affected Protect Abandon	Design route Asset ID	Proposed Scope (ie lower, new route etc)	Remarks / Comments
23	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 020	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 021	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
24	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 025	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 026	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
25	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 030	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 031	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
26	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 005	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 006	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
27	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 010	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 011	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
28	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 015	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 016	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
29	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 020	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 021	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
30	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 025	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 026	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
31	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 030	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 031	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
32	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 035	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 036	Reroute / lay new overhead comms cables. Dedicated NBN poles will be removed and NBN cables will be rerouted to new Ausgrid poles. The shown relocation route is indicative only (A to E). House connection details are excluded in the drawing.Refer NBN design drawings for details.	
33	Henry Lawson Drive	Rabhul Road	E Electrical	AUSGRID	E AG 005	Ausgrid electrical conduits 6x150mm dia PVC	Within new pavement construction zone	NOT AFFECTED	-	Electrical conduits have 2 m cover. Not affected. DBYD / Ausgrid conditions to be followed.	
34	Henry Lawson Drive	Beale Street & Haig Avenue	E Electrical	AUSGRID	E AG 010	Ausgrid electrical / Street light poles	Due to street light design & Road widening works	NEW	E AG 011	Install 3 new poles. Relocate 1 existing pole and associated overhead conductor between Beale Street & Haig Avenue. Refer Ausgrid design drawings AN21340 for details.	
35	Henry Lawson Drive	Endeavour Road & Rabhul Road	E Electrical	AUSGRID	E AG 015	Ausgrid electrical / Street light poles	Due to street light design & Road widening works	NEW	E AG 016	Install 2 new poles. Relocate 2 existing poles and associated overhead conductors betwee between Endeavour Rd & Rabhul Rd. Refer Ausgrid design drawings AN21340 for details.	
36	Henry Lawson Drive	Rabhul Road	E Electrical	AUSGRID	E AG 020	Ausgrid electrical / Street light poles	Due to street light design & Road widening works	NEW	E AG 021	Install 6 new poles. Relocate 3 existing poles and associated overhead conductors at Rabhul Rd intersections and south of the Henry Lawson drive. Refer Ausgrid design drawings AN21340 for details.	

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DESIGN LOT CODE:

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:04:31 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION 0 PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
UTILITIES IMPACT ASSESSMENT SCHEDULE

A3

SHEET 2 OF 2

TfNSW REGISTRATION No.: DS2020/000130

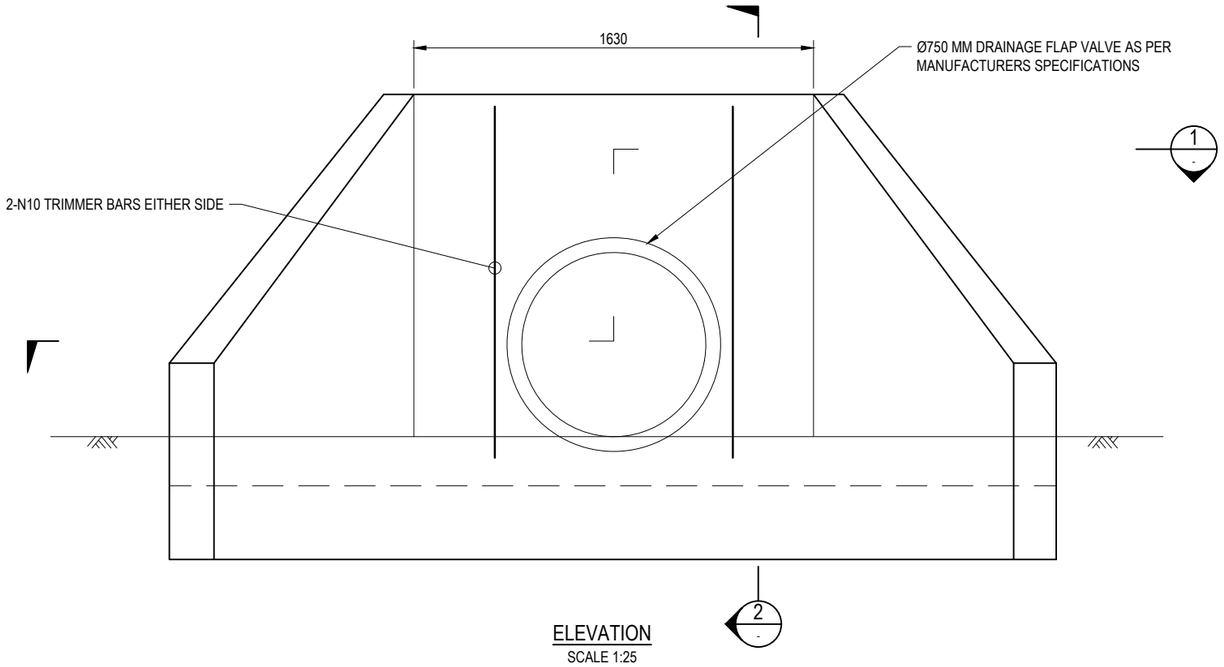
PART: 1

ISSUE STATUS: DETAILED DESIGN

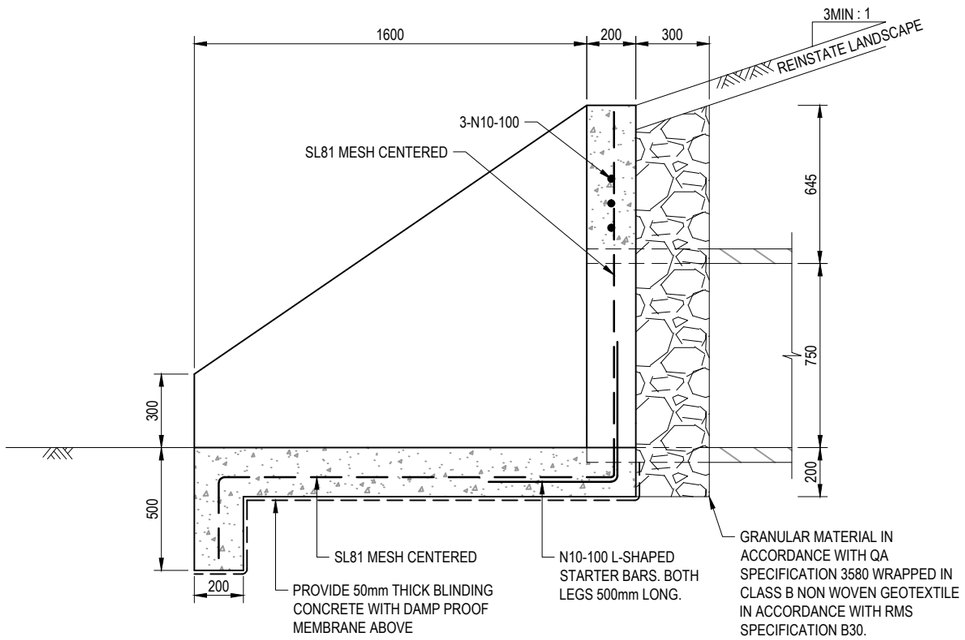
EDMS No.: -

SHEET No.: SHT-UT-002002

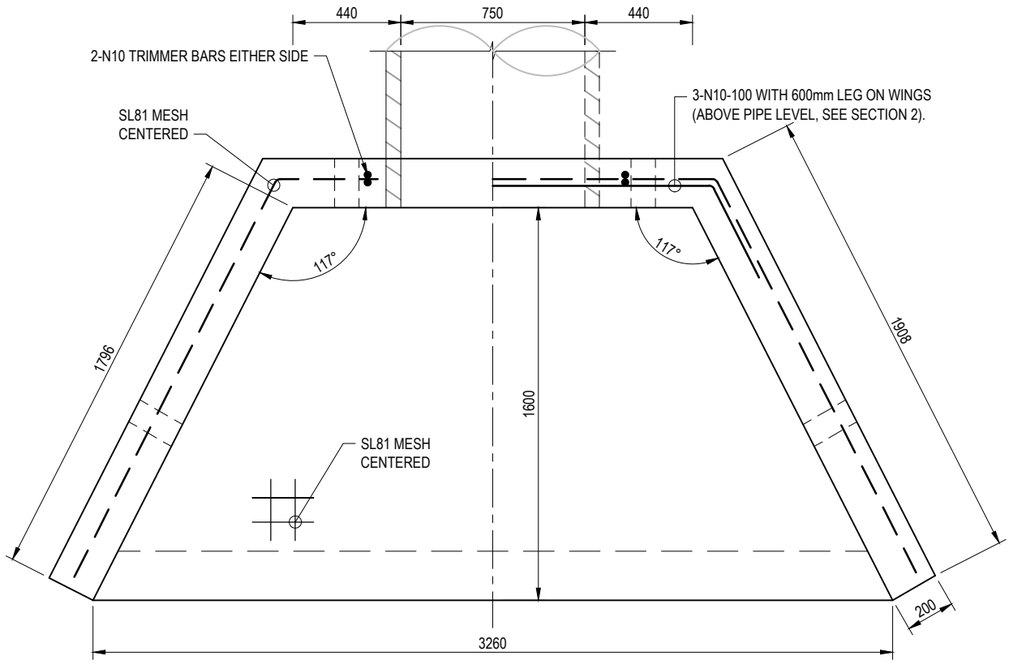
ISSUE: 0



ELEVATION
SCALE 1:25



SECTION 2
SCALE 1:25



SECTION 1
SCALE 1:25

NOTES:

1. CONCRETE EXPOSURE CLASSIFICATION C2. CONCRETE STRENGTH GRADE SHALL BE 50 MPa. MINIMUM COVER TO REINFORCEMENT SHALL BE 60 mm WITH REPETITIVE PROCEDURES AND INTENSE COMPACTION, UNLESS NOTED OTHERWISE.
2. ALL REINFORCEMENT BARS TO BE GRADE D500N TO AS4671-2001.
3. MESH LAPS SHALL BE MADE SO THAT THE TWO OUTERMOST WIRES OF ONE FABRIC OVERLAP THE TWO OUTERMOST WIRES OF THE SHEET BEING LAPPED BY 2 BAYS.
4. MESH REINFORCEMENT SHOULD BE CUT TO SUIT HEADWALL GEOMETRY.

REFERENCED DOCUMENTS:

AS4671-2001 STEEL REINFORCING MATERIALS
AS3600-2009 CONCRETE STRUCTURES
SPECIFICATION R11 - STORMWATER DRAINAGE
SPECIFICATION B80 - CONCRETE WORK FOR BRIDGES

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:05:32 PM
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EXTERNAL REFERENCE FILES:

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1	17.09.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

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CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	INITIAL	DATE
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DISCIPLINE P. MASURKAR		17.09.2020
DISCIPLINE JHON DO		17.09.2020
DISCIPLINE J.CARLOS		17.09.2020
BACKDRAFTED/CORRECTED TUNG LE		17.09.2020
CONFIRMED A. PEREZ		17.09.2020

CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION 1 PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
HEADWALL DETAIL

A3
SHEET 1 OF 2

TINSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-ST-001001
ISSUE 1

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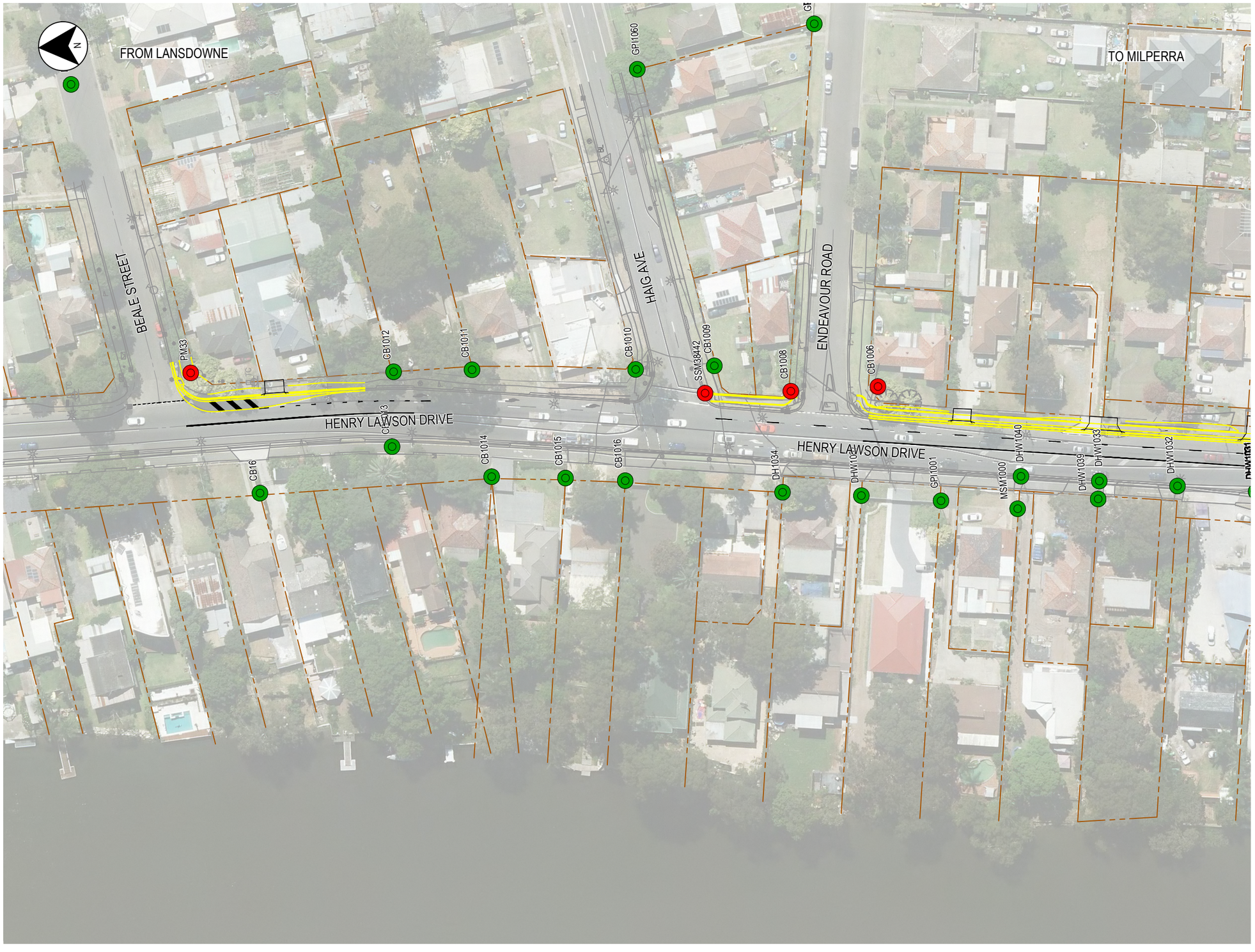

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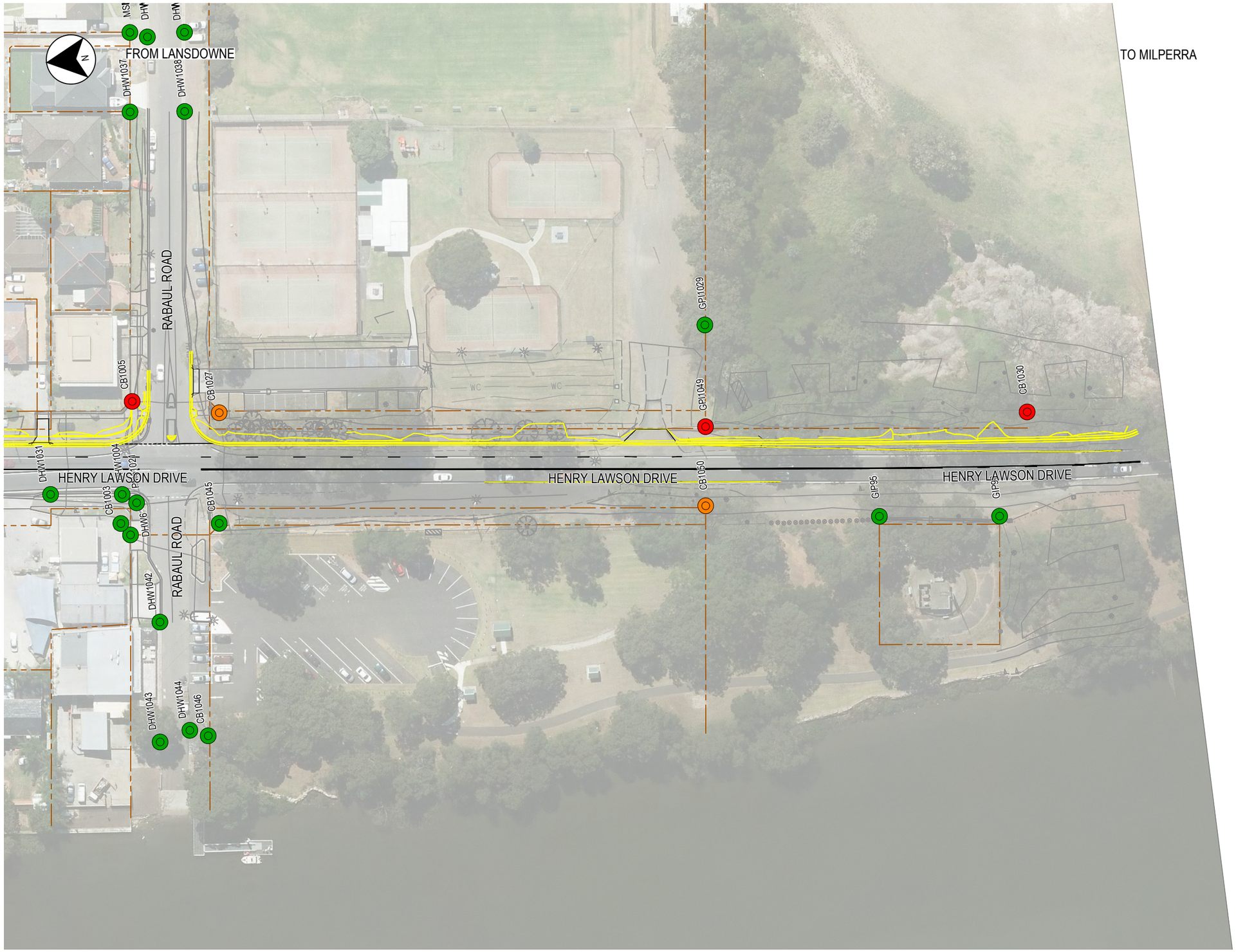

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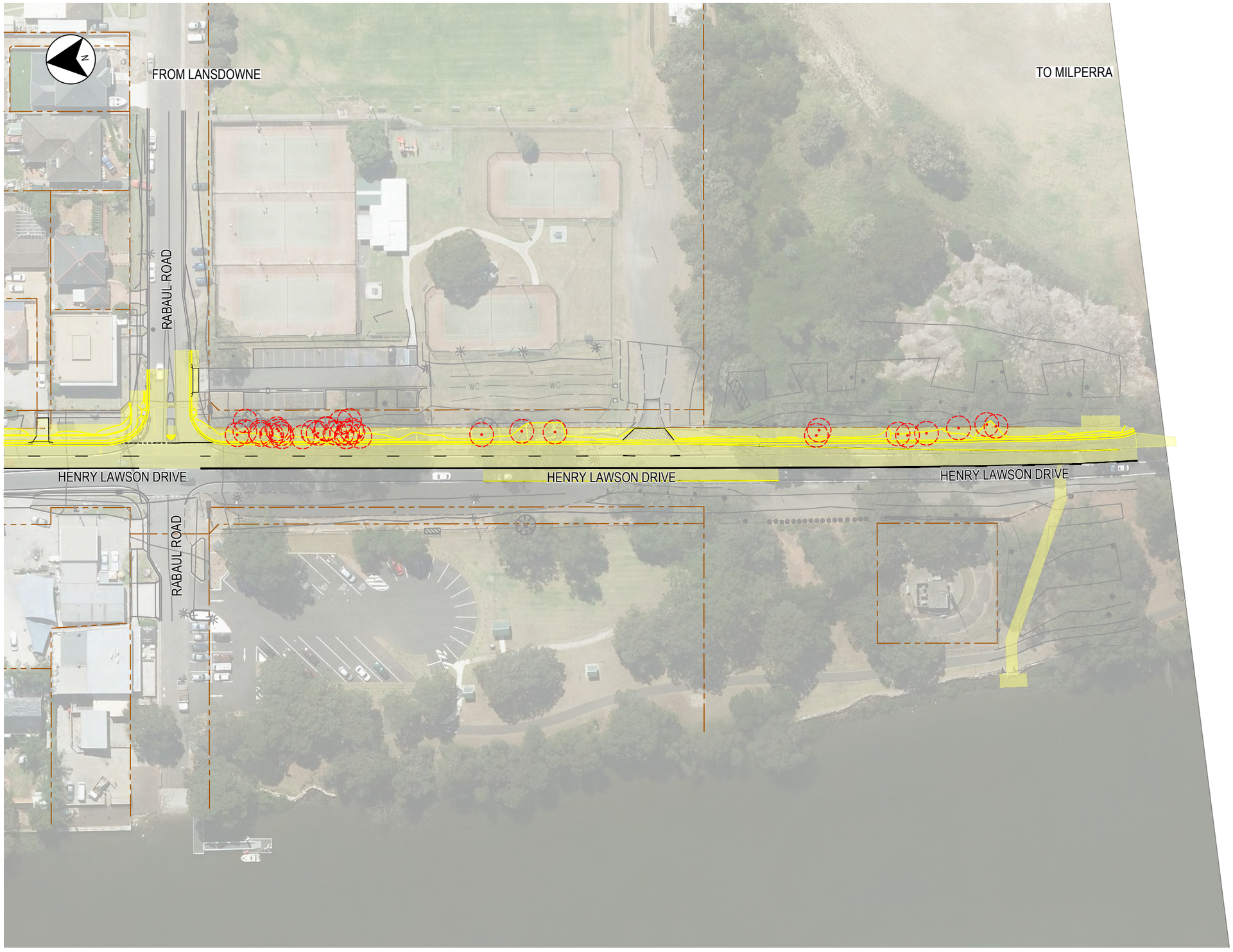

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Appendix D

Traffic Impact Assessment (Options Assessment)

Urban Road Congestion Program

Options Assessment

Henry Lawson Drive / Haig Avenue / Rabaul Road, Georges Hall

November 2020 | Version: 3

Contents

Author:	Islam Rezk – Traffic Engineer
Date:	November 2020
Version:	3
Reference:	P.0043509-09 (Henry Lawson Drive / Haig Avenue / Rabaul Road)
Division:	Greater Sydney
Review date:	November 2020

1 Introduction

The Easing Sydney's Congestion (ESC) Program Office has been commissioned by Network Development to investigate the feasibility of intersection upgrades at ten locations across Greater Sydney with funding provided through the Urban Road Congestion Program (URCP).

The Urban Roads Congestion Program focuses on areas of the road network where traffic congestion is likely to impact the operational efficiency of the wider network. The proposed upgrades targeting intersections or road sections generally aim to improve both safety and efficiency by countering the build-up of delay for motorists and public transport during peak periods.

1.1 Background

The study locations identified as part of URCP have previously been assessed by ESC under various funding streams. Of the ten, two previously passed through Concept / Detailed Design stages, three passed through Strategic Design and the remaining five remained at Initiation only.

The development of these projects did not progress through to the delivery stage for a variety of reasons, though primarily due to competing project candidates assessed through the said funding streams demonstrated greater value for the customer and thus took higher priority.

URCP will review prior study undertaken, identify gaps in assessment or lack thereof, reassess previously identified schemes and look to develop new ideas and options, considering changing traffic conditions over the past few years.

Recommendations will be made as to which schemes should progress through further development towards delivery, and those which do not warrant further investigation at this time.

1.2 Study area

The ten intersections are located across Greater Sydney, as shown in Table 1. The assessment of each intersection is detailed in a separate report with this document discussing the subject of Henry Lawson Drive / Haig Avenue / Rabaul Road in Georges Hall.

Table 1 Study locations

Intersection	Suburb	Prior Assessment
Pennant Hills Road / North Rocks Road	Carlingford	Strategic
Pennant Hills Rd / Carlingford Rd / Rembrandt St	Carlingford	Strategic
Pennant Hills Road / Baker Street	Carlingford	Initiation
Forest Road / Stoney Creek Road	Peakhurst	Initiation
Forest Road / Bonds Road / Boundary Road	Peakhurst	Concept
The Horsley Drive / Cumberland Highway	Smithfield	Strategic
The Horsley Drive / Nelson Street / Court Road	Fairfield	Initiation
The Horsley Drive / Polding Street	Fairfield	Initiation
Henry Lawson Drive / Haig Avenue / Rabaul Road	Georges Hall	Concept
Princes Highway / Bates Drive	Kareela	Initiation

1.3 Objectives

The URCP is strongly aligned with two of the key outcomes listed in Future Transport 2056:

- Safety and performance – the program will develop projects to improve efficiency and reliability of the road network, and provide benefits to multiple modes (including general traffic, public transport, freight)
- A strong economy – the program will develop projects to improve travel times and provide customers with more reliable journeys to metropolitan centres, strategic centres and employment areas.

The intention of the Intersection Option Assessment reports is to present recommended and considered options for each intersection included in the URCP.

The reports would also provide recommendations as to which improvement options should progress through further development towards delivery, and those which do not warrant further investigation at this time.

2 Methodology

This section details, at a high level, the overarching methodology adopted for reassessing the ten intersections listed in Table 1.

2.1 Gap analysis

Gap analysis was undertaken to gain comprehension of all works carried out to date at each intersection, given the varying nature of the level of detail and timeframes over which previous studies were undertaken.

Gap analysis reviewed the status of any available traffic modelling, including whether the assessment year would be recent enough to be considered suitable for URCP. Previous options tested in modelling were checked for consistency against any designs developed, as was the availability of any future year traffic assessments.

Prior traffic survey availability was ascertained with a view to confirming whether any available data would be suitable for use in this updated assessment.

Results and reporting were reviewed, including whether any prior Benefit Cost Ratio (BCR) assessments had been undertaken, whether a traffic report had been written and whether said reporting was suitable for Review of Environmental Factors (REF) input.

Finally, the availability of any crash data or analysis was reviewed to assist in the identification of crash trends and safety concerns at each of the intersections.

2.2 Data collection

Intersection turn count and queue length surveys were commissioned as part of URCP in November 2019 at the following intersections:

- The Horsley Drive / Polding Street
- The Horsey Drive / Nelson Street
- Pennant Hills Road / North Rocks Road
- Henry Lawson Drive / Haig Avenue / Rabaul Road

These intersections were either lacking survey data from prior assessments, or data was deemed aged (pre-2017) and thus requiring further validation prior to reusing in this study.

Whilst survey data at some other intersections dated back to 2016, reviews of SCATS detector counts suggested little change in traffic volumes over the past few years, and as such those 2016 turn counts were deemed suitable for use and considered to be reflective of current day conditions.

2.3 Assessment approach

Assessment has been undertaken to determine whether intersections warrant further investigation and scheme development, or no further investigation is recommended at this time. The assessment comprises certain key investigations to achieve this, as discussed below:

2.3.1 Traffic assessment

SIDRA INTERSECTION8.0 (SIDRA) was used to assess traffic performance of proposed options at each of the intersections under investigation. Base models reflecting existing conditions were developed, using previously developed models as a starting point where available.

Base modelling was developed in accordance with TfNSW Traffic Modelling Guidelines for AM and PM weekday peak hours, which in turn were identified as the hour with the highest overall intersection traffic volumes at each site.

All sites were assessed as isolated intersections, except for Henry Lawson Drive intersections with Rabaul Road and Haig Avenue, the intersections of Pennant Hills Road with Carlingford Road and Rembrandt Street and the intersections of The Horsley Drive with Nelson Street and Alan Street which were assessed as a network.

SCATS traffic signal data was used to inform intersection phasing, controller settings and phase durations, ensuring timings were taken for the day upon which respective intersection turn counts were taken.

The project team drew upon collective knowledge of the sites to inform any further site-specific considerations with regards to operation, including pedestrian activity, driver behaviour and public transport operation.

2.3.2 Crash analysis

Detailed crash reports were obtained for all sites for the five-year period July 2014 – June 2019, in order to identify any crash trends. Analysis considers locations at which certain crash types have occurred multiple times, times of day during which crashes are occurring, lighting conditions and a variety of other factors.

2.3.3 Design constraints

Early identification of key design constraints was undertaken through development of sketches of options identified at each intersection.

Designs developed remain in the early stages, however, identify key considerations such as land-take and property acquisition, some utility impacts and swept path analysis.

Should schemes progress further into development, further assessment could be undertaken to highlight constraints not identified during early design stages.

Assessment undertaken at for Henry Lawson Drive / Haig Avenue / Rabaul Road intersections is presented in the following sections.

3 Henry Lawson Drive / Haig Avenue / Rabaul Road

The intersections of Henry Lawson Drive with Haig Avenue and Rabaul Road are located in Georges Hall in the south west of Sydney. Queuing and delays observed on the Henry Lawson Drive northern approach were key drivers behind the scheme. These queues extend beyond Flinders Road during peak periods.

Henry Lawson Drive is a key link between Hume Highway, Milperra Road and the M5 and is one lane in each direction. TfNSW plans to upgrade the road to two lanes each direction between Milperra Road and Tower Road (Stage 1) and exploring opportunities to extend the widening to Hume Highway (Stage 2) as part of the Henry Lawson Drive Upgrade Project.

Stage 1 is now in the strategic assessment stage with site investigations and strategic design currently underway with the purpose of informing options assessment and economic analysis.

Figure 1 below displays the aerial imagery for the two subject intersections.

Figure 1: Site image *(Source: NEARMAP 2020)*

3.1 Existing conditions

Traffic counts and video footage were recommissioned and collected on Wednesday 6 November 2019. Video footage collected during the peak periods were used to investigate the existing issues at the sites.

The key findings at the sites are detailed below.

- Henry Lawson Drive is heavily used by general traffic and heavy vehicles in both directions during the peak hours.
- Heavy vehicles percentage varies between 7% to 13% in the northbound direction and between 7% and 12% in the southbound direction during the peak hours.
- Delays and lengthy queues for northbound and southbound movements were observed during the peak hours. The rolling queues generally extended to Milperra Road in the south and Flinders Road in the north.
- Southbound queues spilling from the Henry Lawson Drive / Milperra Road intersection occasionally impede southbound traffic at the approach to Haig Avenue during the peak hours. Such downstream constraints were modelled by introducing loss time to the southbound movement as a conservative analysis.

  Loss time parameters were carried over to the future models assuming Stage 1 widening at Milperra Road has not been completed in the future scenarios as a conservative approach.
- Northbound traffic on Henry Lawson Drive is occasionally impeded by vehicles turning right at Rabaul Road during the peak hours. The delays for the right turn traffic result from stopping vehicles trying to find acceptable gaps through the heavy southbound movement.
- The northern and eastern crossings are provided at the signalised intersection of Henry Lawson Drive / Haig Avenue, with no crossing on the southern approach. No obvious issues are observed for pedestrians given the low pedestrian demands during the peak hours (three in the AM peak hour and six in the PM peak hour).
- An exclusive lane is provided for the southbound left turn movement from Henry Lawson Drive north into Haig Avenue. The lane is underutilised given the low traffic volumes turning left at Haig Avenue (maximum of 11 vehicles during the peak hours).
- No public transport is provided along Henry Lawson Drive between Hume Highway and Milperra Road.

3.2 Base model performance

The base year traffic volumes during the peak hours (7:15 to 8:15 and 15:30 to 16:30) are presented in Figure 2 to Figure 5. It should be noted that the Peak Flow Factor is accounted for in the models and therefore, traffic volumes (counts) are usually slightly lower than the traffic demands presented in the modelling outputs.

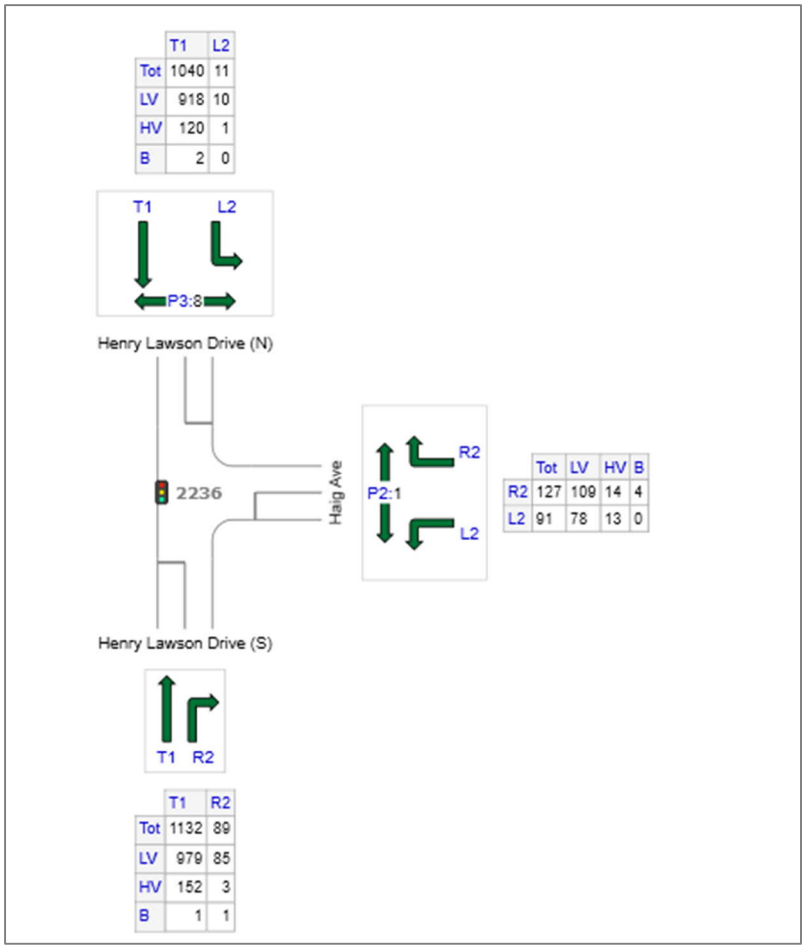

Figure 2: AM peak hour traffic volumes at Haig Avenue (base year)

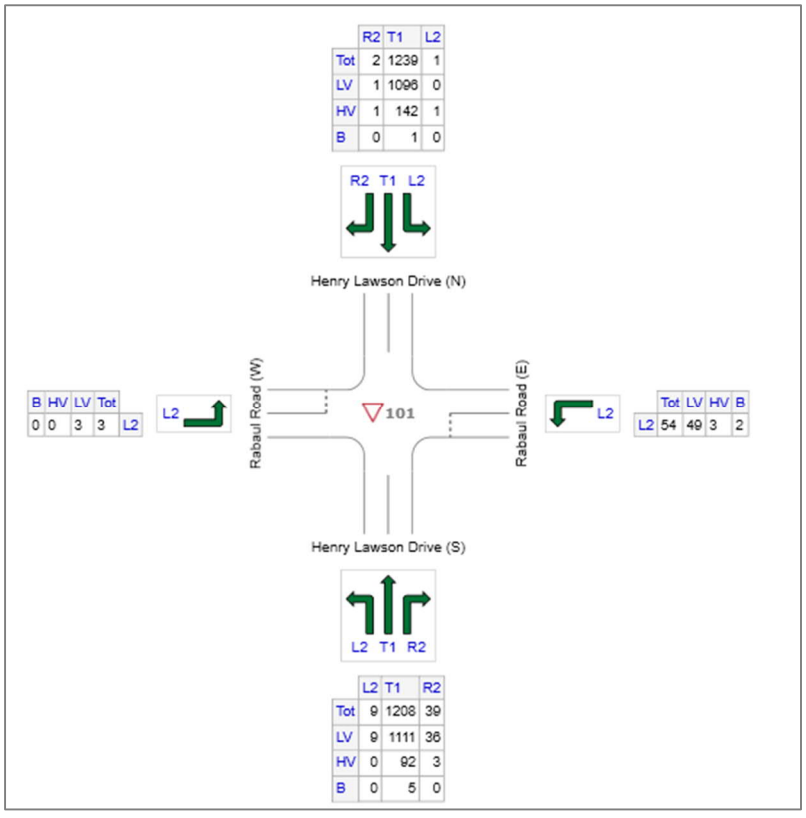

Figure 3: AM peak hour traffic volumes at Rabaul Road (base year)

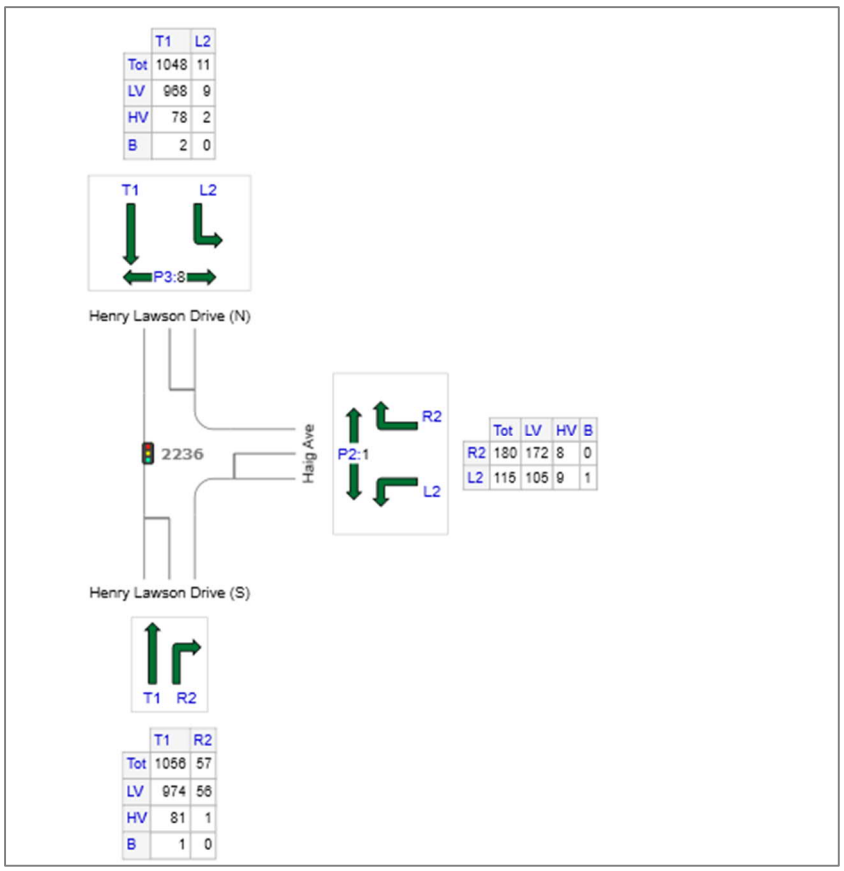

Figure 4: PM peak hour traffic volumes at Haig Avenue (base year)

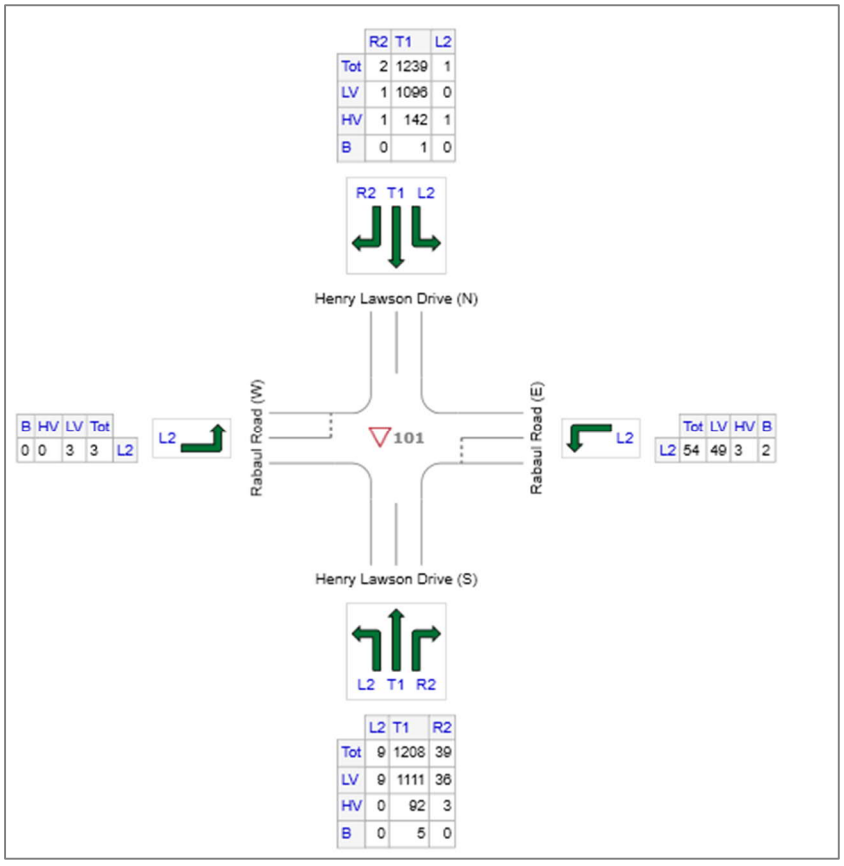

Figure 5: PM peak hour traffic volumes at Rabaul Road (base year)

The SCATS phasing diagram for the intersection of Henry Lawson Drive / Haig Avenue is provided in Figure 6 below.

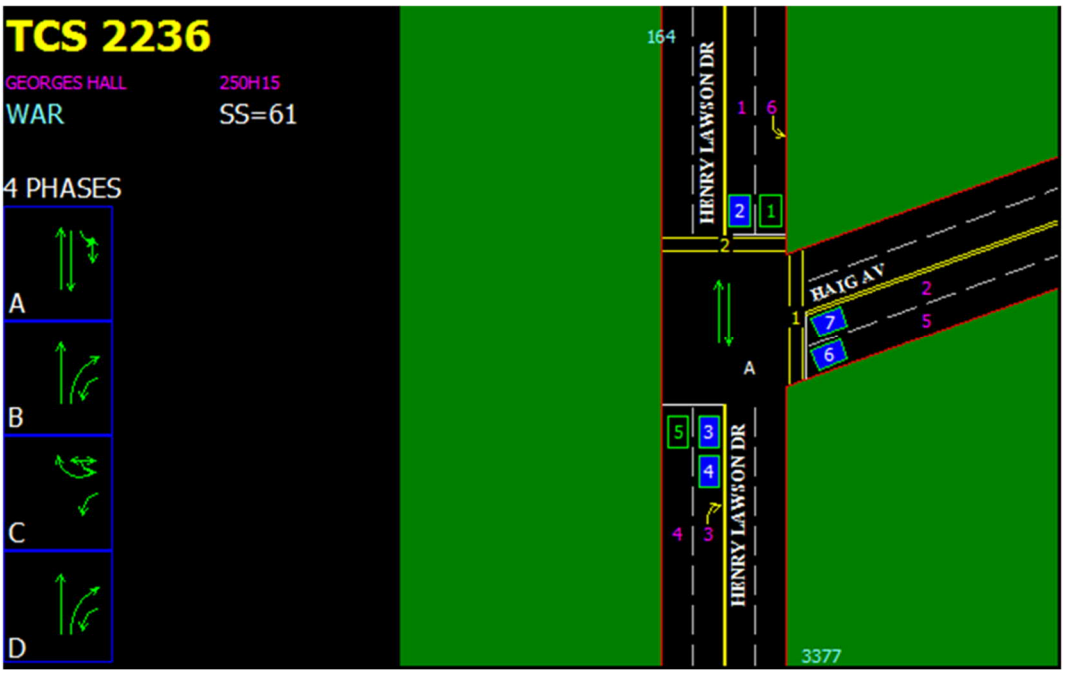

Figure 6: SCATS diagram (TCS 2236)

Averaged phase times adopted in the Base modelling are provided in Table 2 below and were based on SCATS data captured on the same day and peak hours as the traffic surveys.

Table 3 summarises the SIDRA intersection performance in the base year conditions with detailed SIDRA modelling outputs provided in **Appendix A**.

Table 2 Average phase time (TCS 454)

Peak	Green time (s)			Cycle time (s)
	A	B/D	C	
AM	89 (80%)	8 (7%)	15 (13%)	112
PM	89 (74%)	9 (8%)	22 (18%)	120

Table 3 Base year model performance

Approach	Existing AM			Existing PM		
	DoS	Delays (s)	LoS	DoS	Delays (s)	LoS
Henry Lawson Drive (S)	0.91	21	B	0.79	9	A
Haig Avenue	0.98	76	F	0.98	79	F
Henry Lawson Drive (N)	0.88	20	B	0.93	36	C
Intersection	**0.98**	**25**	**B**	**0.98**	**29**	**C**

The analysis shows the intersection operates at LoS B/C with average delays of 25-29 seconds during the peak hours. The intersection operates at capacity in the peak hours with DoS of 0.98

The average back of queues for the southbound through movement is estimated to be 245m in the AM peak and 317m in the PM peak with average delays of 20-36 seconds. Northbound movement on Henry Lawson Drive operates with average delays of 9-21 seconds and average queues of 207m in the AM peak and 140m in the PM peak.

As a priority-controlled intersection with negligible model delays (LoS A) for the main northbound and southbound movements, no results are reported for the intersection of Henry Lawson Drive / Rabaul Road in the main body of the report. However, results are still presented in **Appendix A.**

3.3 Future 'Do Nothing' performance

A future 'Do-Nothing' model was developed for a 10-year horizon by applying growth factors to the base traffic volumes. These factors were based on information from the Strategic Traffic Forecasting Traffic Model (STFM) and shown in Table 4 below.

The planned Stage 2 upgrade, extending dual carriageway to Hume Highway in the north, is unconfirmed at this stage thus not included as part of the forecast future volumes.

Table 4: Annual growth rates

Approach	Annual Growth Rate	
	AM	PM
Henry Lawson Drive (S)	1.3%	0.9%
Haig Avenue	1.4%	2.7%
Henry Lawson Drive (N)	0.5%	2.4%

Signal optimisation was done to the future AM scenario to reflect how the intersection is likely to operate under increased future delays. Table 5 summarises the SIDRA performance under the future do-Nothing scenarios.

Table 5: Future 'Do Nothing' performance

Approach	Future AM			Future PM		
	DoS	Delays (s)	LoS	DoS	Delays (s)	LoS
Henry Lawson Drive (S)	0.95	32	C	0.86	11	A
Haig Avenue	1.03	75	F	1.28	214	F
Henry Lawson Drive (N)	0.99	63	E	0.99	65	E
Intersection	1.03	48	D	1.28	62	E

Under future Do Nothing scenarios, the intersection is expected to operate at LoS D/E with average delays of 48-62 seconds during the peak hours. The anticipated average back of queues for the southbound movement is 359m in the future AM peak and 444m in the future PM peak.

The northbound movement is expected to operate with average delays of 11-32 seconds in the peak hours and average back of queues of 282m in the AM peak and 193m in the PM peak.

The analysis also shows that the demand on Haig Avenue is expected to exceed the existing capacity (DoS above 1.0) resulting in long delays and extended queues on the approach.

Detailed SIDRA modelling outputs are provided in **Appendix A**.

3.4 Crash analysis

Crash data was reviewed for the five-year period July 2014 – June 2019 in order to identify trends at the intersection. A summary illustration of crashes at the intersection during this period is provided in Figure 7.

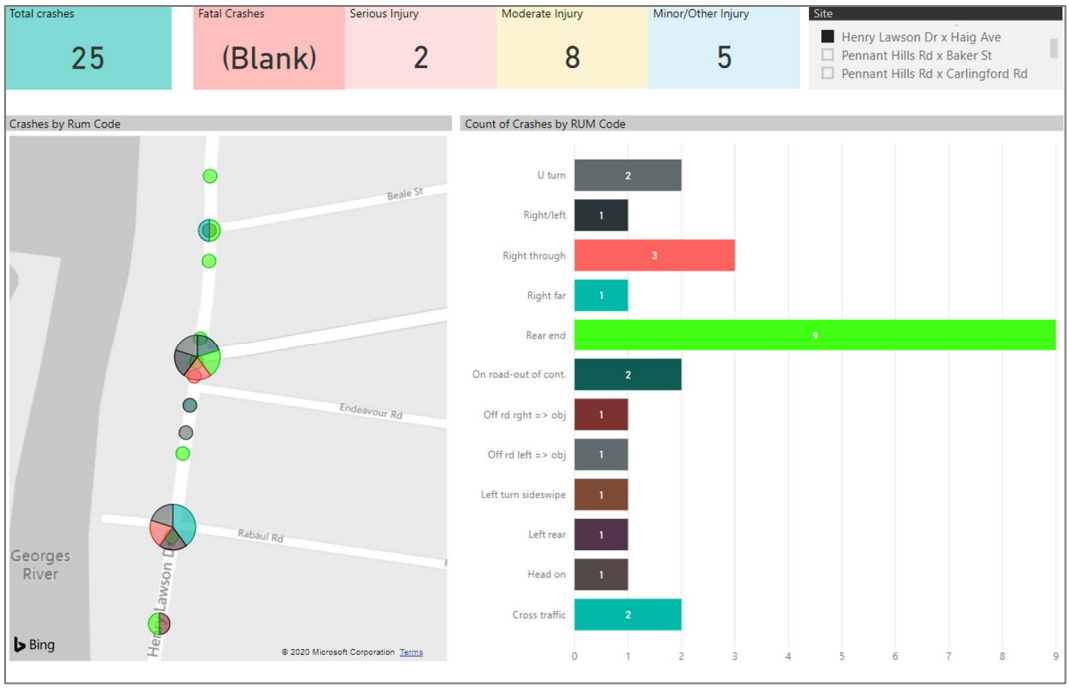

Figure 7: Intersection five-year crash summary

Of the 25 crashes that occurred in the vicinity of the two subject intersections over the five-year period assessed, the noticeable trend identified is rear end collisions, which formed 36% of all crashes. Otherwise, no other crash type occurred more than thrice, with these occurring at different locations suggesting no trend.

Six crashes were reported at or close to the intersection of Henry Lawson Drive / Rabaul Road with one reported crash involved a vehicle turning right at Rabaul Road clashing with a vehicle travelling southbound. No data on the severity of the crash was available to the analysis team.

The other five crashes included two cross traffic, two off-road into objects and one rear-end.

Similarly, eight crashes were reported at the intersection of Henry Lawson Drive / Haig Avenue that included three rear-end and two right-through.

There were no fatalities at the two intersections but two serious injuries, eight moderates and five minor/other injuries.

3.5 Improvement objectives

Site observations and traffic modelling identified the following key objectives where improvement investigations were focused around:

- Reduce the delays and queuing for the critical southbound movement.
- Reduce the likelihood of right turning traffic impeding the dominant northbound through movement at Rabaul Road.

3.6 Optioneering

All improvement measures assessed as part of this scheme are included in the proposed options. No further optioneering was undertaken for the subject intersections.

3.7 Proposed options

Options presented in this chapter include improvement measures, which are considered to have merits for detailed discussion.

3.7.1 Option 1 (Minimal Intervention)

The following improvement measures were included in Option 1. This option aims at improving the intersection performance with minimum civil works.

- Changing the exclusive left turn traffic lane from Henry Lawson Drive north to a shared left and through lane.
- Extending the existing auxiliary lane on the northern approach from approximately 70m to 115m.

Option 1 is presented in Figure 8 below.

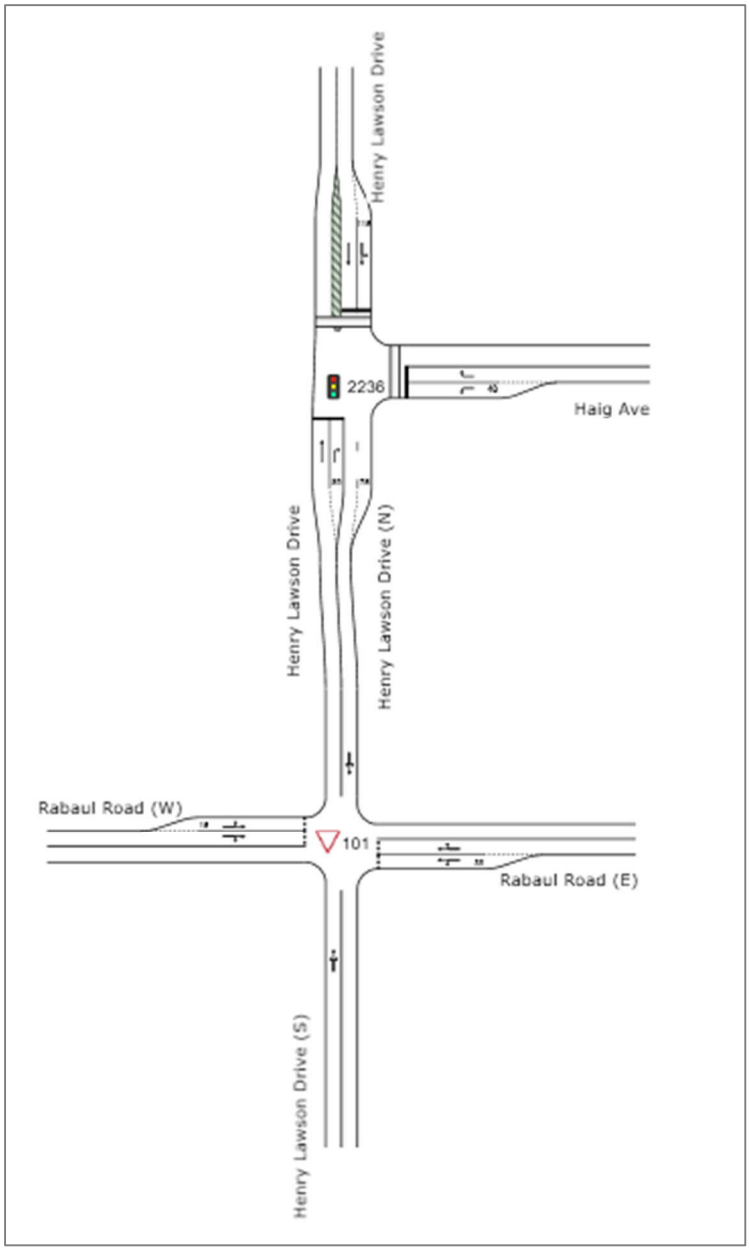

Figure 8: Option 1 layout

3.7.2 Option 2

Option 2 is similar to Option 1 plus the following improvements as presented in Figure 9:

- Extend the southbound downstream exit lane to approximately 100m south of Rabaul Road, increasing the capacity provided for the southbound movement to two lanes between Haig Avenue and Rabaul Road.

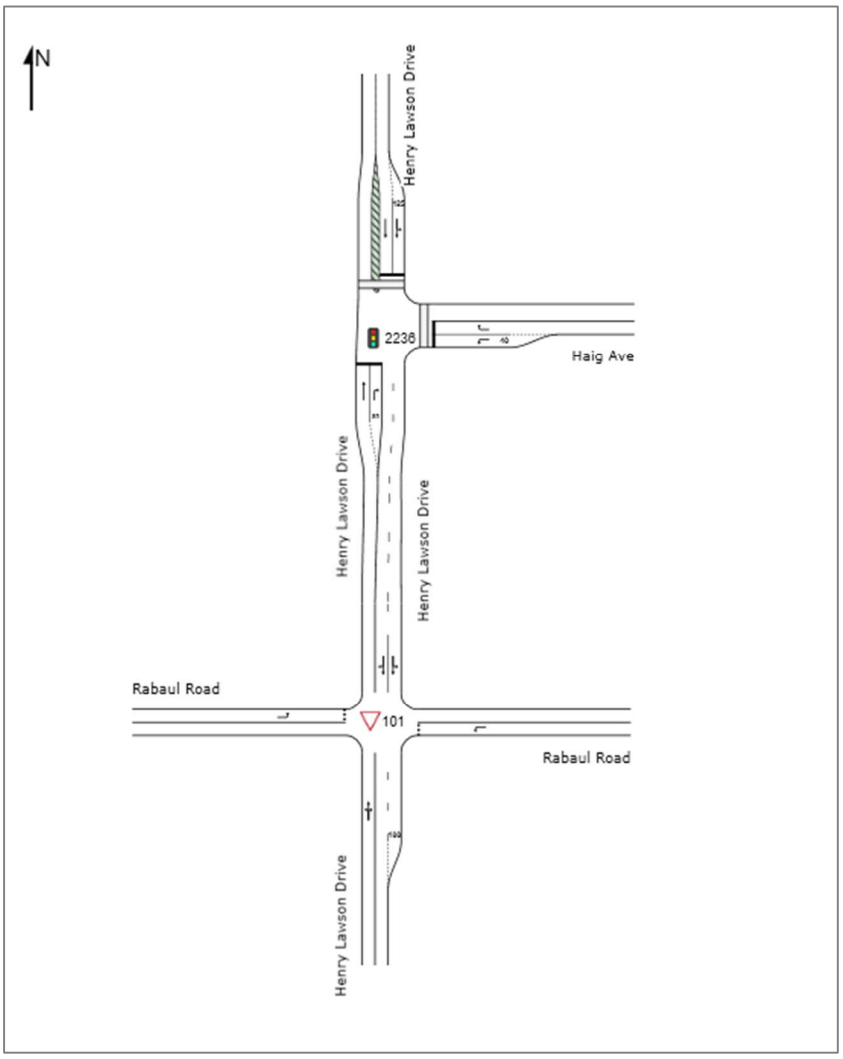

Figure 9: Option 2 layout

3.7.3 Option 3

Option 3 aims at reducing the delays on the northbound approach only by introduction of additional stop line capacity. The following improvement measures were included in Option 3 and are presented in Figure 10:

- Line marking realignment to change the southern approach to one right turn lane and two through lanes and the northern approach to one lane only (shared left and through) instead of two.
- Line marking realignment to provide a short northbound auxiliary lane on the departure side.

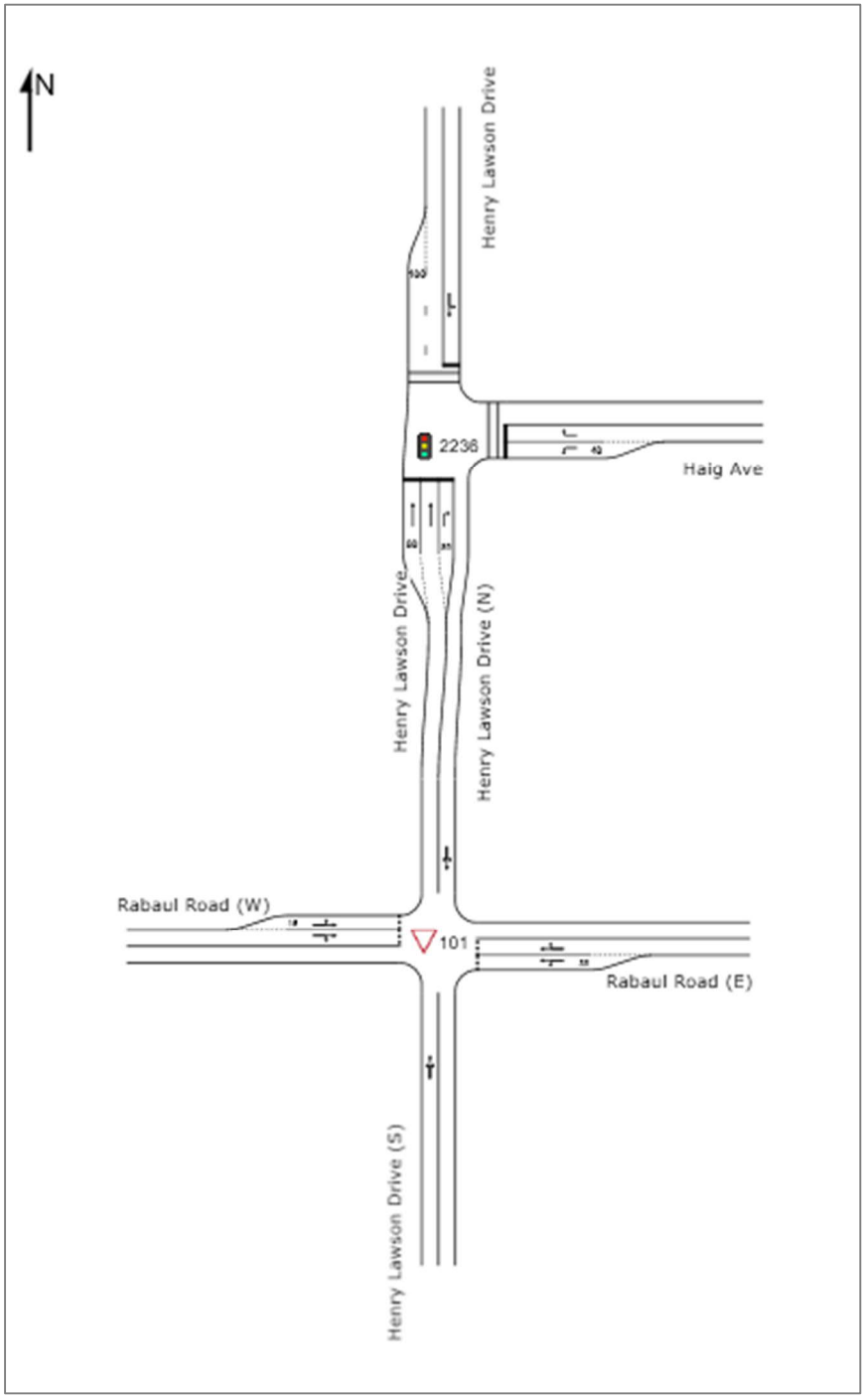

Figure 10: Option 3 Layout

3.8 Options Performance

The three network options were modelled in SIDRA and the results are presented in Table 6 and Table 7 below. Detailed SIDRA modelling outputs are provided in **Appendix A**.

Table 6: Options performance (base year)

	Movement	Base / Do Nothing			Option 1			Option 2			Option 3		
		Delays (s)	LoS	Avg Qs (m)	Delays (s)	LoS	Avg Qs (m)	Delays (s)	LoS	Avg Qs (m)	Delays (s)	LoS	Avg Qs (m)
AM	HLD (S)	21	B	207	5	A	124	5	A	127	5	A	55
	Haig Avenue	76	F	48	76	F	48	76	F	48	76	F	48
	HLD (N)	20	B	245	9	A	108	8	A	64	21	B	250
	Intersection	25	B	-	13	A	-	13	A	-	18	B	-
PM	HLD (S)	9	A	140	7	A	140	7	A	140	6	A	66
	Haig Avenue	79	F	67	79	F	67	79	F	67	79	F	67
	HLD (N)	36	C	317	11	A	124	11	A	75	37	C	327
	Intersection	29	C	-	18	B	-	18	B	-	28	B	-

Table 7: Options performance (future year)

	Movement	Base / Do Nothing			Option 1			Option 2			Option 3		
		Delays (s)	LoS	Avg Qs (m)	Delays (s)	LoS	Avg Qs (m)	Delays (s)	LoS	Avg Qs (m)	Delays (s)	LoS	Avg Qs (m)
AM	HLD (S)	32	C	283	26	B	236	29	C	253	5	A	55
	Haig Avenue	75	F	50	75	F	50	75	F	50	75	F	50
	HLD (N)	63	E	359	8	A	99	8	A	57	65	E	48
	Intersection	48	D	-	23	B	-	25	B	-	35	C	-
PM	HLD (S)	11	A	193	23	B	256	24	B	260	7	A	76
	Haig Avenue	214	F	172	214	F	172	214	F	172	214	F	172
	HLD (N)	65	E	444	13	A	122	12	A	82	67	E	459
	Intersection	62	E	-	46	D	-	46	D	-	61	E	-

3.9 Options Appraisal

The following criteria were used to assess the three options to develop a preferred design option:

- Intersection and network performance
- Road Safety
- Investment estimates
- Constructability
- Land acquisition requirements

3.9.1 Option 1

The anticipated impacts of Option 1 are summarised as:

- Reduction in average delays on the northern approach by up to 25 seconds in the base year scenarios and by up to 55 seconds in the future scenarios through reallocation of available road space and lane capacity for the dominant through movement.
- Reduction of intersection average delays by up to 12 seconds in the base year scenarios and by up to 25 seconds in the future scenarios.
- Reduction in the average queues for the southbound through movement at Haig Avenue by up to 190m in the base year scenarios and by up to 320m in the future scenarios.
- Low construction costs with no property acquisition needed.
- Option 1 partially meets the objectives set out in Section 3.5 by reducing queues for the critical southbound movement.

3.9.2 Option 2

The anticipated impacts of Option 2 are summarised as:

- Reduction in average delays on the northern approach by up to 25 seconds in the base scenarios and by up to 55 seconds in the future scenarios. The reduction in delays is achieved by increasing the capacity at both the approach and departure.
- Reduction of intersection average delays by up to 12 seconds in the base year scenarios and by up to 25 seconds in the future scenarios.
- Reduction in the average queues for the southbound through movement at Haig Avenue by up to 240m in the base year scenarios and by up to 360m in the future scenarios.
- Option 2 provides relatively similar traffic benefits as Option 1 with shorter queues for the critical southbound movement.
- Low construction costs with no property acquisition needed.

- Option 2 partially meets the objectives set out in Section 3.5 by reducing queues for the critical southbound movement.
- Option 2 aligns with the planned future improvements along the corridor (Stage 1) which, once realised, is anticipated to further increase the benefits currently reported for the option which assumed Stage 1 is not completed yet as a conservative approach.

The following benefits are expected for Option 2 when compared to Option 1:

- Increased lane split for the kerbside lane for through vehicles from 35% (Option 1) to 50%.
- Option 2 is anticipated to reduce the average queue lengths on the northern approach by 33% - 42% in the base year and future scenarios when compared to Option 1.

3.9.3 Option 3

The anticipated impacts of Option 3 are summarised as:

- No reduction in average delays on Henry Lawson Drive northern approach given the absence of improvement for that approach in this option.
- Reduction in the average queues for the northbound through movement at Haig Avenue by up to 160m in the base year and 220m in the future scenarios.
- Reduction of intersection average delays by up to seven seconds in the base scenarios and by up to 13 seconds in the future scenarios.
- The level of investment needed to construct Option 3 is anticipated to be lower than Option 2, but higher than Option 1.

The results indicate that Option 1 and Option 2 are generally providing comparable results with better anticipated performance compared to Option 3 in the base year and future scenarios.

3.9.4 Option Recommendation

It is recommended to take Option 2 to the next design stage for the following reasons;

- Anticipated increase in the lane split for the kerbside lane for through vehicles with shorter average queues.
- Unlike Option 1 and Option 3, Option 2 aligns with the planned future improvements along the corridor (Stage 1) which, once realised, is anticipated to further increase the benefits currently reported.
- Option 2 provides relatively similar traffic benefits as Option 1 with shorter queues for the critical southbound movement. Both Option 1 and Option 2 are anticipated to provide better time savings to the network compared to Option 3.

3.10 Safety improvements at Rabaul Road

As mentioned in earlier in Section 3.7.2, Option 2 extends the southbound downstream exit lane to approximately 100m south of Rabaul Road. With heavy southbound traffic on two lanes at Rabaul Road, it will likely take longer for the opposing right turn traffic to find acceptable gaps increasing the stopping time for this movement. This could further increase the delays for the trailing northbound traffic with increased risk of rear-end crashes.

To improve the safety of the scheme, it is proposed to restrict the right turn movement from Henry Lawson Drive south into Rabaul Road. This layout was assessed as Option 2A as shown in Figure 11.

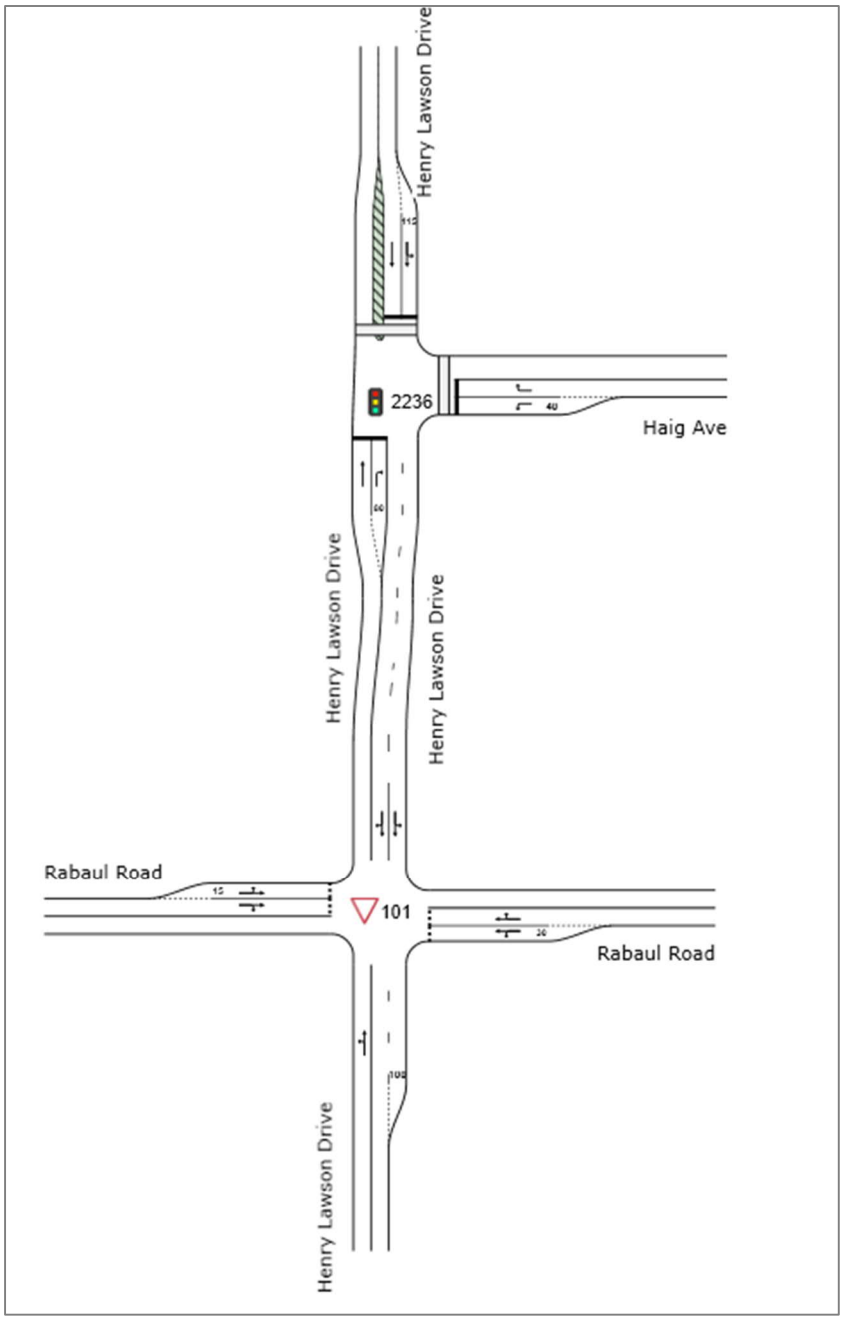

Figure 11: Option 2A Layout

In the existing conditions, 36 vehicles in the AM peak and nine in the PM peak turn right at Rabaul Road during the modelled peak hours (7:15 to 8:15 and 15:30 to 16:30). Those vehicles were added to the right turn at Haig Avenue in the models.

Higher volumes are recorded for this movement outside the intersection peak hours with up to approximately 70 vehicles between 8:15-9:15am and 38 vehicles between 6:00-7:00pm. It is generally perceived that during peak hours, drivers generally find it harder to find gaps through the heavy southbound traffic and hence, some would prefer to turn right at the signalised Haig Avenue instead.

These volumes were not modelled as they fall outside the peak hours with more opportunities to turn right at Haig Avenue.

3.10.1 Option considerations

Providing a dedicated northbound right turn bay, at Rabaul Road, to separate the right turn movement from the through movement was investigated and the relocation of the existing power pole is required. To relocate the pole, the existing overhead connections with the adjacent poles would need to be relocated/undergrounded which is expected to trigger property acquisition and deemed not feasible.

The performance of the intersection of Henry Lawson Drive / Haig Avenue under the two layout of Option 2 is presented in Table 8 and Table 9 with the detailed outputs in **Appendix A**.

Table 8: Delays and queue lengths assessment (base year)

	Movement	Base / Do Nothing			Option 2			Option 2A		
		Delays	LOS	Avg Qs (m)	Delays	LOS	Avg Qs (m)	Delays	LOS	Avg Qs (m)
AM	Henry Lawson Drive (S)*	21	B	207	5	A	127	19	B	192
	Haig Avenue	76	F	48	76	F	48	76	F	48
	Henry Lawson Drive (N)	20	B	245	8	A	64	8	A	64
	Intersection	25	B	-	13	A	-	20	B	-
PM	Henry Lawson Drive (S)*	9	A	140	7	A	140	7	A	136
	Haig Avenue	79	F	67	79	F	67	79	F	67
	Henry Lawson Drive (N)	36	C	317	11	A	75	11	A	75
	Intersection	29	C	-	18	B	-	18	B	-

Table 9: Delays and queue lengths assessment (future year)

	Movement	Base / Do Nothing			Option 2			Option 2A		
		Delays	LOS	Avg Qs (m)	Delays	LOS	Avg Qs (m)	Delays	LOS	Avg Qs (m)
AM	Henry Lawson Drive (S)*	32	C	283	29	C	253	58	E	448
	Haig Avenue	75	F	50	75	F	50	75	F	50
	Henry Lawson Drive (N)	63	E	359	8	A	57	8	A	57
	Intersection	48	D	-	25	B	-	40	C	-
PM	Henry Lawson Drive (S)*	11	A	193	24	B	260	30	C	282
	Haig Avenue	214	F	172	214	F	172	214	F	172
	Henry Lawson Drive (N)	65	E	444	12	A	82	12	A	82
	Intersection	62	E	-	46	D	-	48	D	-

** The reported length of the queue is the sum of average queue length at the stop line at Haig Avenue and the average queue length at Rabaul Road intersection.*

Option 2A is expected to reduce the delays for the northbound movement no longer impeded by the stopping right turn vehicles. However, due to model limitations for priority intersections, the delays for the northbound traffic impeded by the right turn movement are not fully captured.

Option 2 requires right turn traffic at Rabaul filter across two lanes of heavy southbound movement. Option 2A provides a safer arrangement by diverting that traffic to the controlled traffic signals at Haig Avenue. The modelling results indicate that the right turn is anticipated to continue to operate within acceptable bounds (LOS A/B) in future year peak hours with the diverted traffic.

However, the additional approach volumes impact the modelling outputs for the through movement, particularly in the AM peak hour. Estimated approach speeds reduce by up to 15km/h for the northbound movement. This results in the reporting of additional delays on that approach in the Option 2A models.

As queueing for this approach continue beyond Rabaul Road in all models, the overall number of vehicles in the queue are not anticipated to change between Option 2A and Base/1/2. Given the limitations of SIDRA INTERSECTION, this effects of this may not be actually represented in the modelling results for Base/1/2.

Thus, it is assessed that the safety improvements at Rabaul Road in Option 2A would have marginal impacts to operations of Henry Lawson Drive/ Haig Avenue intersection.

In the PM peak, Option 2 and Option 2A are expected to provide comparable results in terms of delays, LOS and queueing in the base year and future conditions, which is reflected in the results.

A technical note will be prepared to provide discussion on likely modelling limitation and for review by the project team and relevant TfNSW subject matter experts. It is however not expected to have any material significance to the overall finding and recommendation documented in this report.

3.11 Summary and Recommendation

Three Options (Option 1, Option 2 and Option 3) were assessed for the network with Option 1 and Option 2 focusing on improving the traffic conditions for the southbound movement on Henry Lawson Drive and Option 3 on the northbound.

The results indicate that Option 1 and Option 2 are generally performing better than Option 3 in the base year and future scenarios. The results also show that Option 1 and Option 2 are providing comparable results terms of average delays and LOS; however, the following benefits are expected for Option 2 compared to Option 1:

- Increased lane split for the kerbside lane for through vehicles from 35% (Option 1) to 50%.
- Reduction in maximum queue lengths on the northern approach by 32% - 41% in the base year and future scenarios.
- Option 2 aligns with the planned future improvements along the corridor (Stage 1) which, once realised, is anticipated to further increase the benefits currently reported.

With Option 2 emerging as the preferred option for the network, further safety improvements at Rabaul Road were assessed and a new layout (Option 2A) was developed. Option 2A proposes to ban the right turn ban from Henry Lawson Drive (S) into Rabaul Street.

Option 2A layout provides a safer arrangement with northbound traffic no longer need to navigate around the stopping right turn vehicles reducing the delays for the northbound movement and the probability of rear-end crashes.

It is therefore recommended to take Option 2A to the next design stage.

As noted previously, the estimated benefits of the scheme do not include potential additional operational benefits which may results from proposed upgrades near the intersection of Henry Lawson Drive / Milperra Road, to the south of this project.

Appendix A – SIDRA Modelling Outputs

NETWORK SUMMARY

Network: 1 [Base Yr AM (Do Nothing)]

Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	6.89							
Speed Efficiency	0.72							
Congestion Coefficient	1.39							
Travel Speed (Average)	43.2	km/h			1.6	km/h	42.0	km/h
Travel Distance (Total)	3282.1	veh-km/h			0.3	ped-km/h	4294.1	pers-km/h
Travel Time (Total)	76.0	veh-h/h			0.2	ped-h/h	102.1	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Arrival Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Demand Flows (Entry Total)	2718	veh/h						
Midblock Inflows (Total)	184	veh/h						
Midblock Outflows (Total)	-57	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	0.981							
Control Delay (Total)	20.86	veh-h/h			0.13	ped-h/h	29.75	pers-h/h
Control Delay (Average)	14.1	sec			50.2	sec	15.6	sec
Control Delay (Worst Lane)	94.3	sec						
Control Delay (Worst Movement)	94.3	sec			50.2	sec	94.3	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	13.7	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2021	veh/h			9	ped/h	2726	pers/h
Effective Stop Rate	0.38		0.62	per km	0.95		0.40	
Proportion Queued	0.61				0.95		0.63	
Performance Index	311.7				0.3		311.9	
Cost (Total)	2927.49	$/h	0.89	$/km	4.93	$/h	2932.42	$/h
Fuel Consumption (Total)	443.1	L/h	135.0	mL/km				
Fuel Economy	13.5	L/100km						
Carbon Dioxide (Total)	1065.2	kg/h	324.5	g/km				
Hydrocarbons (Total)	0.092	kg/h	0.028	g/km				
Carbon Monoxide (Total)	1.088	kg/h	0.331	g/km				
NOx (Total)	3.621	kg/h	1.103	g/km				

Network Model Variability Index (Iterations 3 to N): 0.1 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.1% 0.1% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,549,053	veh/y	4,547	ped/y	3,296,236	pers/y
Delay	10,014	veh-h/y	63	ped-h/y	14,278	pers-h/y
Effective Stops	970,008	veh/y	4,305	ped/y	1,308,684	pers/y
Travel Distance	1,575,390	veh-km/y	154	ped-km/y	2,061,190	pers-km/y
Travel Time	36,466	veh-h/y	96	ped-h/y	49,030	pers-h/y
Cost	1,405,196	$/y	2,368	$/y	1,407,564	$/y
Fuel Consumption	212,672	L/y				
Carbon Dioxide	511,283	kg/y				
Hydrocarbons	44	kg/y				
Carbon Monoxide	522	kg/y				
NOx	1,738	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr AM (Do Nothing)]

Network: 1 [Base Yr AM (Do Nothing)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
2	T1	1192	13.5	1192	13.5	0.917	19.4	LOS B	21.8	170.0	0.51	0.57	0.63	40.8
3	R2	94	4.5	94	4.5	0.337	38.1	LOS C	2.6	18.8	0.84	0.79	0.84	30.5
Approach		1285	12.9	1285	12.9	0.917	20.7	LOS B	21.8	170.0	0.53	0.59	0.64	39.8
East: Haig Ave														
4	L2	96	14.3	96	14.3	0.333	50.7	LOS D	2.9	22.7	0.92	0.77	0.92	22.8
6	R2	134	14.2	134	14.2	0.981	94.3	LOS F	6.0	47.5	1.00	1.11	1.80	23.2
Approach		229	14.2	229	14.2	0.981	76.1	LOS F	6.0	47.5	0.97	0.97	1.43	23.1
North: Henry Lawson Drive (N)														
7	L2	12	9.1	12	9.1	0.009	9.6	LOS A	0.1	0.7	0.27	0.61	0.27	50.4
8	T1	1095	11.7	1095	11.7	0.881	20.5	LOS B	31.7	244.5	0.85	0.85	0.91	36.1
Approach		1106	11.7	1106	11.7	0.881	20.4	LOS B	31.7	244.5	0.85	0.85	0.90	36.3
All Vehicles		2621	12.5	2621	12.5	0.981	25.4	LOS B	31.7	244.5	0.70	0.73	0.82	35.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	50.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	50.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		9	50.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr AM (Do Nothing)]

Network: 1 [Base Yr AM (Do Nothing)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
1	L2	9	0.0	9	0.0	0.789	36.3	LOS C	5.0	37.3	1.00	0.03	1.25	39.8
2	T1	1272	8.0	1272	8.0	0.789	3.4	LOS A	5.0	37.3	1.00	0.03	1.25	52.0
3	R2	41	7.7	41	7.7	0.789	37.7	LOS C	5.0	37.3	1.00	0.03	1.25	49.9
Approach		1322	8.0	1322	8.0	0.789	4.7	NA	5.0	37.3	1.00	0.03	1.25	51.7
East: Rabaul Road (E)														
4	L2	57	9.3	57	9.3	0.265	25.4	LOS B	0.4	3.0	0.90	0.98	1.00	38.8
Approach		57	9.3	57	9.3	0.265	25.4	LOS B	0.4	3.0	0.90	0.98	1.00	38.8
North: Henry Lawson Drive (N)														
7	L2	1	100.0	1	100.0	0.727	58.3	LOS E	0.2	1.6	0.03	0.00	0.04	49.6
8	T1	1304	11.5	1304	11.5	0.727	0.4	LOS A	0.2	1.6	0.03	0.00	0.04	59.2
9	R2	2	50.0	2	50.0	0.727	64.7	LOS E	0.2	1.6	0.03	0.00	0.04	20.1
Approach		1307	11.7	1307	11.7	0.727	0.6	NA	0.2	1.6	0.03	0.00	0.04	59.1
West: Rabaul Road (W)														
10	L2	3	0.0	3	0.0	0.034	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
Approach		3	0.0	3	0.0	0.034	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
All Vehicles		2689	9.8	2689	9.8	0.789	3.1	NA	5.0	37.3	0.53	0.04	0.66	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: 1 [Base Yr PM (Do Nothing)]

New Network
Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	6.65							
Speed Efficiency	0.70							
Congestion Coefficient	1.43							
Travel Speed (Average)	41.9	km/h			1.5	km/h	41.6	km/h
Travel Distance (Total)	3250.8	veh-km/h			0.3	ped-km/h	4117.4	pers-km/h
Travel Time (Total)	77.6	veh-h/h			0.2	ped-h/h	98.9	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5258	veh/h			9	ped/h	6622	pers/h
Arrival Flows (Total for all Sites)	5210	veh/h			9	ped/h	6564	pers/h
Demand Flows (Entry Total)	2801	veh/h						
Midblock Inflows (Total)	62	veh/h						
Midblock Outflows (Total)	-56	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.6	%						
Degree of Saturation	0.991							
Control Delay (Total)	22.88	veh-h/h			0.14	ped-h/h	29.36	pers-h/h
Control Delay (Average)	15.8	sec			54.2	sec	16.1	sec
Control Delay (Worst Lane)	98.5	sec						
Control Delay (Worst Movement)	98.5	sec			54.2	sec	98.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	15.3	sec						
Queue Storage Ratio (Worst Lane)	0.82							
Total Effective Stops	2171	veh/h			9	ped/h	2812	pers/h
Effective Stop Rate	0.42		0.67	per km	0.95		0.43	
Proportion Queued	0.43				0.95		0.44	
Performance Index	320.0				0.3		320.2	
Cost (Total)	2590.03	$/h	0.80	$/km	5.22	$/h	2595.25	$/h
Fuel Consumption (Total)	355.2	L/h	109.3	mL/km				
Fuel Economy	10.9	L/100km						
Carbon Dioxide (Total)	847.9	kg/h	260.8	g/km				
Hydrocarbons (Total)	0.073	kg/h	0.022	g/km				
Carbon Monoxide (Total)	0.900	kg/h	0.277	g/km				
NOx (Total)	2.106	kg/h	0.648	g/km				

Network Model Variability Index (Iterations 3 to N): 26.5 %
Number of Iterations: 10 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 100.0% 2.2% 0.7%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values							
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,523,790	veh/y	4,547	ped/y	3,178,611	pers/y
Delay	10,983	veh-h/y	68	ped-h/y	14,095	pers-h/y
Effective Stops	1,042,151	veh/y	4,321	ped/y	1,349,598	pers/y
Travel Distance	1,560,408	veh-km/y	156	ped-km/y	1,976,340	pers-km/y
Travel Time	37,245	veh-h/y	102	ped-h/y	47,468	pers-h/y
Cost	1,243,215	$/y	2,504	$/y	1,245,719	$/y
Fuel Consumption	170,477	L/y				
Carbon Dioxide	406,995	kg/y				
Hydrocarbons	35	kg/y				
Carbon Monoxide	432	kg/y				
NOx	1,011	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr PM (Do Nothing)]

Network: 1 [Base Yr PM (Do Nothing)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
2	T1	1112	7.8	1067	7.8	0.788	6.8	LOS A	18.7	139.6	0.54	0.51	0.54	51.5
3	R2	60	1.8	58	1.8	0.230	48.1	LOS D	1.8	12.7	0.88	0.76	0.88	27.1
Approach		1172	7.5	1124[N1]	7.5	0.788	8.9	LOS A	18.7	139.6	0.56	0.52	0.56	49.2
East: Haig Ave														
4	L2	121	8.7	121	8.7	0.331	49.6	LOS D	3.7	28.1	0.89	0.78	0.89	23.1
6	R2	189	4.4	189	4.4	0.982	98.5	LOS F	9.1	66.5	1.00	1.10	1.70	22.7
Approach		311	6.1	311	6.1	0.982	79.4	LOS F	9.1	66.5	0.96	0.98	1.38	22.8
North: Henry Lawson Drive (N)														
7	L2	12	18.2	12	18.2	0.010	11.7	LOS A	0.1	1.0	0.32	0.62	0.32	48.7
8	T1	1103	7.6	1103	7.6	0.928	36.3	LOS C	42.5	317.2	0.96	1.01	1.10	27.7
Approach		1115	7.7	1115	7.7	0.928	36.0	LOS C	42.5	317.2	0.95	1.00	1.09	27.9
All Vehicles		2597	7.4	2549[N1]	7.6	0.982	29.4	LOS C	42.5	317.2	0.78	0.79	0.89	33.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		9	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr PM (Do Nothing)]

Network: 1 [Base Yr PM (Do Nothing)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	13	25.0	13	25.0	0.991	18.3	LOS B	1.7	12.9	0.06	0.01	0.81	40.8
2	T1	1223	8.2	1223	8.2	0.991	2.7	LOS A	1.7	12.9	0.06	0.01	0.81	54.6
3	R2	9	0.0	9	0.0	0.991	25.1	LOS B	1.7	12.9	0.06	0.01	0.81	51.2
Approach		1245	8.3	1245	8.3	0.991	3.0	NA	1.7	12.9	0.06	0.01	0.81	54.4
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.479	25.9	LOS B	0.9	6.2	0.91	1.07	1.27	38.6
Approach		127	4.1	127	4.1	0.479	25.9	LOS B	0.9	6.2	0.91	1.07	1.27	38.6
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.695	18.7	LOS B	0.1	0.7	0.03	0.00	0.04	51.2
8	T1	1277	7.5	1277	7.5	0.695	0.1	LOS A	0.1	0.7	0.03	0.00	0.04	59.6
9	R2	6	0.0	6	0.0	0.695	20.6	LOS B	0.1	0.7	0.03	0.00	0.04	18.2
Approach		1285	7.5	1285	7.5	0.695	0.3	NA	0.1	0.7	0.03	0.00	0.04	59.3
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.021	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
Approach		3	0.0	3	0.0	0.021	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
All Vehicles		2661	7.7	2661	7.7	0.991	2.8	NA	1.7	12.9	0.09	0.06	0.46	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr AM (Option 1)]

Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.66							
Speed Efficiency	0.79							
Congestion Coefficient	1.27							
Travel Speed (Average)	47.4	km/h			1.6	km/h	45.7	km/h
Travel Distance (Total)	3282.1	veh-km/h			0.3	ped-km/h	4294.1	pers-km/h
Travel Time (Total)	69.3	veh-h/h			0.2	ped-h/h	93.9	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Arrival Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Demand Flows (Entry Total)	2718	veh/h						
Midblock Inflows (Total)	184	veh/h						
Midblock Outflows (Total)	-57	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	0.985							
Control Delay (Total)	14.17	veh-h/h			0.13	ped-h/h	21.48	pers-h/h
Control Delay (Average)	9.6	sec			50.2	sec	11.3	sec
Control Delay (Worst Lane)	94.3	sec						
Control Delay (Worst Movement)	94.3	sec			50.2	sec	94.3	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	9.1	sec						
Queue Storage Ratio (Worst Lane)	0.73							
Total Effective Stops	1444	veh/h			9	ped/h	2007	pers/h
Effective Stop Rate	0.27		0.44	per km	0.95		0.29	
Proportion Queued	0.53				0.95		0.55	
Performance Index	250.6				0.3		250.9	
Cost (Total)	2595.14	$/h	0.79	$/km	4.93	$/h	2600.07	$/h
Fuel Consumption (Total)	409.8	L/h	124.9	mL/km				
Fuel Economy	12.5	L/100km						
Carbon Dioxide (Total)	985.9	kg/h	300.4	g/km				
Hydrocarbons (Total)	0.082	kg/h	0.025	g/km				
Carbon Monoxide (Total)	1.012	kg/h	0.308	g/km				
NOx (Total)	3.261	kg/h	0.994	g/km				

Network Model Variability Index (Iterations 3 to N): 0.7 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.7% 0.7% 0.7%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,549,053	veh/y	4,547	ped/y	3,296,236	pers/y
Delay	6,804	veh-h/y	63	ped-h/y	10,311	pers-h/y
Effective Stops	693,046	veh/y	4,305	ped/y	963,280	pers/y
Travel Distance	1,575,390	veh-km/y	154	ped-km/y	2,061,190	pers-km/y
Travel Time	33,251	veh-h/y	96	ped-h/y	45,058	pers-h/y
Cost	1,245,666	$/y	2,368	$/y	1,248,034	$/y
Fuel Consumption	196,719	L/y				
Carbon Dioxide	473,224	kg/y				
Hydrocarbons	39	kg/y				
Carbon Monoxide	486	kg/y				
NOx	1,565	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr AM (Option 1)]

Network: N101 [Base Yr AM (Option 1)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1192	13.5	1192	13.5	0.854	4.3	LOS A	15.8	123.6	0.43	0.41	0.44	54.4
3	R2	94	4.5	94	4.5	0.215	16.0	LOS B	1.4	10.5	0.50	0.71	0.50	41.8
Approach		1285	12.9	1285	12.9	0.854	5.1	LOS A	15.8	123.6	0.44	0.43	0.44	53.2
East: Haig Ave														
4	L2	96	14.3	96	14.3	0.333	50.7	LOS D	2.9	22.7	0.92	0.77	0.92	22.8
6	R2	134	14.2	134	14.2	0.981	94.3	LOS F	6.0	47.5	1.00	1.11	1.80	23.2
Approach		229	14.2	229	14.2	0.981	76.1	LOS F	6.0	47.5	0.97	0.97	1.43	23.1
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.266	12.3	LOS A	4.0	30.7	0.40	0.36	0.40	52.2
8	T1	1095	11.7	1095	11.7	0.623	9.1	LOS A	14.0	108.2	0.54	0.49	0.54	46.2
Approach		1106	11.7	1106	11.7	0.623	9.2	LOS A	14.0	108.2	0.54	0.49	0.54	46.3
All Vehicles		2621	12.5	2621	12.5	0.981	13.0	LOS A	15.8	123.6	0.53	0.51	0.57	44.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	50.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	50.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		9	50.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr AM (Option 1)]

Network: N101 [Base Yr AM (Option 1)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
1	L2	9	0.0	9	0.0	0.985	42.6	LOS D	9.0	67.2	1.00	0.04	2.57	35.5
2	T1	1272	8.0	1272	8.0	0.985	9.7	LOS A	9.0	67.2	1.00	0.04	2.57	44.1
3	R2	41	7.7	41	7.7	0.985	44.1	LOS D	9.0	67.2	1.00	0.04	2.57	45.9
Approach		1322	8.0	1322	8.0	0.985	11.0	NA	9.0	67.2	1.00	0.04	2.57	44.1
East: Rabaul Road (E)														
4	L2	57	9.3	57	9.3	0.265	25.4	LOS B	0.4	3.0	0.90	0.98	1.00	38.8
Approach		57	9.3	57	9.3	0.265	25.4	LOS B	0.4	3.0	0.90	0.98	1.00	38.8
North: Henry Lawson Drive (N)														
7	L2	1	100.0	1	100.0	0.727	58.3	LOS E	0.2	1.6	0.03	0.00	0.04	49.6
8	T1	1304	11.5	1304	11.5	0.727	0.4	LOS A	0.2	1.6	0.03	0.00	0.04	59.2
9	R2	2	50.0	2	50.0	0.727	64.7	LOS E	0.2	1.6	0.03	0.00	0.04	20.1
Approach		1307	11.7	1307	11.7	0.727	0.6	NA	0.2	1.6	0.03	0.00	0.04	59.1
West: Rabaul Road (W)														
10	L2	3	0.0	3	0.0	0.021	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
Approach		3	0.0	3	0.0	0.021	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
All Vehicles		2689	9.8	2689	9.8	0.985	6.3	NA	9.0	67.2	0.53	0.04	1.31	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr PM (Option 1)]

New Network
Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.50							
Speed Efficiency	0.78							
Congestion Coefficient	1.29							
Travel Speed (Average)	46.5	km/h			1.7	km/h	46.1	km/h
Travel Distance (Total)	3250.9	veh-km/h			0.3	ped-km/h	4117.4	pers-km/h
Travel Time (Total)	69.9	veh-h/h			0.2	ped-h/h	89.2	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5258	veh/h			9	ped/h	6622	pers/h
Arrival Flows (Total for all Sites)	5210	veh/h			9	ped/h	6564	pers/h
Demand Flows (Entry Total)	2801	veh/h						
Midblock Inflows (Total)	62	veh/h						
Midblock Outflows (Total)	-56	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.6	%						
Degree of Saturation	0.991							
Control Delay (Total)	15.19	veh-h/h			0.13	ped-h/h	19.72	pers-h/h
Control Delay (Average)	10.5	sec			48.3	sec	10.8	sec
Control Delay (Worst Lane)	98.5	sec						
Control Delay (Worst Movement)	98.5	sec			53.2	sec	98.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	9.9	sec						
Queue Storage Ratio (Worst Lane)	0.82							
Total Effective Stops	1661	veh/h			8	ped/h	2171	pers/h
Effective Stop Rate	0.32		0.51	per km	0.88		0.33	
Proportion Queued	0.35				0.88		0.36	
Performance Index	230.1				0.2		230.3	
Cost (Total)	2249.00	$/h	0.69	$/km	4.84	$/h	2253.84	$/h
Fuel Consumption (Total)	328.0	L/h	100.9	mL/km				
Fuel Economy	10.1	L/100km						
Carbon Dioxide (Total)	783.5	kg/h	241.0	g/km				
Hydrocarbons (Total)	0.065	kg/h	0.020	g/km				
Carbon Monoxide (Total)	0.842	kg/h	0.259	g/km				
NOx (Total)	1.902	kg/h	0.585	g/km				

Network Model Variability Index (Iterations 3 to N): 26.5 %
Number of Iterations: 10 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 100.0% 2.2% 0.7%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,523,790	veh/y	4,547	ped/y	3,178,611	pers/y
Delay	7,290	veh-h/y	61	ped-h/y	9,465	pers-h/y
Effective Stops	797,204	veh/y	4,006	ped/y	1,042,035	pers/y
Travel Distance	1,560,408	veh-km/y	156	ped-km/y	1,976,341	pers-km/y
Travel Time	33,552	veh-h/y	94	ped-h/y	42,837	pers-h/y
Cost	1,079,521	$/y	2,323	$/y	1,081,844	$/y
Fuel Consumption	157,449	L/y				
Carbon Dioxide	376,094	kg/y				
Hydrocarbons	31	kg/y				
Carbon Monoxide	404	kg/y				
NOx	913	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr PM (Option 1)]

Network: N101 [Base Yr PM (Option 1)]

HenryLawson_Haig
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1112	7.8	1067	7.8	0.810	6.8	LOS A	18.7	139.6	0.54	0.51	0.54	51.5
3	R2	60	1.8	58	1.8	0.139	20.3	LOS B	1.0	7.4	0.55	0.70	0.55	39.0
Approach		1172	7.5	1124[N1]	7.5	0.810	7.5	LOS A	18.7	139.6	0.55	0.52	0.55	50.6
East: Haig Ave														
4	L2	121	8.7	121	8.7	0.331	49.6	LOS D	3.7	28.1	0.89	0.78	0.89	23.1
6	R2	189	4.4	189	4.4	0.982	98.5	LOS F	9.1	66.5	1.00	1.10	1.70	22.7
Approach		311	6.1	311	6.1	0.982	79.4	LOS F	9.1	66.5	0.96	0.98	1.38	22.8
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.286	15.3	LOS B	5.2	38.6	0.46	0.41	0.46	49.9
8	T1	1103	7.6	1103	7.6	0.654	12.6	LOS A	16.7	124.3	0.60	0.55	0.60	42.6
Approach		1115	7.7	1115	7.7	0.654	12.6	LOS A	16.7	124.3	0.60	0.55	0.60	42.8
All Vehicles		2597	7.4	2549[N1]	7.6	0.982	18.5	LOS B	18.7	139.6	0.62	0.59	0.67	40.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	9.2	LOS A	0.0	0.0	0.39	0.39
P3	North Full Crossing	8	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		9	48.3	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr PM (Option 1)]

Network: N101 [Base Yr PM (Option 1)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	13	25.0	13	25.0	0.991	18.3	LOS B	1.7	12.9	0.06	0.01	0.81	40.8
2	T1	1223	8.2	1223	8.2	0.991	2.7	LOS A	1.7	12.9	0.06	0.01	0.81	54.6
3	R2	9	0.0	9	0.0	0.991	25.1	LOS B	1.7	12.9	0.06	0.01	0.81	51.2
Approach		1245	8.3	1245	8.3	0.991	3.0	NA	1.7	12.9	0.06	0.01	0.81	54.4
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.479	25.9	LOS B	0.9	6.2	0.91	1.07	1.27	38.6
Approach		127	4.1	127	4.1	0.479	25.9	LOS B	0.9	6.2	0.91	1.07	1.27	38.6
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.695	18.7	LOS B	0.1	0.7	0.03	0.00	0.04	51.2
8	T1	1277	7.5	1277	7.5	0.695	0.1	LOS A	0.1	0.7	0.03	0.00	0.04	59.6
9	R2	6	0.0	6	0.0	0.695	20.6	LOS B	0.1	0.7	0.03	0.00	0.04	18.2
Approach		1285	7.5	1285	7.5	0.695	0.3	NA	0.1	0.7	0.03	0.00	0.04	59.3
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.021	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
Approach		3	0.0	3	0.0	0.021	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
All Vehicles		2661	7.7	2661	7.7	0.991	2.8	NA	1.7	12.9	0.09	0.06	0.46	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr AM (Option 2)]

Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.04							
Speed Efficiency	0.73							
Congestion Coefficient	1.36							
Travel Speed (Average)	44.0	km/h			1.6	km/h	42.7	km/h
Travel Distance (Total)	3282.2	veh-km/h			0.3	ped-km/h	4294.3	pers-km/h
Travel Time (Total)	74.5	veh-h/h			0.2	ped-h/h	100.5	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Arrival Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Demand Flows (Entry Total)	2718	veh/h						
Midblock Inflows (Total)	184	veh/h						
Midblock Outflows (Total)	-57	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	1.010							
Control Delay (Total)	19.41	veh-h/h			0.13	ped-h/h	27.98	pers-h/h
Control Delay (Average)	13.2	sec			50.2	sec	14.7	sec
Control Delay (Worst Lane)	94.3	sec						
Control Delay (Worst Movement)	112.6	sec			50.2	sec	112.6	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	12.7	sec						
Queue Storage Ratio (Worst Lane)	0.75							
Total Effective Stops	1373	veh/h			9	ped/h	1896	pers/h
Effective Stop Rate	0.26		0.42	per km	0.95		0.28	
Proportion Queued	0.50				0.95		0.52	
Performance Index	271.4				0.3		271.7	
Cost (Total)	2756.53	$/h	0.84	$/km	4.93	$/h	2761.47	$/h
Fuel Consumption (Total)	413.1	L/h	125.9	mL/km				
Fuel Economy	12.6	L/100km						
Carbon Dioxide (Total)	993.7	kg/h	302.8	g/km				
Hydrocarbons (Total)	0.084	kg/h	0.026	g/km				
Carbon Monoxide (Total)	1.022	kg/h	0.311	g/km				
NOx (Total)	3.239	kg/h	0.987	g/km				

Network Model Variability Index (Iterations 3 to N): 0.9 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.9% 0.9% 0.9%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,549,053	veh/y	4,547	ped/y	3,296,236	pers/y
Delay	9,316	veh-h/y	63	ped-h/y	13,428	pers-h/y
Effective Stops	659,012	veh/y	4,305	ped/y	909,960	pers/y
Travel Distance	1,575,448	veh-km/y	154	ped-km/y	2,061,267	pers-km/y
Travel Time	35,781	veh-h/y	96	ped-h/y	48,241	pers-h/y
Cost	1,323,136	$/y	2,368	$/y	1,325,504	$/y
Fuel Consumption	198,305	L/y				
Carbon Dioxide	476,969	kg/y				
Hydrocarbons	41	kg/y				
Carbon Monoxide	491	kg/y				
NOx	1,555	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr AM (Option 2)]

Network: N101 [Base Yr AM (Option 2)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1192	13.5	1192	13.5	0.859	4.9	LOS A	16.3	127.1	0.43	0.42	0.44	53.6
3	R2	94	4.5	94	4.5	0.195	11.3	LOS A	1.1	7.7	0.38	0.68	0.38	45.5
Approach		1285	12.9	1285	12.9	0.859	5.4	LOS A	16.3	127.1	0.43	0.44	0.44	52.9
East: Haig Ave														
4	L2	96	14.3	96	14.3	0.333	50.7	LOS D	2.9	22.7	0.92	0.77	0.92	22.8
6	R2	134	14.2	134	14.2	0.981	94.3	LOS F	6.0	47.5	1.00	1.11	1.80	23.2
Approach		229	14.2	229	14.2	0.981	76.1	LOS F	6.0	47.5	0.97	0.97	1.43	23.1
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.446	13.6	LOS A	7.9	61.1	0.48	0.44	0.48	51.4
8	T1	1095	11.7	1095	11.7	0.446	8.1	LOS A	8.3	63.9	0.48	0.44	0.48	47.4
Approach		1106	11.7	1106	11.7	0.446	8.2	LOS A	8.3	63.9	0.48	0.44	0.48	47.5
All Vehicles		2621	12.5	2621	12.5	0.981	12.8	LOS A	16.3	127.1	0.50	0.48	0.54	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	50.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	50.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		9	50.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr AM (Option 2)]

Network: N101 [Base Yr AM (Option 2)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	9	0.0	9	0.0	1.010	107.8	LOS F	12.1	90.5	1.00	0.05	3.26	27.9
2	T1	1272	8.0	1272	8.0	1.010	23.5	LOS B	12.1	90.5	1.00	0.05	3.26	31.9
3	R2	41	7.7	41	7.7	1.010	112.6	LOS F	12.1	90.5	1.00	0.05	3.26	38.4
Approach		1322	8.0	1322	8.0	1.010	26.9	NA	12.1	90.5	1.00	0.05	3.26	32.2
East: Rabaul Road														
4	L2	57	9.3	57	9.3	0.056	6.7	LOS A	0.1	0.8	0.48	0.61	0.48	48.5
Approach		57	9.3	57	9.3	0.056	6.7	LOS A	0.1	0.8	0.48	0.61	0.48	48.5
North: Henry Lawson Drive														
7	L2	1	100.0	1	100.0	0.250	6.1	LOS A	0.0	0.0	0.00	0.00	0.00	54.1
8	T1	1304	11.5	1304	11.5	0.477	0.2	LOS A	0.1	0.8	0.01	0.00	0.02	59.6
9	R2	2	50.0	2	50.0	0.477	36.6	LOS C	0.1	0.8	0.02	0.00	0.03	18.0
Approach		1307	11.7	1307	11.7	0.477	0.3	NA	0.1	0.8	0.01	0.00	0.02	59.5
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.022	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
Approach		3	0.0	3	0.0	0.022	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
All Vehicles		2689	9.8	2689	9.8	1.010	13.5	NA	12.1	90.5	0.51	0.04	1.62	43.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr PM (Option 2)]

New Network
Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.67							
Speed Efficiency	0.79							
Congestion Coefficient	1.26							
Travel Speed (Average)	47.4	km/h			1.7	km/h	47.3	km/h
Travel Distance (Total)	3250.3	veh-km/h			0.3	ped-km/h	4116.7	pers-km/h
Travel Time (Total)	68.5	veh-h/h			0.2	ped-h/h	87.1	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5258	veh/h			9	ped/h	6622	pers/h
Arrival Flows (Total for all Sites)	5210	veh/h			9	ped/h	6563	pers/h
Demand Flows (Entry Total)	2801	veh/h						
Midblock Inflows (Total)	62	veh/h						
Midblock Outflows (Total)	-56	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.6	%						
Degree of Saturation	0.990							
Control Delay (Total)	13.81	veh-h/h			0.13	ped-h/h	17.55	pers-h/h
Control Delay (Average)	9.5	sec			48.3	sec	9.6	sec
Control Delay (Worst Lane)	98.5	sec						
Control Delay (Worst Movement)	98.5	sec			53.2	sec	98.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	9.0	sec						
Queue Storage Ratio (Worst Lane)	0.82							
Total Effective Stops	1542	veh/h			8	ped/h	1985	pers/h
Effective Stop Rate	0.30		0.47	per km	0.88		0.30	
Proportion Queued	0.32				0.88		0.33	
Performance Index	223.2				0.2		223.5	
Cost (Total)	2173.01	$/h	0.67	$/km	4.84	$/h	2177.85	$/h
Fuel Consumption (Total)	322.5	L/h	99.2	mL/km				
Fuel Economy	9.9	L/100km						
Carbon Dioxide (Total)	770.5	kg/h	237.0	g/km				
Hydrocarbons (Total)	0.063	kg/h	0.019	g/km				
Carbon Monoxide (Total)	0.830	kg/h	0.255	g/km				
NOx (Total)	1.862	kg/h	0.573	g/km				

Network Model Variability Index (Iterations 3 to N): 26.5 %
Number of Iterations: 10 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 100.0% 2.2% 0.7%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,523,790	veh/y	4,547	ped/y	3,178,611	pers/y
Delay	6,628	veh-h/y	61	ped-h/y	8,422	pers-h/y
Effective Stops	740,047	veh/y	4,006	ped/y	952,590	pers/y
Travel Distance	1,560,156	veh-km/y	156	ped-km/y	1,976,031	pers-km/y
Travel Time	32,884	veh-h/y	94	ped-h/y	41,787	pers-h/y
Cost	1,043,044	$/y	2,323	$/y	1,045,367	$/y
Fuel Consumption	154,800	L/y				
Carbon Dioxide	369,818	kg/y				
Hydrocarbons	30	kg/y				
Carbon Monoxide	398	kg/y				
NOx	894	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr PM (Option 2)]

Network: N101 [Base Yr PM (Option 2)]

HenryLawson_Haig
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1112	7.8	1066	7.8	0.813	6.8	LOS A	18.7	139.3	0.54	0.51	0.54	51.5
3	R2	60	1.8	58	1.8	0.125	14.5	LOS B	0.8	5.8	0.44	0.68	0.44	43.0
Approach		1172	7.5	1123[N1]	7.5	0.813	7.2	LOS A	18.7	139.3	0.54	0.52	0.54	51.0
East: Haig Ave														
4	L2	121	8.7	121	8.7	0.331	49.6	LOS D	3.7	28.1	0.89	0.78	0.89	23.1
6	R2	189	4.4	189	4.4	0.982	98.5	LOS F	9.1	66.5	1.00	1.10	1.70	22.7
Approach		311	6.1	311	6.1	0.982	79.4	LOS F	9.1	66.5	0.96	0.98	1.38	22.8
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.466	16.9	LOS B	9.8	73.5	0.54	0.49	0.54	48.9
8	T1	1103	7.6	1103	7.6	0.466	11.4	LOS A	10.0	74.9	0.55	0.50	0.55	43.9
Approach		1115	7.7	1115	7.7	0.466	11.4	LOS A	10.0	74.9	0.55	0.50	0.55	43.9
All Vehicles		2597	7.4	2549[N1]	7.6	0.982	17.9	LOS B	18.7	139.3	0.59	0.56	0.65	40.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	9.2	LOS A	0.0	0.0	0.39	0.39
P3	North Full Crossing	8	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		9	48.3	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr PM (Option 2)]

Network: N101 [Base Yr PM (Option 2)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	13	25.0	13	25.0	0.990	16.3	LOS B	1.5	11.0	0.05	0.01	0.65	41.2
2	T1	1223	8.2	1223	8.2	0.990	2.2	LOS A	1.5	11.0	0.05	0.01	0.65	55.5
3	R2	9	0.0	9	0.0	0.990	22.5	LOS B	1.5	11.0	0.05	0.01	0.65	51.9
Approach		1245	8.3	1245	8.3	0.990	2.5	NA	1.5	11.0	0.05	0.01	0.65	55.2
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.118	6.6	LOS A	0.2	1.6	0.48	0.63	0.48	48.6
Approach		127	4.1	127	4.1	0.118	6.6	LOS A	0.2	1.6	0.48	0.63	0.48	48.6
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.239	5.5	LOS A	0.0	0.0	0.00	0.00	0.00	57.5
8	T1	1277	7.5	1277	7.5	0.456	0.1	LOS A	0.1	0.4	0.02	0.00	0.02	59.8
9	R2	6	0.0	6	0.0	0.456	13.9	LOS A	0.1	0.4	0.03	0.00	0.03	18.4
Approach		1285	7.5	1285	7.5	0.456	0.2	NA	0.1	0.4	0.02	0.00	0.02	59.5
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.021	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
Approach		3	0.0	3	0.0	0.021	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
All Vehicles		2661	7.7	2661	7.7	0.990	1.6	NA	1.5	11.0	0.06	0.04	0.34	56.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr AM (Option 2A)]

Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.59							
Speed Efficiency	0.78							
Congestion Coefficient	1.28							
Travel Speed (Average)	47.0	km/h			1.6	km/h	45.7	km/h
Travel Distance (Total)	3289.7	veh-km/h			0.3	ped-km/h	4303.3	pers-km/h
Travel Time (Total)	70.0	veh-h/h			0.2	ped-h/h	94.1	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5352	veh/h			9	ped/h	6916	pers/h
Arrival Flows (Total for all Sites)	5352	veh/h			9	ped/h	6916	pers/h
Demand Flows (Entry Total)	2718	veh/h						
Midblock Inflows (Total)	184	veh/h						
Midblock Outflows (Total)	-57	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	0.981							
Control Delay (Total)	14.85	veh-h/h			0.13	ped-h/h	21.65	pers-h/h
Control Delay (Average)	10.0	sec			50.2	sec	11.3	sec
Control Delay (Worst Lane)	94.3	sec						
Control Delay (Worst Movement)	94.3	sec			50.2	sec	94.3	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	9.5	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	1453	veh/h			9	ped/h	1988	pers/h
Effective Stop Rate	0.27		0.44	per km	0.95		0.29	
Proportion Queued	0.26				0.95		0.27	
Performance Index	225.2				0.3		225.4	
Cost (Total)	2354.08	$/h	0.72	$/km	4.93	$/h	2359.02	$/h
Fuel Consumption (Total)	362.3	L/h	110.1	mL/km				
Fuel Economy	11.0	L/100km						
Carbon Dioxide (Total)	873.2	kg/h	265.4	g/km				
Hydrocarbons (Total)	0.072	kg/h	0.022	g/km				
Carbon Monoxide (Total)	0.914	kg/h	0.278	g/km				
NOx (Total)	2.794	kg/h	0.849	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,568,758	veh/y	4,547	ped/y	3,319,883	pers/y
Delay	7,126	veh-h/y	63	ped-h/y	10,394	pers-h/y
Effective Stops	697,240	veh/y	4,305	ped/y	954,092	pers/y
Travel Distance	1,579,044	veh-km/y	154	ped-km/y	2,065,575	pers-km/y
Travel Time	33,605	veh-h/y	96	ped-h/y	45,153	pers-h/y
Cost	1,129,960	$/y	2,368	$/y	1,132,328	$/y
Fuel Consumption	173,903	L/y				
Carbon Dioxide	419,144	kg/y				
Hydrocarbons	35	kg/y				
Carbon Monoxide	439	kg/y				
NOx	1,341	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr AM (Option 2A]

Network: N101 [Base Yr AM (Option 2A)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1192	13.5	1192	13.5	0.922	20.2	LOS B	21.8	170.0	0.43	0.51	0.56	40.2
3	R2	135	5.5	135	5.5	0.282	11.9	LOS A	1.7	12.3	0.42	0.69	0.42	44.9
Approach		1326	12.7	1326	12.7	0.922	19.3	LOS B	21.8	170.0	0.43	0.53	0.55	40.7
East: Haig Ave														
4	L2	96	14.3	96	14.3	0.333	50.7	LOS D	2.9	22.7	0.92	0.77	0.92	22.8
6	R2	134	14.2	134	14.2	0.981	94.3	LOS F	6.0	47.5	1.00	1.11	1.80	23.2
Approach		229	14.2	229	14.2	0.981	76.1	LOS F	6.0	47.5	0.97	0.97	1.43	23.1
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.446	13.6	LOS A	7.9	61.1	0.48	0.44	0.48	51.4
8	T1	1095	11.7	1095	11.7	0.446	8.1	LOS A	8.3	63.9	0.48	0.44	0.48	47.4
Approach		1106	11.7	1106	11.7	0.446	8.2	LOS A	8.3	63.9	0.48	0.44	0.48	47.5
All Vehicles		2662	12.4	2662	12.4	0.981	19.6	LOS B	21.8	170.0	0.50	0.53	0.60	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	50.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	50.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		9	50.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr AM (Option 2A)]

Network: N101 [Base Yr AM (Option 2A)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	9	0.0	9	0.0	0.710	5.7	LOS A	3.0	22.3	0.00	0.00	0.00	43.5
2	T1	1313	8.0	1313	8.0	0.710	0.2	LOS A	3.0	22.3	0.00	0.00	0.00	59.5
Approach		1322	8.0	1322	8.0	0.710	0.2	NA	3.0	22.3	0.00	0.00	0.00	59.3
East: Rabaul Road														
4	L2	57	9.3	57	9.3	0.056	6.7	LOS A	0.1	0.8	0.48	0.61	0.48	48.5
Approach		57	9.3	57	9.3	0.056	6.7	LOS A	0.1	0.8	0.48	0.61	0.48	48.5
North: Henry Lawson Drive														
7	L2	1	100.0	1	100.0	0.250	6.1	LOS A	0.0	0.0	0.00	0.00	0.00	54.1
8	T1	1304	11.5	1304	11.5	0.478	0.3	LOS A	0.1	0.9	0.02	0.00	0.02	59.5
9	R2	2	50.0	2	50.0	0.478	41.4	LOS C	0.1	0.9	0.02	0.00	0.03	18.0
Approach		1307	11.7	1307	11.7	0.478	0.4	NA	0.1	0.9	0.02	0.00	0.02	59.4
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.039	24.7	LOS B	0.0	0.2	0.90	0.95	0.90	9.5
Approach		3	0.0	3	0.0	0.039	24.7	LOS B	0.0	0.2	0.90	0.95	0.90	9.5
All Vehicles		2689	9.8	2689	9.8	0.710	0.5	NA	3.0	22.3	0.02	0.02	0.02	58.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr PM (Option 2A)]

New Network
Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.69							
Speed Efficiency	0.79							
Congestion Coefficient	1.26							
Travel Speed (Average)	47.5	km/h			1.7	km/h	47.4	km/h
Travel Distance (Total)	3244.1	veh-km/h			0.3	ped-km/h	4109.0	pers-km/h
Travel Time (Total)	68.2	veh-h/h			0.2	ped-h/h	86.7	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5267	veh/h			9	ped/h	6633	pers/h
Arrival Flows (Total for all Sites)	5207	veh/h			9	ped/h	6560	pers/h
Demand Flows (Entry Total)	2801	veh/h						
Midblock Inflows (Total)	62	veh/h						
Midblock Outflows (Total)	-56	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.6	%						
Degree of Saturation	0.982							
Control Delay (Total)	13.64	veh-h/h			0.13	ped-h/h	17.35	pers-h/h
Control Delay (Average)	9.4	sec			48.3	sec	9.5	sec
Control Delay (Worst Lane)	98.5	sec						
Control Delay (Worst Movement)	98.5	sec			53.2	sec	98.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	8.9	sec						
Queue Storage Ratio (Worst Lane)	0.80							
Total Effective Stops	1527	veh/h			8	ped/h	1967	pers/h
Effective Stop Rate	0.29		0.47	per km	0.88		0.30	
Proportion Queued	0.31				0.88		0.32	
Performance Index	213.1				0.2		213.3	
Cost (Total)	2150.74	$/h	0.66	$/km	4.84	$/h	2155.58	$/h
Fuel Consumption (Total)	318.1	L/h	98.1	mL/km				
Fuel Economy	9.8	L/100km						
Carbon Dioxide (Total)	760.0	kg/h	234.3	g/km				
Hydrocarbons (Total)	0.062	kg/h	0.019	g/km				
Carbon Monoxide (Total)	0.807	kg/h	0.249	g/km				
NOx (Total)	1.827	kg/h	0.563	g/km				

Network Model Variability Index (Iterations 3 to N): 3.2 %
Number of Iterations: 10 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 3.9% 1.5% 3.1%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,528,337	veh/y	4,547	ped/y	3,184,068	pers/y
Delay	6,549	veh-h/y	61	ped-h/y	8,326	pers-h/y
Effective Stops	733,154	veh/y	4,006	ped/y	944,065	pers/y
Travel Distance	1,557,146	veh-km/y	156	ped-km/y	1,972,323	pers-km/y
Travel Time	32,748	veh-h/y	94	ped-h/y	41,620	pers-h/y
Cost	1,032,356	$/y	2,323	$/y	1,034,679	$/y
Fuel Consumption	152,702	L/y				
Carbon Dioxide	364,823	kg/y				
Hydrocarbons	30	kg/y				
Carbon Monoxide	387	kg/y				
NOx	877	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr PM (Option 2A)]

Network: N101 [Base Yr PM (Option 2A)]

HenryLawson_Haig
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1112	7.8	1055	7.8	0.819	6.7	LOS A	18.2	136.2	0.54	0.50	0.54	51.6
3	R2	69	1.5	66	1.5	0.143	14.6	LOS B	0.9	6.7	0.44	0.68	0.44	42.9
Approach		1181	7.4	1121 N1	7.4	0.819	7.2	LOS A	18.2	136.2	0.53	0.51	0.53	51.0
East: Haig Ave														
4	L2	121	8.7	121	8.7	0.331	49.6	LOS D	3.7	28.1	0.89	0.78	0.89	23.1
6	R2	189	4.4	189	4.4	0.982	98.5	LOS F	9.1	66.5	1.00	1.10	1.70	22.7
Approach		311	6.1	311	6.1	0.982	79.4	LOS F	9.1	66.5	0.96	0.98	1.38	22.8
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.466	16.9	LOS B	9.8	73.5	0.54	0.49	0.54	48.9
8	T1	1103	7.6	1103	7.6	0.466	11.4	LOS A	10.0	74.9	0.55	0.50	0.55	43.9
Approach		1115	7.7	1115	7.7	0.466	11.4	LOS A	10.0	74.9	0.55	0.50	0.55	43.9
All Vehicles		2606	7.4	2546 N1	7.6	0.982	17.9	LOS B	18.2	136.2	0.59	0.56	0.64	40.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	9.2	LOS A	0.0	0.0	0.39	0.39
P3	North Full Crossing	8	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		9	48.3	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr PM (Option 2A)]

Network: N101 [Base Yr PM (Option 2A)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	13	25.0	13	25.0	0.946	7.4	LOS A	0.0	0.0	0.00	0.01	0.00	41.0
2	T1	1233	8.1	1233	8.1	0.946	2.0	LOS A	0.0	0.0	0.00	0.01	0.00	56.3
Approach		1245	8.3	1245	8.3	0.946	2.0	NA	0.0	0.0	0.00	0.01	0.00	56.0
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.118	6.6	LOS A	0.2	1.6	0.48	0.63	0.48	48.6
Approach		127	4.1	127	4.1	0.118	6.6	LOS A	0.2	1.6	0.48	0.63	0.48	48.6
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.239	5.5	LOS A	0.0	0.0	0.00	0.00	0.00	57.5
8	T1	1277	7.5	1277	7.5	0.456	0.1	LOS A	0.1	0.4	0.02	0.00	0.02	59.8
9	R2	6	0.0	6	0.0	0.456	14.0	LOS A	0.1	0.4	0.03	0.00	0.03	18.4
Approach		1285	7.5	1285	7.5	0.456	0.2	NA	0.1	0.4	0.02	0.00	0.02	59.5
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.021	19.6	LOS B	0.0	0.1	0.87	0.94	0.87	11.4
Approach		3	0.0	3	0.0	0.021	19.6	LOS B	0.0	0.1	0.87	0.94	0.87	11.4
All Vehicles		2661	7.7	2661	7.7	0.946	1.4	NA	0.2	1.6	0.03	0.04	0.03	57.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Base Yr AM (Option 3)]

Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	7.53							
Speed Efficiency	0.78							
Congestion Coefficient	1.29							
Travel Speed (Average)	46.7	km/h			1.6	km/h	45.1	km/h
Travel Distance (Total)	3281.6	veh-km/h			0.3	ped-km/h	4293.2	pers-km/h
Travel Time (Total)	70.3	veh-h/h			0.2	ped-h/h	95.2	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Arrival Flows (Total for all Sites)	5311	veh/h			9	ped/h	6867	pers/h
Demand Flows (Entry Total)	2718	veh/h						
Midblock Inflows (Total)	184	veh/h						
Midblock Outflows (Total)	-57	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	0.981							
Control Delay (Total)	15.19	veh-h/h			0.13	ped-h/h	22.76	pers-h/h
Control Delay (Average)	10.3	sec			50.2	sec	11.9	sec
Control Delay (Worst Lane)	94.2	sec						
Control Delay (Worst Movement)	94.2	sec			50.2	sec	94.2	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	9.8	sec						
Queue Storage Ratio (Worst Lane)	0.50							
Total Effective Stops	1648	veh/h			9	ped/h	2267	pers/h
Effective Stop Rate	0.31		0.50	per km	0.95		0.33	
Proportion Queued	0.56				0.95		0.58	
Performance Index	321.9				0.2		322.1	
Cost (Total)	2667.82	$/h	0.81	$/km	4.87	$/h	2672.69	$/h
Fuel Consumption (Total)	419.0	L/h	127.7	mL/km				
Fuel Economy	12.8	L/100km						
Carbon Dioxide (Total)	1007.8	kg/h	307.1	g/km				
Hydrocarbons (Total)	0.085	kg/h	0.026	g/km				
Carbon Monoxide (Total)	1.032	kg/h	0.315	g/km				
NOx (Total)	3.358	kg/h	1.023	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,549,053	veh/y	4,547	ped/y	3,296,236	pers/y
Delay	7,293	veh-h/y	63	ped-h/y	10,923	pers-h/y
Effective Stops	790,914	veh/y	4,305	ped/y	1,088,125	pers/y
Travel Distance	1,575,162	veh-km/y	148	ped-km/y	2,060,752	pers-km/y
Travel Time	33,749	veh-h/y	95	ped-h/y	45,683	pers-h/y
Cost	1,280,555	$/y	2,336	$/y	1,282,891	$/y
Fuel Consumption	201,136	L/y				
Carbon Dioxide	483,732	kg/y				
Hydrocarbons	41	kg/y				
Carbon Monoxide	495	kg/y				
NOx	1,612	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Base Yr AM (Option 3)]

Network: N101 [Base Yr AM (Option 3)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 112 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1192	13.5	1192	13.5	0.504	2.4	LOS A	7.0	55.0	0.28	0.25	0.28	56.7
3	R2	94	4.5	94	4.5	0.270	32.8	LOS C	2.3	16.7	0.77	0.77	0.77	32.4
Approach		1285	12.9	1285	12.9	0.504	4.6	LOS A	7.0	55.0	0.31	0.29	0.31	53.8
East: Haig Ave														
4	L2	96	14.3	96	14.3	0.333	50.7	LOS D	2.9	22.7	0.92	0.77	0.92	22.8
6	R2	134	14.2	134	14.2	0.981	94.2	LOS F	6.0	47.5	1.00	1.10	1.80	23.1
Approach		229	14.2	229	14.2	0.981	76.1	LOS F	6.0	47.5	0.97	0.96	1.43	23.0
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.884	26.2	LOS B	32.5	250.4	0.86	0.86	0.92	43.6
8	T1	1095	11.7	1095	11.7	0.884	20.6	LOS B	32.5	250.4	0.86	0.86	0.92	36.0
Approach		1106	11.7	1106	11.7	0.884	20.6	LOS B	32.5	250.4	0.86	0.86	0.92	36.1
All Vehicles		2621	12.5	2621	12.5	0.981	17.6	LOS B	32.5	250.4	0.60	0.59	0.67	40.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	50.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	50.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		9	50.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr AM (Option 3)]

Network: N101 [Base Yr AM (Option 3)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
1	L2	9	0.0	9	0.0	0.789	36.3	LOS C	5.0	37.6	1.00	0.03	1.25	39.8
2	T1	1272	8.0	1272	8.0	0.789	3.4	LOS A	5.0	37.6	1.00	0.03	1.25	52.0
3	R2	41	7.7	41	7.7	0.789	37.7	LOS C	5.0	37.6	1.00	0.03	1.25	49.9
Approach		1322	8.0	1322	8.0	0.789	4.7	NA	5.0	37.6	1.00	0.03	1.25	51.7
East: Rabaul Road (E)														
4	L2	57	9.3	57	9.3	0.265	25.4	LOS B	0.4	3.0	0.90	0.98	1.00	38.8
Approach		57	9.3	57	9.3	0.265	25.4	LOS B	0.4	3.0	0.90	0.98	1.00	38.8
North: Henry Lawson Drive (N)														
7	L2	1	100.0	1	100.0	0.727	58.3	LOS E	0.2	1.6	0.03	0.00	0.04	49.6
8	T1	1304	11.5	1304	11.5	0.727	0.4	LOS A	0.2	1.6	0.03	0.00	0.04	59.2
9	R2	2	50.0	2	50.0	0.727	64.7	LOS E	0.2	1.6	0.03	0.00	0.04	20.1
Approach		1307	11.7	1307	11.7	0.727	0.6	NA	0.2	1.6	0.03	0.00	0.04	59.1
West: Rabaul Road (W)														
10	L2	3	0.0	3	0.0	0.017	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
Approach		3	0.0	3	0.0	0.017	21.8	LOS B	0.0	0.1	0.89	0.95	0.89	10.5
All Vehicles		2689	9.8	2689	9.8	0.789	3.1	NA	5.0	37.6	0.53	0.04	0.66	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: 1 [Base Yr PM (Option 3)]

New Network
Network Category: (None)

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	6.79							
Speed Efficiency	0.71							
Congestion Coefficient	1.41							
Travel Speed (Average)	42.7	km/h			1.5	km/h	42.4	km/h
Travel Distance (Total)	3277.6	veh-km/h			0.3	ped-km/h	4150.1	pers-km/h
Travel Time (Total)	76.8	veh-h/h			0.2	ped-h/h	98.0	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5258	veh/h			9	ped/h	6622	pers/h
Arrival Flows (Total for all Sites)	5258	veh/h			9	ped/h	6622	pers/h
Demand Flows (Entry Total)	2801	veh/h						
Midblock Inflows (Total)	62	veh/h						
Midblock Outflows (Total)	-56	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.5	%						
Degree of Saturation	0.982							
Control Delay (Total)	21.66	veh-h/h			0.14	ped-h/h	27.87	pers-h/h
Control Delay (Average)	14.8	sec			53.3	sec	15.1	sec
Control Delay (Worst Lane)	98.4	sec						
Control Delay (Worst Movement)	98.4	sec			54.2	sec	98.4	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	14.3	sec						
Queue Storage Ratio (Worst Lane)	0.65							
Total Effective Stops	1998	veh/h			9	ped/h	2600	pers/h
Effective Stop Rate	0.38		0.61	per km	0.94		0.39	
Proportion Queued	0.39				0.94		0.40	
Performance Index	365.6				0.3		365.8	
Cost (Total)	2526.36	$/h	0.77	$/km	5.16	$/h	2531.52	$/h
Fuel Consumption (Total)	349.1	L/h	106.5	mL/km				
Fuel Economy	10.7	L/100km						
Carbon Dioxide (Total)	833.6	kg/h	254.3	g/km				
Hydrocarbons (Total)	0.071	kg/h	0.022	g/km				
Carbon Monoxide (Total)	0.888	kg/h	0.271	g/km				
NOx (Total)	2.043	kg/h	0.623	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,523,790	veh/y	4,547	ped/y	3,178,611	pers/y
Delay	10,395	veh-h/y	67	ped-h/y	13,375	pers-h/y
Effective Stops	959,100	veh/y	4,288	ped/y	1,247,873	pers/y
Travel Distance	1,573,250	veh-km/y	156	ped-km/y	1,992,057	pers-km/y
Travel Time	36,884	veh-h/y	101	ped-h/y	47,025	pers-h/y
Cost	1,212,651	$/y	2,476	$/y	1,215,127	$/y
Fuel Consumption	167,565	L/y				
Carbon Dioxide	400,134	kg/y				
Hydrocarbons	34	kg/y				
Carbon Monoxide	426	kg/y				
NOx	981	kg/y				

MOVEMENT SUMMARY

Site: 543 [Haig Ave - Base Yr PM (Option 3)]

Network: 1 [Base Yr PM (Option 3)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1112	7.8	1112	7.8	0.487	4.4	LOS A	8.8	65.9	0.35	0.32	0.35	54.2
3	R2	60	1.8	60	1.8	0.194	43.1	LOS D	1.7	12.3	0.83	0.75	0.83	28.6
Approach		1172	7.5	1172	7.5	0.487	6.4	LOS A	8.8	65.9	0.37	0.34	0.37	51.8
East: Haig Ave														
4	L2	121	8.7	121	8.7	0.331	49.6	LOS D	3.7	28.1	0.89	0.78	0.89	23.1
6	R2	189	4.4	189	4.4	0.982	98.4	LOS F	9.1	66.5	1.00	1.08	1.70	22.6
Approach		311	6.1	311	6.1	0.982	79.4	LOS F	9.1	66.5	0.96	0.96	1.38	22.7
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.931	42.7	LOS D	43.8	327.1	0.97	1.03	1.11	36.3
8	T1	1103	7.6	1103	7.6	0.931	37.0	LOS C	43.8	327.1	0.97	1.03	1.11	27.3
Approach		1115	7.7	1115	7.7	0.931	37.0	LOS C	43.8	327.1	0.97	1.03	1.11	27.4
All Vehicles		2597	7.4	2597	7.4	0.982	28.3	LOS B	43.8	327.1	0.70	0.71	0.81	34.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	8	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		9	53.3	LOS E			0.94	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Base Yr PM (Option 3)]

Network: 1 [Base Yr PM (Option 3)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	13	25.0	13	25.0	0.682	15.9	LOS B	0.3	1.9	0.06	0.01	0.09	42.8
2	T1	1223	8.2	1223	8.2	0.682	0.3	LOS A	0.3	1.9	0.06	0.01	0.09	58.7
3	R2	9	0.0	9	0.0	0.682	22.8	LOS B	0.3	1.9	0.06	0.01	0.09	53.0
Approach		1245	8.3	1245	8.3	0.682	0.7	NA	0.3	1.9	0.06	0.01	0.09	58.4
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.479	25.9	LOS B	0.9	6.2	0.91	1.07	1.27	38.6
Approach		127	4.1	127	4.1	0.479	25.9	LOS B	0.9	6.2	0.91	1.07	1.27	38.6
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.695	18.7	LOS B	0.1	0.7	0.03	0.00	0.04	51.2
8	T1	1277	7.5	1277	7.5	0.695	0.1	LOS A	0.1	0.7	0.03	0.00	0.04	59.6
9	R2	6	0.0	6	0.0	0.695	20.6	LOS B	0.1	0.7	0.03	0.00	0.04	18.2
Approach		1285	7.5	1285	7.5	0.695	0.3	NA	0.1	0.7	0.03	0.00	0.04	59.3
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.014	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
Approach		3	0.0	3	0.0	0.014	19.1	LOS B	0.0	0.1	0.87	0.94	0.87	11.7
All Vehicles		2661	7.7	2661	7.7	0.695	1.7	NA	0.9	6.2	0.09	0.06	0.13	56.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: 1 [Future Yr AM (Do Nothing)]

Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	5.29							
Speed Efficiency	0.58							
Congestion Coefficient	1.74							
Travel Speed (Average)	34.5	km/h			2.0	km/h	34.0	km/h
Travel Distance (Total)	3598.9	veh-km/h			0.4	ped-km/h	4717.2	pers-km/h
Travel Time (Total)	104.2	veh-h/h			0.2	ped-h/h	138.9	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5819	veh/h			12	ped/h	7537	pers/h
Arrival Flows (Total for all Sites)	5819	veh/h			12	ped/h	7537	pers/h
Demand Flows (Entry Total)	2990	veh/h						
Midblock Inflows (Total)	190	veh/h						
Midblock Outflows (Total)	-64	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	1.030							
Control Delay (Total)	43.69	veh-h/h			0.11	ped-h/h	59.16	pers-h/h
Control Delay (Average)	27.0	sec			34.2	sec	28.3	sec
Control Delay (Worst Lane)	100.6	sec						
Control Delay (Worst Movement)	140.9	sec			34.2	sec	140.9	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	26.5	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	3376	veh/h			11	ped/h	4467	pers/h
Effective Stop Rate	0.58		0.94	per km	0.93		0.59	
Proportion Queued	0.71				0.93		0.73	
Performance Index	455.1				0.3		455.4	
Cost (Total)	4141.62	$/h	1.15	$/km	4.76	$/h	4146.38	$/h
Fuel Consumption (Total)	558.4	L/h	155.2	mL/km				
Fuel Economy	15.5	L/100km						
Carbon Dioxide (Total)	1341.0	kg/h	372.6	g/km				
Hydrocarbons (Total)	0.124	kg/h	0.034	g/km				
Carbon Monoxide (Total)	1.364	kg/h	0.379	g/km				
NOx (Total)	4.682	kg/h	1.301	g/km				

Network Model Variability Index (Iterations 3 to N): 0.6 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.8% 0.6% 0.4%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,793,276	veh/y	5,543	ped/y	3,617,677	pers/y
Delay	20,970	veh-h/y	53	ped-h/y	28,396	pers-h/y
Effective Stops	1,620,423	veh/y	5,129	ped/y	2,144,097	pers/y
Travel Distance	1,727,453	veh-km/y	188	ped-km/y	2,264,240	pers-km/y
Travel Time	50,001	veh-h/y	93	ped-h/y	66,653	pers-h/y
Cost	1,987,979	$/y	2,283	$/y	1,990,261	$/y
Fuel Consumption	268,029	L/y				
Carbon Dioxide	643,680	kg/y				
Hydrocarbons	59	kg/y				
Carbon Monoxide	655	kg/y				
NOx	2,247	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr AM (Do Nothing)]

Network: 1 [Future Yr AM (Do Nothing)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
2	T1	1355	13.5	1355	13.5	0.946	30.9	LOS C	21.8	170.0	0.75	0.94	1.03	34.3
3	R2	106	4.5	106	4.5	0.415	39.6	LOS C	2.4	17.7	0.95	0.76	0.95	29.9
Approach		1461	12.9	1461	12.9	0.946	31.5	LOS C	21.8	170.0	0.76	0.92	1.03	33.9
East: Haig Ave														
4	L2	110	14.3	110	14.3	0.369	38.3	LOS C	2.4	18.9	0.93	0.78	0.93	26.9
6	R2	153	14.2	153	14.2	1.030	100.6	LOS F	6.3	49.6	1.00	1.32	2.31	22.1
Approach		262	14.2	262	14.2	1.030	74.6	LOS F	6.3	49.6	0.97	1.09	1.73	23.2
North: Henry Lawson Drive (N)														
7	L2	12	9.1	12	9.1	0.010	9.1	LOS A	0.1	0.6	0.30	0.62	0.30	50.7
8	T1	1146	11.7	1146	11.7	0.994	63.3	LOS E	46.6	359.1	1.00	1.40	1.59	19.7
Approach		1158	11.7	1158	11.7	0.994	62.7	LOS E	46.6	359.1	0.99	1.40	1.58	19.9
All Vehicles		2882	12.5	2882	12.5	1.030	48.0	LOS D	46.6	359.1	0.87	1.13	1.31	26.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P3	North Full Crossing	10	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		12	34.2	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr AM (Do Nothing)]

Network: 1 [Future Yr AM (Do Nothing)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
1	L2	11	0.0	11	0.0	0.914	61.8	LOS E	15.0	112.5	1.00	0.04	1.60	36.5
2	T1	1445	8.0	1445	8.0	0.914	7.2	LOS A	15.0	112.5	1.00	0.04	1.60	45.9
3	R2	47	7.7	47	7.7	0.914	64.1	LOS E	15.0	112.5	1.00	0.04	1.60	46.9
Approach		1503	8.0	1503	8.0	0.914	9.4	NA	15.0	112.5	1.00	0.04	1.60	45.9
East: Rabaul Road (E)														
4	L2	63	9.3	63	9.3	0.351	32.1	LOS C	0.5	4.0	0.92	1.02	1.10	36.2
Approach		63	9.3	63	9.3	0.351	32.1	LOS C	0.5	4.0	0.92	1.02	1.10	36.2
North: Henry Lawson Drive (N)														
7	L2	1	100.0	1	100.0	0.771	133.1	LOS F	0.7	5.4	0.05	0.00	0.07	48.2
8	T1	1365	11.5	1365	11.5	0.771	1.7	LOS A	0.7	5.4	0.05	0.00	0.07	57.1
9	R2	2	50.0	2	50.0	0.771	140.9	LOS F	0.7	5.4	0.05	0.00	0.07	19.4
Approach		1369	11.7	1369	11.7	0.771	2.1	NA	0.7	5.4	0.05	0.00	0.07	57.1
West: Rabaul Road (W)														
10	L2	3	0.0	3	0.0	0.070	40.6	LOS C	0.0	0.3	0.95	0.97	0.95	6.3
Approach		3	0.0	3	0.0	0.070	40.6	LOS C	0.0	0.3	0.95	0.97	0.95	6.3
All Vehicles		2938	9.7	2938	9.7	0.914	6.5	NA	15.0	112.5	0.56	0.04	0.88	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: 1 [Future Yr PM (Do Nothing)]

Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	4.79							
Speed Efficiency	0.53							
Congestion Coefficient	1.88							
Travel Speed (Average)	31.9	km/h			1.5	km/h	31.9	km/h
Travel Distance (Total)	3582.5	veh-km/h			0.4	ped-km/h	4528.9	pers-km/h
Travel Time (Total)	112.4	veh-h/h			0.3	ped-h/h	141.9	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5721	veh/h			12	ped/h	7202	pers/h
Arrival Flows (Total for all Sites)	5721	veh/h			12	ped/h	7202	pers/h
Demand Flows (Entry Total)	3077	veh/h						
Midblock Inflows (Total)	38	veh/h						
Midblock Outflows (Total)	-61	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.5	%						
Degree of Saturation	1.280							
Control Delay (Total)	51.19	veh-h/h			0.17	ped-h/h	64.34	pers-h/h
Control Delay (Average)	32.2	sec			54.2	sec	32.2	sec
Control Delay (Worst Lane)	318.5	sec						
Control Delay (Worst Movement)	318.5	sec			54.2	sec	318.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	31.6	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2941	veh/h			11	ped/h	3775	pers/h
Effective Stop Rate	0.51		0.82	per km	0.95		0.52	
Proportion Queued	0.48				0.95		0.49	
Performance Index	464.0				0.3		464.3	
Cost (Total)	3815.26	$/h	1.06	$/km	6.36	$/h	3821.62	$/h
Fuel Consumption (Total)	440.7	L/h	123.0	mL/km				
Fuel Economy	12.3	L/100km						
Carbon Dioxide (Total)	1051.2	kg/h	293.4	g/km				
Hydrocarbons (Total)	0.097	kg/h	0.027	g/km				
Carbon Monoxide (Total)	1.096	kg/h	0.306	g/km				
NOx (Total)	2.549	kg/h	0.712	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,746,048	veh/y	5,543	ped/y	3,457,065	pers/y
Delay	24,573	veh-h/y	83	ped-h/y	30,883	pers-h/y
Effective Stops	1,411,834	veh/y	5,268	ped/y	1,811,881	pers/y
Travel Distance	1,719,608	veh-km/y	190	ped-km/y	2,173,889	pers-km/y
Travel Time	53,937	veh-h/y	124	ped-h/y	68,094	pers-h/y
Cost	1,831,324	$/y	3,053	$/y	1,834,377	$/y
Fuel Consumption	211,557	L/y				
Carbon Dioxide	504,590	kg/y				
Hydrocarbons	46	kg/y				
Carbon Monoxide	526	kg/y				
NOx	1,224	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr PM (Do Nothing)]

Network: 1 [Future Yr PM (Do Nothing)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
2	T1	1210	7.8	1210	7.8	0.864	8.4	LOS A	22.8	170.0	0.66	0.63	0.66	49.8
3	R2	65	1.8	65	1.8	0.299	57.5	LOS E	2.2	15.9	0.95	0.75	0.95	24.6
Approach		1275	7.5	1275	7.5	0.864	10.9	LOS A	22.8	170.0	0.68	0.63	0.68	47.3
East: Haig Ave														
4	L2	158	8.7	158	8.7	0.431	50.7	LOS D	5.0	37.5	0.92	0.80	0.92	22.8
6	R2	247	4.4	247	4.4	1.280	318.5	LOS F	23.7	172.4	1.00	1.63	2.96	9.3
Approach		405	6.1	405	6.1	1.280	214.1	LOS F	23.7	172.4	0.97	1.31	2.16	10.9
North: Henry Lawson Drive (N)														
7	L2	12	18.2	12	18.2	0.011	11.7	LOS A	0.1	1.1	0.32	0.62	0.32	48.7
8	T1	1175	7.6	1175	7.6	0.989	65.5	LOS E	59.5	443.6	1.00	1.22	1.35	19.3
Approach		1187	7.7	1187	7.7	0.989	64.9	LOS E	59.5	443.6	0.99	1.21	1.34	19.5
All Vehicles		2867	7.4	2867	7.4	1.280	62.0	LOS E	59.5	443.6	0.85	0.97	1.16	22.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	10	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		12	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr PM (Do Nothing)]

Network: 1 [Future Yr PM (Do Nothing)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	14	25.0	14	25.0	0.745	22.0	LOS B	3.0	22.7	0.09	0.01	0.13	42.5
2	T1	1331	8.2	1331	8.2	0.745	0.6	LOS A	3.0	22.7	0.09	0.01	0.13	58.1
3	R2	10	0.0	10	0.0	0.745	31.4	LOS C	3.0	22.7	0.09	0.01	0.13	52.7
Approach		1355	8.3	1355	8.3	0.745	1.0	NA	3.0	22.7	0.09	0.01	0.13	57.8
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.601	36.2	LOS C	1.1	8.1	0.94	1.13	1.47	34.9
Approach		127	4.1	127	4.1	0.601	36.2	LOS C	1.1	8.1	0.94	1.13	1.47	34.9
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.743	26.7	LOS B	0.2	1.3	0.05	0.00	0.06	51.0
8	T1	1360	7.5	1360	7.5	0.743	0.3	LOS A	0.2	1.3	0.05	0.00	0.06	59.3
9	R2	7	0.0	7	0.0	0.743	29.0	LOS C	0.2	1.3	0.05	0.00	0.06	18.1
Approach		1369	7.5	1369	7.5	0.743	0.4	NA	0.2	1.3	0.05	0.00	0.06	59.1
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.042	26.3	LOS B	0.0	0.2	0.91	0.96	0.91	9.0
Approach		3	0.0	3	0.0	0.042	26.3	LOS B	0.0	0.2	0.91	0.96	0.91	9.0
All Vehicles		2854	7.7	2854	7.7	0.745	2.3	NA	3.0	22.7	0.11	0.06	0.16	55.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr AM (Option 1)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	6.77							
Speed Efficiency	0.71							
Congestion Coefficient	1.41							
Travel Speed (Average)	42.6	km/h			2.0	km/h	41.4	km/h
Travel Distance (Total)	3598.9	veh-km/h			0.4	ped-km/h	4717.2	pers-km/h
Travel Time (Total)	84.5	veh-h/h			0.2	ped-h/h	114.0	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5820	veh/h			12	ped/h	7537	pers/h
Arrival Flows (Total for all Sites)	5820	veh/h			12	ped/h	7537	pers/h
Demand Flows (Entry Total)	2990	veh/h						
Midblock Inflows (Total)	190	veh/h						
Midblock Outflows (Total)	-64	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	1.030							
Control Delay (Total)	24.03	veh-h/h			0.11	ped-h/h	34.34	pers-h/h
Control Delay (Average)	14.9	sec			34.2	sec	16.4	sec
Control Delay (Worst Lane)	100.6	sec						
Control Delay (Worst Movement)	140.9	sec			34.2	sec	140.9	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	14.4	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2183	veh/h			11	ped/h	2975	pers/h
Effective Stop Rate	0.38		0.61	per km	0.93		0.39	
Proportion Queued	0.60				0.93		0.62	
Performance Index	285.3				0.3		285.5	
Cost (Total)	3259.83	$/h	0.91	$/km	4.76	$/h	3264.58	$/h
Fuel Consumption (Total)	487.7	L/h	135.5	mL/km				
Fuel Economy	13.6	L/100km						
Carbon Dioxide (Total)	1172.4	kg/h	325.8	g/km				
Hydrocarbons (Total)	0.101	kg/h	0.028	g/km				
Carbon Monoxide (Total)	1.198	kg/h	0.333	g/km				
NOx (Total)	3.990	kg/h	1.109	g/km				

Network Model Variability Index (Iterations 3 to N): 0.6 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.8% 0.6% 0.4%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,793,434	veh/y	5,543	ped/y	3,617,867	pers/y
Delay	11,535	veh-h/y	53	ped-h/y	16,484	pers-h/y
Effective Stops	1,047,603	veh/y	5,129	ped/y	1,428,041	pers/y
Travel Distance	1,727,466	veh-km/y	188	ped-km/y	2,264,256	pers-km/y
Travel Time	40,566	veh-h/y	93	ped-h/y	54,742	pers-h/y
Cost	1,564,716	$/y	2,283	$/y	1,566,999	$/y
Fuel Consumption	234,076	L/y				
Carbon Dioxide	562,740	kg/y				
Hydrocarbons	49	kg/y				
Carbon Monoxide	575	kg/y				
NOx	1,915	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr AM (Option 1)]

Network: N101 [Future Yr AM (Option 1)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1355	13.5	1355	13.5	0.937	26.3	LOS B	21.8	170.0	0.59	0.75	0.84	36.6
3	R2	106	4.5	106	4.5	0.226	15.7	LOS B	1.4	9.8	0.58	0.72	0.58	42.1
Approach		1461	12.9	1461	12.9	0.937	25.5	LOS B	21.8	170.0	0.59	0.75	0.82	36.9
East: Haig Ave														
4	L2	110	14.3	110	14.3	0.369	38.3	LOS C	2.4	18.9	0.93	0.78	0.93	26.9
6	R2	153	14.2	153	14.2	1.030	100.6	LOS F	6.3	49.6	1.00	1.32	2.31	22.1
Approach		262	14.2	262	14.2	1.030	74.6	LOS F	6.3	49.6	0.97	1.09	1.73	23.2
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.301	12.1	LOS A	3.5	27.2	0.47	0.42	0.47	52.4
8	T1	1146	11.7	1146	11.7	0.703	9.2	LOS A	12.8	98.5	0.64	0.58	0.64	46.2
Approach		1158	11.7	1158	11.7	0.703	9.2	LOS A	12.8	98.5	0.64	0.58	0.64	46.3
All Vehicles		2882	12.5	2882	12.5	1.030	23.4	LOS B	21.8	170.0	0.64	0.71	0.83	36.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P3	North Full Crossing	10	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		12	34.2	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr AM (Option 1)]

Network: N101 [Future Yr AM (Option 1)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
1	L2	11	0.0	11	0.0	0.914	61.8	LOS E	8.8	65.5	1.00	0.04	1.60	36.5
2	T1	1445	8.0	1445	8.0	0.914	7.2	LOS A	8.8	65.5	1.00	0.04	1.60	45.9
3	R2	47	7.7	47	7.7	0.914	64.1	LOS E	8.8	65.5	1.00	0.04	1.60	46.9
Approach		1503	8.0	1503	8.0	0.914	9.4	NA	8.8	65.5	1.00	0.04	1.60	45.9
East: Rabaul Road (E)														
4	L2	63	9.3	63	9.3	0.351	32.1	LOS C	0.5	4.0	0.92	1.02	1.10	36.2
Approach		63	9.3	63	9.3	0.351	32.1	LOS C	0.5	4.0	0.92	1.02	1.10	36.2
North: Henry Lawson Drive (N)														
7	L2	1	100.0	1	100.0	0.771	133.1	LOS F	0.7	5.4	0.05	0.00	0.07	48.2
8	T1	1365	11.5	1365	11.5	0.771	1.7	LOS A	0.7	5.4	0.05	0.00	0.07	57.1
9	R2	2	50.0	2	50.0	0.771	140.9	LOS F	0.7	5.4	0.05	0.00	0.07	19.4
Approach		1369	11.7	1369	11.7	0.771	2.1	NA	0.7	5.4	0.05	0.00	0.07	57.1
West: Rabaul Road (W)														
10	L2	3	0.0	3	0.0	0.078	40.7	LOS C	0.0	0.3	0.95	0.98	0.95	6.3
Approach		3	0.0	3	0.0	0.078	40.7	LOS C	0.0	0.3	0.95	0.98	0.95	6.3
All Vehicles		2938	9.7	2938	9.7	0.914	6.5	NA	8.8	65.5	0.56	0.04	0.88	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr PM (Option 1)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	Vehicles		Per Unit Distance		Pedestrians		Persons	
Network Level of Service (LOS)	LOS D							
Travel Time Index	5.57							
Speed Efficiency	0.60							
Congestion Coefficient	1.66							
Travel Speed (Average)	36.1	km/h			1.7	km/h	36.1	km/h
Travel Distance (Total)	3582.5	veh-km/h			0.4	ped-km/h	4528.9	pers-km/h
Travel Time (Total)	99.3	veh-h/h			0.2	ped-h/h	125.3	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5721	veh/h			12	ped/h	7202	pers/h
Arrival Flows (Total for all Sites)	5721	veh/h			12	ped/h	7202	pers/h
Demand Flows (Entry Total)	3077	veh/h						
Midblock Inflows (Total)	38	veh/h						
Midblock Outflows (Total)	-61	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.5	%						
Degree of Saturation	1.280							
Control Delay (Total)	38.11	veh-h/h			0.16	ped-h/h	47.80	pers-h/h
Control Delay (Average)	24.0	sec			48.3	sec	23.9	sec
Control Delay (Worst Lane)	318.5	sec						
Control Delay (Worst Movement)	318.5	sec			53.2	sec	318.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	23.4	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2252	veh/h			10	ped/h	2906	pers/h
Effective Stop Rate	0.39		0.63	per km	0.88		0.40	
Proportion Queued	0.39				0.88		0.40	
Performance Index	369.0				0.3		369.3	
Cost (Total)	3266.27	$/h	0.91	$/km	5.90	$/h	3272.17	$/h
Fuel Consumption (Total)	401.6	L/h	112.1	mL/km				
Fuel Economy	11.2	L/100km						
Carbon Dioxide (Total)	958.4	kg/h	267.5	g/km				
Hydrocarbons (Total)	0.085	kg/h	0.024	g/km				
Carbon Monoxide (Total)	1.011	kg/h	0.282	g/km				
NOx (Total)	2.273	kg/h	0.634	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	Vehicles		Pedestrians		Persons	
Demand Flows (Total for all Sites)	2,746,048	veh/y	5,543	ped/y	3,457,065	pers/y
Delay	18,294	veh-h/y	74	ped-h/y	22,946	pers-h/y
Effective Stops	1,080,945	veh/y	4,883	ped/y	1,395,010	pers/y
Travel Distance	1,719,609	veh-km/y	190	ped-km/y	2,173,890	pers-km/y
Travel Time	47,656	veh-h/y	115	ped-h/y	60,155	pers-h/y
Cost	1,567,808	$/y	2,832	$/y	1,570,640	$/y
Fuel Consumption	192,768	L/y				
Carbon Dioxide	460,030	kg/y				
Hydrocarbons	41	kg/y				
Carbon Monoxide	485	kg/y				
NOx	1,091	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr PM (Option 1)]

Network: N101 [Future Yr PM (Option 1)]

HenryLawson_Haig
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1210	7.8	1210	7.8	0.924	23.0	LOS B	22.8	170.0	0.66	0.71	0.77	38.5
3	R2	65	1.8	65	1.8	0.162	20.1	LOS B	1.2	8.5	0.55	0.71	0.55	39.1
Approach		1275	7.5	1275	7.5	0.924	22.8	LOS B	22.8	170.0	0.66	0.71	0.76	38.6
East: Haig Ave														
4	L2	158	8.7	158	8.7	0.431	50.7	LOS D	5.0	37.5	0.92	0.80	0.92	22.8
6	R2	247	4.4	247	4.4	1.280	318.5	LOS F	23.7	172.4	1.00	1.63	2.96	9.3
Approach		405	6.1	405	6.1	1.280	214.1	LOS F	23.7	172.4	0.97	1.31	2.16	10.9
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.355	15.8	LOS B	6.8	50.7	0.49	0.44	0.49	49.5
8	T1	1175	7.6	1175	7.6	0.637	12.5	LOS A	16.3	121.5	0.60	0.55	0.60	42.7
Approach		1187	7.7	1187	7.7	0.637	12.5	LOS A	16.3	121.5	0.60	0.55	0.60	42.9
All Vehicles		2867	7.4	2867	7.4	1.280	45.5	LOS D	23.7	172.4	0.68	0.73	0.89	27.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	9.2	LOS A	0.0	0.0	0.39	0.39
P3	North Full Crossing	10	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		12	48.3	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr PM (Option 1)]

Network: N101 [Future Yr PM (Option 1)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	14	25.0	14	25.0	0.745	22.0	LOS B	11.4	85.6	0.09	0.01	0.13	42.5
2	T1	1331	8.2	1331	8.2	0.745	0.6	LOS A	11.4	85.6	0.09	0.01	0.13	58.1
3	R2	10	0.0	10	0.0	0.745	31.4	LOS C	11.4	85.6	0.09	0.01	0.13	52.7
Approach		1355	8.3	1355	8.3	0.745	1.0	NA	11.4	85.6	0.09	0.01	0.13	57.8
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.601	36.2	LOS C	1.1	8.1	0.94	1.13	1.47	34.9
Approach		127	4.1	127	4.1	0.601	36.2	LOS C	1.1	8.1	0.94	1.13	1.47	34.9
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.743	26.7	LOS B	0.2	1.3	0.05	0.00	0.06	51.0
8	T1	1360	7.5	1360	7.5	0.743	0.3	LOS A	0.2	1.3	0.05	0.00	0.06	59.3
9	R2	7	0.0	7	0.0	0.743	29.0	LOS C	0.2	1.3	0.05	0.00	0.06	18.1
Approach		1369	7.5	1369	7.5	0.743	0.4	NA	0.2	1.3	0.05	0.00	0.06	59.1
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.042	26.3	LOS B	0.0	0.2	0.91	0.96	0.91	9.0
Approach		3	0.0	3	0.0	0.042	26.3	LOS B	0.0	0.2	0.91	0.96	0.91	9.0
All Vehicles		2854	7.7	2854	7.7	0.745	2.3	NA	11.4	85.6	0.11	0.06	0.16	55.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr AM (Option 2)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS C							
Travel Time Index	6.85							
Speed Efficiency	0.72							
Congestion Coefficient	1.39							
Travel Speed (Average)	43.0	km/h			2.0	km/h	42.0	km/h
Travel Distance (Total)	3599.0	veh-km/h			0.4	ped-km/h	4717.4	pers-km/h
Travel Time (Total)	83.7	veh-h/h			0.2	ped-h/h	112.4	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5820	veh/h			12	ped/h	7537	pers/h
Arrival Flows (Total for all Sites)	5820	veh/h			12	ped/h	7537	pers/h
Demand Flows (Entry Total)	2990	veh/h						
Midblock Inflows (Total)	190	veh/h						
Midblock Outflows (Total)	-64	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	1.030							
Control Delay (Total)	23.19	veh-h/h			0.11	ped-h/h	32.70	pers-h/h
Control Delay (Average)	14.3	sec			34.2	sec	15.6	sec
Control Delay (Worst Lane)	100.6	sec						
Control Delay (Worst Movement)	100.6	sec			34.2	sec	100.6	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	13.9	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2127	veh/h			11	ped/h	2878	pers/h
Effective Stop Rate	0.37		0.59	per km	0.93		0.38	
Proportion Queued	0.57				0.93		0.59	
Performance Index	291.4				0.3		291.7	
Cost (Total)	3195.67	$/h	0.89	$/km	4.76	$/h	3200.43	$/h
Fuel Consumption (Total)	482.5	L/h	134.1	mL/km				
Fuel Economy	13.4	L/100km						
Carbon Dioxide (Total)	1160.2	kg/h	322.4	g/km				
Hydrocarbons (Total)	0.100	kg/h	0.028	g/km				
Carbon Monoxide (Total)	1.187	kg/h	0.330	g/km				
NOx (Total)	3.944	kg/h	1.096	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,793,434	veh/y	5,543	ped/y	3,617,867	pers/y
Delay	11,131	veh-h/y	53	ped-h/y	15,695	pers-h/y
Effective Stops	1,021,138	veh/y	5,129	ped/y	1,381,373	pers/y
Travel Distance	1,727,532	veh-km/y	188	ped-km/y	2,264,343	pers-km/y
Travel Time	40,162	veh-h/y	93	ped-h/y	53,942	pers-h/y
Cost	1,533,922	$/y	2,283	$/y	1,536,205	$/y
Fuel Consumption	231,609	L/y				
Carbon Dioxide	556,882	kg/y				
Hydrocarbons	48	kg/y				
Carbon Monoxide	570	kg/y				
NOx	1,893	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr AM (Option 2)]

Network: N101 [Future Yr AM (Option 2)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1355	13.5	1355	13.5	0.950	31.3	LOS C	21.8	170.0	0.59	0.80	0.89	34.0
3	R2	106	4.5	106	4.5	0.205	10.8	LOS A	1.0	7.1	0.44	0.69	0.44	45.8
Approach		1461	12.9	1461	12.9	0.950	29.8	LOS C	21.8	170.0	0.58	0.79	0.86	34.7
East: Haig Ave														
4	L2	110	14.3	110	14.3	0.369	38.3	LOS C	2.4	18.9	0.93	0.78	0.93	26.9
6	R2	153	14.2	153	14.2	1.030	100.6	LOS F	6.3	49.6	1.00	1.32	2.31	22.1
Approach		262	14.2	262	14.2	1.030	74.6	LOS F	6.3	49.6	0.97	1.09	1.73	23.2
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.504	13.5	LOS A	7.1	54.7	0.56	0.51	0.56	51.5
8	T1	1146	11.7	1146	11.7	0.504	8.1	LOS A	7.4	57.3	0.57	0.51	0.57	47.5
Approach		1158	11.7	1158	11.7	0.504	8.1	LOS A	7.4	57.3	0.57	0.51	0.57	47.6
All Vehicles		2882	12.5	2882	12.5	1.030	25.2	LOS B	21.8	170.0	0.61	0.71	0.82	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P3	North Full Crossing	10	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		12	34.2	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr AM (Option 2)]

Network: N101 [Future Yr AM (Option 2)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	11	0.0	11	0.0	0.818	48.4	LOS D	11.1	82.9	1.00	0.03	1.23	38.8
2	T1	1445	8.0	1445	8.0	0.818	4.3	LOS A	11.1	82.9	1.00	0.03	1.23	50.1
3	R2	47	7.7	47	7.7	0.818	50.6	LOS D	11.1	82.9	1.00	0.03	1.23	49.2
Approach		1503	8.0	1503	8.0	0.818	6.1	NA	11.1	82.9	1.00	0.03	1.23	49.9
East: Rabaul Road														
4	L2	63	9.3	63	9.3	0.063	6.9	LOS A	0.1	0.9	0.50	0.62	0.50	48.3
Approach		63	9.3	63	9.3	0.063	6.9	LOS A	0.1	0.9	0.50	0.62	0.50	48.3
North: Henry Lawson Drive														
7	L2	1	100.0	1	100.0	0.265	6.1	LOS A	0.0	0.0	0.00	0.00	0.00	54.1
8	T1	1365	11.5	1365	11.5	0.506	0.8	LOS A	0.3	2.5	0.02	0.00	0.03	58.7
9	R2	2	50.0	2	50.0	0.506	70.1	LOS E	0.3	2.5	0.04	0.00	0.05	17.6
Approach		1369	11.7	1369	11.7	0.506	0.9	NA	0.3	2.5	0.02	0.00	0.03	58.6
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.078	40.7	LOS C	0.0	0.3	0.95	0.98	0.95	6.3
Approach		3	0.0	3	0.0	0.078	40.7	LOS C	0.0	0.3	0.95	0.98	0.95	6.3
All Vehicles		2938	9.7	2938	9.7	0.818	3.7	NA	11.1	82.9	0.53	0.03	0.66	54.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr PM (Option 2)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	Vehicles		Per Unit Distance		Pedestrians		Persons	
Network Level of Service (LOS)	LOS D							
Travel Time Index	5.66							
Speed Efficiency	0.61							
Congestion Coefficient	1.64							
Travel Speed (Average)	36.6	km/h			1.7	km/h	36.8	km/h
Travel Distance (Total)	3577.4	veh-km/h			0.4	ped-km/h	4522.7	pers-km/h
Travel Time (Total)	97.9	veh-h/h			0.2	ped-h/h	122.9	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5721	veh/h			12	ped/h	7202	pers/h
Arrival Flows (Total for all Sites)	5721	veh/h			12	ped/h	7202	pers/h
Demand Flows (Entry Total)	3077	veh/h						
Midblock Inflows (Total)	38	veh/h						
Midblock Outflows (Total)	-71	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.5	%						
Degree of Saturation	1.280							
Control Delay (Total)	36.80	veh-h/h			0.16	ped-h/h	45.48	pers-h/h
Control Delay (Average)	23.2	sec			48.3	sec	22.7	sec
Control Delay (Worst Lane)	318.5	sec						
Control Delay (Worst Movement)	318.5	sec			53.2	sec	318.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	22.6	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2150	veh/h			10	ped/h	2738	pers/h
Effective Stop Rate	0.38		0.60	per km	0.88		0.38	
Proportion Queued	0.35				0.88		0.35	
Performance Index	356.8				0.3		357.1	
Cost (Total)	3167.60	$/h	0.89	$/km	5.90	$/h	3173.50	$/h
Fuel Consumption (Total)	392.1	L/h	109.6	mL/km				
Fuel Economy	11.0	L/100km						
Carbon Dioxide (Total)	935.8	kg/h	261.6	g/km				
Hydrocarbons (Total)	0.082	kg/h	0.023	g/km				
Carbon Monoxide (Total)	0.990	kg/h	0.277	g/km				
NOx (Total)	2.196	kg/h	0.614	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	Vehicles		Pedestrians		Persons	
Demand Flows (Total for all Sites)	2,746,048	veh/y	5,543	ped/y	3,457,065	pers/y
Delay	17,665	veh-h/y	74	ped-h/y	21,831	pers-h/y
Effective Stops	1,032,176	veh/y	4,883	ped/y	1,314,088	pers/y
Travel Distance	1,717,131	veh-km/y	190	ped-km/y	2,170,917	pers-km/y
Travel Time	46,974	veh-h/y	115	ped-h/y	58,974	pers-h/y
Cost	1,520,449	$/y	2,832	$/y	1,523,281	$/y
Fuel Consumption	188,187	L/y				
Carbon Dioxide	449,173	kg/y				
Hydrocarbons	39	kg/y				
Carbon Monoxide	475	kg/y				
NOx	1,054	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr PM (Option 2)]

Network: N101 [Future Yr PM (Option 2)]

HenryLawson_Haig
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1210	7.8	1210	7.8	0.927	24.2	LOS B	22.8	170.0	0.66	0.72	0.78	37.8
3	R2	65	1.8	65	1.8	0.149	15.6	LOS B	1.0	7.0	0.46	0.69	0.46	42.2
Approach		1275	7.5	1275	7.5	0.927	23.7	LOS B	22.8	170.0	0.65	0.72	0.76	38.0
East: Haig Ave														
4	L2	158	8.7	158	8.7	0.431	50.7	LOS D	5.0	37.5	0.92	0.80	0.92	22.8
6	R2	247	4.4	247	4.4	1.280	318.5	LOS F	23.7	172.4	1.00	1.63	2.96	9.3
Approach		405	6.1	405	6.1	1.280	214.1	LOS F	23.7	172.4	0.97	1.31	2.16	10.9
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.496	17.2	LOS B	10.8	80.6	0.56	0.51	0.56	48.7
8	T1	1175	7.6	1175	7.6	0.496	11.7	LOS A	11.0	82.0	0.56	0.51	0.56	43.5
Approach		1187	7.7	1187	7.7	0.496	11.8	LOS A	11.0	82.0	0.56	0.51	0.56	43.6
All Vehicles		2867	7.4	2867	7.4	1.280	45.6	LOS D	23.7	172.4	0.66	0.72	0.88	26.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	9.2	LOS A	0.0	0.0	0.39	0.39
P3	North Full Crossing	10	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		12	48.3	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr PM (Option 2)]

Network: N101 [Future Yr PM (Option 2)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	14	25.0	14	25.0	0.729	6.0	LOS A	12.0	90.1	0.00	0.01	0.00	43.0
2	T1	1342	8.1	1342	8.1	0.729	0.2	LOS A	12.0	90.1	0.00	0.01	0.00	59.5
Approach		1355	8.3	1355	8.3	0.729	0.3	NA	12.0	90.1	0.00	0.01	0.00	59.2
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.122	6.7	LOS A	0.2	1.7	0.50	0.64	0.50	48.5
Approach		127	4.1	127	4.1	0.122	6.7	LOS A	0.2	1.7	0.50	0.64	0.50	48.5
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.256	5.5	LOS A	0.0	0.0	0.00	0.00	0.00	57.5
8	T1	1360	7.5	1360	7.5	0.488	0.1	LOS A	0.1	0.6	0.02	0.00	0.03	59.7
9	R2	7	0.0	7	0.0	0.488	17.6	LOS B	0.1	0.6	0.03	0.00	0.04	18.4
Approach		1369	7.5	1369	7.5	0.488	0.2	NA	0.1	0.6	0.02	0.00	0.03	59.4
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.044	27.2	LOS B	0.0	0.2	0.91	0.96	0.91	8.8
All Vehicles		2854	7.7	2854	7.7	0.729	0.6	NA	12.0	90.1	0.03	0.03	0.04	58.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr AM (Option 2A)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	6.02							
Speed Efficiency	0.64							
Congestion Coefficient	1.56							
Travel Speed (Average)	38.5	km/h			2.0	km/h	38.0	km/h
Travel Distance (Total)	3607.5	veh-km/h			0.4	ped-km/h	4727.6	pers-km/h
Travel Time (Total)	93.7	veh-h/h			0.2	ped-h/h	124.5	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5866	veh/h			12	ped/h	7593	pers/h
Arrival Flows (Total for all Sites)	5866	veh/h			12	ped/h	7593	pers/h
Demand Flows (Entry Total)	2990	veh/h						
Midblock Inflows (Total)	190	veh/h						
Midblock Outflows (Total)	-64	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.1	%						
Degree of Saturation	1.030							
Control Delay (Total)	33.17	veh-h/h			0.11	ped-h/h	44.80	pers-h/h
Control Delay (Average)	20.4	sec			34.2	sec	21.2	sec
Control Delay (Worst Lane)	100.6	sec						
Control Delay (Worst Movement)	100.6	sec			34.2	sec	100.6	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	19.9	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2972	veh/h			11	ped/h	3909	pers/h
Effective Stop Rate	0.51		0.82	per km	0.93		0.51	
Proportion Queued	0.41				0.93		0.42	
Performance Index	390.4				0.3		390.7	
Cost (Total)	3454.70	$/h	0.96	$/km	4.76	$/h	3459.45	$/h
Fuel Consumption (Total)	479.9	L/h	133.0	mL/km				
Fuel Economy	13.3	L/100km						
Carbon Dioxide (Total)	1154.8	kg/h	320.1	g/km				
Hydrocarbons (Total)	0.104	kg/h	0.029	g/km				
Carbon Monoxide (Total)	1.194	kg/h	0.331	g/km				
NOx (Total)	3.979	kg/h	1.103	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,815,675	veh/y	5,543	ped/y	3,644,557	pers/y
Delay	15,923	veh-h/y	53	ped-h/y	21,503	pers-h/y
Effective Stops	1,426,568	veh/y	5,129	ped/y	1,876,282	pers/y
Travel Distance	1,731,607	veh-km/y	188	ped-km/y	2,269,225	pers-km/y
Travel Time	44,994	veh-h/y	93	ped-h/y	59,759	pers-h/y
Cost	1,658,254	$/y	2,283	$/y	1,660,536	$/y
Fuel Consumption	230,351	L/y				
Carbon Dioxide	554,309	kg/y				
Hydrocarbons	50	kg/y				
Carbon Monoxide	573	kg/y				
NOx	1,910	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr AM (Option 2A)]

Network: N101 [Future Yr AM (Option 2A)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1355	13.5	1355	13.5	1.003	63.4	LOS E	21.8	170.0	1.00	1.43	1.61	23.6
3	R2	153	5.5	153	5.5	0.297	11.3	LOS A	1.5	11.3	0.47	0.70	0.47	45.3
Approach		1508	12.7	1508	12.7	1.003	58.1	LOS E	21.8	170.0	0.95	1.35	1.50	24.8
East: Haig Ave														
4	L2	110	14.3	110	14.3	0.369	38.3	LOS C	2.4	18.9	0.93	0.78	0.93	26.9
6	R2	153	14.2	153	14.2	1.030	100.6	LOS F	6.3	49.6	1.00	1.32	2.31	22.1
Approach		262	14.2	262	14.2	1.030	74.6	LOS F	6.3	49.6	0.97	1.09	1.73	23.2
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.504	13.5	LOS A	7.1	54.7	0.56	0.51	0.56	51.5
8	T1	1146	11.7	1146	11.7	0.504	8.1	LOS A	7.4	57.3	0.57	0.51	0.57	47.5
Approach		1158	11.7	1158	11.7	0.504	8.1	LOS A	7.4	57.3	0.57	0.51	0.57	47.6
All Vehicles		2928	12.4	2928	12.4	1.030	39.8	LOS C	21.8	170.0	0.80	1.00	1.15	29.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P3	North Full Crossing	10	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		12	34.2	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr AM (Option 2A)]

Network: N101 [Future Yr AM (Option 2A)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	11	0.0	11	0.0	0.733	5.7	LOS A	37.1	277.6	0.00	0.00	0.00	43.5
2	T1	1492	8.0	1492	8.0	0.733	0.2	LOS A	37.1	277.6	0.00	0.00	0.00	59.5
Approach		1503	8.0	1503	8.0	0.733	0.3	NA	37.1	277.6	0.00	0.00	0.00	59.3
East: Rabaul Road														
4	L2	63	9.3	63	9.3	0.063	6.9	LOS A	0.1	0.9	0.50	0.62	0.50	48.3
Approach		63	9.3	63	9.3	0.063	6.9	LOS A	0.1	0.9	0.50	0.62	0.50	48.3
North: Henry Lawson Drive														
7	L2	1	100.0	1	100.0	0.267	6.1	LOS A	0.0	0.0	0.00	0.00	0.00	54.1
8	T1	1365	11.5	1365	11.5	0.510	1.2	LOS A	0.5	3.6	0.03	0.00	0.04	58.0
9	R2	2	50.0	2	50.0	0.510	86.2	LOS F	0.5	3.6	0.05	0.00	0.06	17.4
Approach		1369	11.7	1369	11.7	0.510	1.4	NA	0.5	3.6	0.03	0.00	0.04	58.0
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.090	50.4	LOS D	0.0	0.3	0.96	0.98	0.96	5.2
Approach		3	0.0	3	0.0	0.090	50.4	LOS D	0.0	0.3	0.96	0.98	0.96	5.2
All Vehicles		2938	9.7	2938	9.7	0.733	1.0	NA	37.1	277.6	0.03	0.02	0.03	58.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr PM (Option 2A)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	5.51							
Speed Efficiency	0.60							
Congestion Coefficient	1.68							
Travel Speed (Average)	35.8	km/h			1.6	km/h	36.0	km/h
Travel Distance (Total)	3584.4	veh-km/h			0.4	ped-km/h	4531.2	pers-km/h
Travel Time (Total)	100.2	veh-h/h			0.3	ped-h/h	125.8	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5731	veh/h			12	ped/h	7215	pers/h
Arrival Flows (Total for all Sites)	5731	veh/h			12	ped/h	7215	pers/h
Demand Flows (Entry Total)	3077	veh/h						
Midblock Inflows (Total)	38	veh/h						
Midblock Outflows (Total)	-61	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.5	%						
Degree of Saturation	1.280							
Control Delay (Total)	39.06	veh-h/h			0.17	ped-h/h	48.27	pers-h/h
Control Delay (Average)	24.5	sec			53.3	sec	24.1	sec
Control Delay (Worst Lane)	318.5	sec						
Control Delay (Worst Movement)	318.5	sec			54.2	sec	318.5	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	23.9	sec						
Queue Storage Ratio (Worst Lane)	1.00							
Total Effective Stops	2203	veh/h			11	ped/h	2803	pers/h
Effective Stop Rate	0.38		0.61	per km	0.94		0.39	
Proportion Queued	0.35				0.94		0.35	
Performance Index	374.9				0.3		375.2	
Cost (Total)	3249.12	$/h	0.91	$/km	6.29	$/h	3255.42	$/h
Fuel Consumption (Total)	396.5	L/h	110.6	mL/km				
Fuel Economy	11.1	L/100km						
Carbon Dioxide (Total)	946.4	kg/h	264.0	g/km				
Hydrocarbons (Total)	0.084	kg/h	0.023	g/km				
Carbon Monoxide (Total)	1.000	kg/h	0.279	g/km				
NOx (Total)	2.216	kg/h	0.618	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,750,997	veh/y	5,543	ped/y	3,463,004	pers/y
Delay	18,749	veh-h/y	82	ped-h/y	23,168	pers-h/y
Effective Stops	1,057,426	veh/y	5,227	ped/y	1,345,322	pers/y
Travel Distance	1,720,526	veh-km/y	190	ped-km/y	2,174,991	pers-km/y
Travel Time	48,117	veh-h/y	123	ped-h/y	60,382	pers-h/y
Cost	1,559,579	$/y	3,021	$/y	1,562,601	$/y
Fuel Consumption	190,342	L/y				
Carbon Dioxide	454,278	kg/y				
Hydrocarbons	40	kg/y				
Carbon Monoxide	480	kg/y				
NOx	1,063	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr PM (Option 2A)]

Network: N101 [Future Yr PM (Option 2A)]

HLD / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1210	7.8	1210	7.8	0.944	30.8	LOS C	22.8	170.0	0.66	0.76	0.83	34.4
3	R2	76	1.5	76	1.5	0.173	15.8	LOS B	1.2	8.3	0.47	0.70	0.47	42.0
Approach		1285	7.4	1285	7.4	0.944	29.9	LOS C	22.8	170.0	0.65	0.75	0.81	34.7
East: Haig Ave														
4	L2	158	8.7	158	8.7	0.431	50.7	LOS D	5.0	37.5	0.92	0.80	0.92	22.8
6	R2	247	4.4	247	4.4	1.280	318.5	LOS F	23.7	172.4	1.00	1.63	2.96	9.3
Approach		405	6.1	405	6.1	1.280	214.1	LOS F	23.7	172.4	0.97	1.31	2.16	10.9
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.496	17.2	LOS B	10.8	80.6	0.56	0.51	0.56	48.7
8	T1	1175	7.6	1175	7.6	0.496	11.7	LOS A	11.0	82.0	0.56	0.51	0.56	43.5
Approach		1187	7.7	1187	7.7	0.496	11.8	LOS A	11.0	82.0	0.56	0.51	0.56	43.6
All Vehicles		2877	7.4	2877	7.4	1.280	48.3	LOS D	23.7	172.4	0.66	0.73	0.90	26.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	10	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		12	53.3	LOS E			0.94	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr PM (Option 2A)]

Network: N101 [Future Yr PM (Option 2A)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	14	25.0	14	25.0	0.729	6.0	LOS A	15.0	112.8	0.00	0.01	0.00	43.0
2	T1	1342	8.1	1342	8.1	0.729	0.2	LOS A	15.0	112.8	0.00	0.01	0.00	59.5
Approach		1355	8.3	1355	8.3	0.729	0.3	NA	15.0	112.8	0.00	0.01	0.00	59.2
East: Rabaul Road														
4	L2	127	4.1	127	4.1	0.122	6.7	LOS A	0.2	1.7	0.50	0.64	0.50	48.5
Approach		127	4.1	127	4.1	0.122	6.7	LOS A	0.2	1.7	0.50	0.64	0.50	48.5
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.256	5.5	LOS A	0.0	0.0	0.00	0.00	0.00	57.5
8	T1	1360	7.5	1360	7.5	0.488	0.1	LOS A	0.1	0.6	0.02	0.00	0.03	59.7
9	R2	7	0.0	7	0.0	0.488	17.6	LOS B	0.1	0.6	0.03	0.00	0.04	18.4
Approach		1369	7.5	1369	7.5	0.488	0.2	NA	0.1	0.6	0.02	0.00	0.03	59.4
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.044	27.2	LOS B	0.0	0.2	0.91	0.96	0.91	8.8
Approach		3	0.0	3	0.0	0.044	27.2	LOS B	0.0	0.2	0.91	0.96	0.91	8.8
All Vehicles		2854	7.7	2854	7.7	0.729	0.6	NA	15.0	112.8	0.03	0.03	0.04	58.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK SUMMARY

Network: N101 [Future Yr AM (Option 3)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	5.78							
Speed Efficiency	0.62							
Congestion Coefficient	1.61							
Travel Speed (Average)	37.2	km/h			2.0	km/h	36.2	km/h
Travel Distance (Total)	3664.1	veh-km/h			0.4	ped-km/h	4796.5	pers-km/h
Travel Time (Total)	98.5	veh-h/h			0.2	ped-h/h	132.4	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5946	veh/h			12	ped/h	7692	pers/h
Arrival Flows (Total for all Sites)	5916	veh/h			12	ped/h	7655	pers/h
Demand Flows (Entry Total)	2990	veh/h						
Midblock Inflows (Total)	316	veh/h						
Midblock Outflows (Total)	-64	veh/h						
Percent Heavy Vehicles (Demand)	11.1	%						
Percent Heavy Vehicles (Arrival)	11.2	%						
Degree of Saturation	1.030							
Control Delay (Total)	36.87	veh-h/h			0.11	ped-h/h	51.28	pers-h/h
Control Delay (Average)	22.4	sec			34.2	sec	24.1	sec
Control Delay (Worst Lane)	100.5	sec						
Control Delay (Worst Movement)	178.2	sec			34.2	sec	178.2	sec
Geometric Delay (Average)	0.5	sec						
Stop-Line Delay (Average)	22.0	sec						
Queue Storage Ratio (Worst Lane)	0.74							
Total Effective Stops	2546	veh/h			11	ped/h	3449	pers/h
Effective Stop Rate	0.43		0.69	per km	0.93		0.45	
Proportion Queued	0.61				0.93		0.63	
Performance Index	471.2				0.3		471.4	
Cost (Total)	3799.92	$/h	1.04	$/km	4.78	$/h	3804.71	$/h
Fuel Consumption (Total)	520.0	L/h	141.9	mL/km				
Fuel Economy	14.2	L/100km						
Carbon Dioxide (Total)	1249.5	kg/h	341.0	g/km				
Hydrocarbons (Total)	0.113	kg/h	0.031	g/km				
Carbon Monoxide (Total)	1.280	kg/h	0.349	g/km				
NOx (Total)	4.185	kg/h	1.142	g/km				

Network Model Variability Index (Iterations 3 to N): 0.9 %
Number of Iterations: 6 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.9% 0.7% 0.6%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,854,016	veh/y	5,543	ped/y	3,691,970	pers/y
Delay	17,697	veh-h/y	53	ped-h/y	24,612	pers-h/y
Effective Stops	1,221,990	veh/y	5,129	ped/y	1,655,738	pers/y
Travel Distance	1,758,763	veh-km/y	190	ped-km/y	2,302,299	pers-km/y
Travel Time	47,260	veh-h/y	93	ped-h/y	63,537	pers-h/y
Cost	1,823,963	$/y	2,296	$/y	1,826,259	$/y
Fuel Consumption	249,604	L/y				
Carbon Dioxide	599,783	kg/y				
Hydrocarbons	54	kg/y				
Carbon Monoxide	615	kg/y				
NOx	2,009	kg/y				

MOVEMENT SUMMARY

Site: 2236 [Haig Ave - Future Yr AM (Option 3)]

Network: N101 [Future Yr AM (Option 3)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1355	13.5	1355	13.5	0.583	2.2	LOS A	7.0	54.6	0.33	0.30	0.33	56.9
3	R2	106	4.5	106	4.5	0.309	34.6	LOS C	2.2	16.1	0.90	0.76	0.90	31.7
Approach		1461	12.9	1461	12.9	0.583	4.6	LOS A	7.0	54.6	0.37	0.33	0.37	53.8
East: Haig Ave														
4	L2	110	14.3	110	14.3	0.369	38.3	LOS C	2.4	18.9	0.93	0.78	0.93	26.9
6	R2	153	14.2	153	14.2	1.030	100.5	LOS F	6.3	49.6	1.00	1.29	2.31	22.1
Approach		262	14.2	262	14.2	1.030	74.5	LOS F	6.3	49.6	0.97	1.08	1.73	23.2
North: Henry Lawson Drive														
7	L2	12	9.1	12	9.1	0.998	70.9	LOS F	48.3	372.3	1.00	1.42	1.61	28.5
8	T1	1146	11.7	1146	11.7	0.998	65.3	LOS E	48.3	372.3	1.00	1.42	1.61	19.3
Approach		1158	11.7	1158	11.7	0.998	65.3	LOS E	48.3	372.3	1.00	1.42	1.61	19.4
All Vehicles		2882	12.5	2882	12.5	1.030	35.4	LOS C	48.3	372.3	0.68	0.84	0.99	30.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P3	North Full Crossing	10	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		12	34.2	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr AM (Option 3)]

Network: N101 [Future Yr AM (Option 3)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive (S)														
1	L2	11	0.0	11	0.0	0.951	83.3	LOS F	10.4	77.8	1.00	0.04	2.03	32.8
2	T1	1445	8.0	1445	8.0	0.951	13.0	LOS A	10.4	77.8	1.00	0.04	2.03	39.6
3	R2	47	7.7	47	7.7	0.951	85.8	LOS F	10.4	77.8	1.00	0.04	2.03	43.3
Approach		1503	8.0	1503	8.0	0.951	15.8	NA	10.4	77.8	1.00	0.04	2.03	39.7
East: Rabaul Road (E)														
4	L2	63	9.3	63	9.3	0.479	48.5	LOS D	0.7	5.5	0.95	1.06	1.23	31.2
Approach		63	9.3	63	9.3	0.479	48.5	LOS D	0.7	5.5	0.95	1.06	1.23	31.2
North: Henry Lawson Drive (N)														
7	L2	1	100.0	1	100.0	0.826	168.2	LOS F	1.0	7.4	0.07	0.00	0.09	47.7
8	T1	1491	11.5	1462	11.5	0.826	2.2	LOS A	1.0	7.4	0.07	0.00	0.09	56.4
9	R2	2	50.0	2	50.0	0.826	178.2	LOS F	1.0	7.4	0.07	0.00	0.09	19.2
Approach		1495	11.7	1466 N1	11.7	0.826	2.6	NA	1.0	7.4	0.07	0.00	0.09	56.3
West: Rabaul Road (W)														
10	L2	3	0.0	3	0.0	0.039	40.7	LOS C	0.0	0.3	0.95	0.98	0.95	6.3
Approach		3	0.0	3	0.0	0.039	40.7	LOS C	0.0	0.3	0.95	0.98	0.95	6.3
All Vehicles		3064	9.8	3035 N1	9.9	0.951	10.1	NA	10.4	77.8	0.55	0.04	1.08	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

NETWORK SUMMARY

Network: 1 [Future Yr PM (Option 3)]

New Network
Network Category: (None)

Design Life Analysis (Final Year): Results for 10 years

Network Performance - Hourly Values									
Performance Measure	**Vehicles**		**Per Unit Distance**		**Pedestrians**		**Persons**	
Network Level of Service (LOS)	LOS D							
Travel Time Index	4.82							
Speed Efficiency	0.53							
Congestion Coefficient	1.87							
Travel Speed (Average)	32.0	km/h			1.5	km/h	32.0	km/h
Travel Distance (Total)	3589.6	veh-km/h			0.4	ped-km/h	4546.9	pers-km/h
Travel Time (Total)	112.2	veh-h/h			0.3	ped-h/h	142.0	pers-h/h
Desired Speed	60.0	km/h						
Demand Flows (Total for all Sites)	5735	veh/h			12	ped/h	7228	pers/h
Arrival Flows (Total for all Sites)	5735	veh/h			12	ped/h	7228	pers/h
Demand Flows (Entry Total)	3091	veh/h						
Midblock Inflows (Total)	38	veh/h						
Midblock Outflows (Total)	-61	veh/h						
Percent Heavy Vehicles (Demand)	7.5	%						
Percent Heavy Vehicles (Arrival)	7.5	%						
Degree of Saturation	1.280							
Control Delay (Total)	50.80	veh-h/h			0.17	ped-h/h	64.05	pers-h/h
Control Delay (Average)	31.9	sec			53.3	sec	31.9	sec
Control Delay (Worst Lane)	318.4	sec						
Control Delay (Worst Movement)	318.4	sec			54.2	sec	318.4	sec
Geometric Delay (Average)	0.6	sec						
Stop-Line Delay (Average)	31.3	sec						
Queue Storage Ratio (Worst Lane)	0.92							
Total Effective Stops	2611	veh/h			11	ped/h	3385	pers/h
Effective Stop Rate	0.46		0.73	per km	0.94		0.47	
Proportion Queued	0.42				0.94		0.43	
Performance Index	530.9				0.3		531.2	
Cost (Total)	3758.12	$/h	1.05	$/km	6.29	$/h	3764.41	$/h
Fuel Consumption (Total)	427.8	L/h	119.2	mL/km				
Fuel Economy	11.9	L/100km						
Carbon Dioxide (Total)	1020.6	kg/h	284.3	g/km				
Hydrocarbons (Total)	0.094	kg/h	0.026	g/km				
Carbon Monoxide (Total)	1.069	kg/h	0.298	g/km				
NOx (Total)	2.411	kg/h	0.672	g/km				

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New South Wales.

Network Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total for all Sites)	2,752,603	veh/y	5,543	ped/y	3,469,498	pers/y
Delay	24,386	veh-h/y	82	ped-h/y	30,744	pers-h/y
Effective Stops	1,253,255	veh/y	5,227	ped/y	1,624,575	pers/y
Travel Distance	1,723,022	veh-km/y	190	ped-km/y	2,182,517	pers-km/y
Travel Time	53,835	veh-h/y	123	ped-h/y	68,143	pers-h/y
Cost	1,803,898	$/y	3,019	$/y	1,806,917	$/y
Fuel Consumption	205,360	L/y				
Carbon Dioxide	489,891	kg/y				
Hydrocarbons	45	kg/y				
Carbon Monoxide	513	kg/y				
NOx	1,157	kg/y				

MOVEMENT SUMMARY

Site: 543 [Haig Ave - Future Yr PM (Option 3)]

Network: 1 [Future Yr PM (Option 3)]

Henry Lawson Drive / Haig Avenue
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
2	T1	1210	7.8	1210	7.8	0.530	4.6	LOS A	10.2	75.9	0.37	0.34	0.37	53.9
3	R2	65	1.8	65	1.8	0.240	53.4	LOS D	2.1	14.9	0.92	0.75	0.92	25.5
Approach		1275	7.5	1275	7.5	0.530	7.1	LOS A	10.2	75.9	0.40	0.36	0.40	51.0
East: Haig Ave														
4	L2	158	8.7	158	8.7	0.431	50.7	LOS D	5.0	37.5	0.92	0.80	0.92	22.8
6	R2	247	4.4	247	4.4	1.280	318.4	LOS F	23.7	172.4	1.00	1.57	2.96	9.2
Approach		405	6.1	405	6.1	1.280	214.0	LOS F	23.7	172.4	0.97	1.27	2.16	10.8
North: Henry Lawson Drive														
7	L2	12	18.2	12	18.2	0.992	72.7	LOS F	61.4	458.7	1.00	1.23	1.36	28.0
8	T1	1175	7.6	1175	7.6	0.992	67.0	LOS E	61.4	458.7	1.00	1.23	1.36	18.9
Approach		1187	7.7	1187	7.7	0.992	67.1	LOS E	61.4	458.7	1.00	1.23	1.36	19.0
All Vehicles		2867	7.4	2867	7.4	1.280	61.1	LOS E	61.4	458.7	0.73	0.84	1.04	22.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	10	53.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		12	53.3	LOS E			0.94	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Rabaul Rd - Future Yr PM (Option 3)]

Network: 1 [Future Yr PM (Option 3)]

HenryLawsonDrive_RabaulRoad
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Henry Lawson Drive														
1	L2	14	25.0	14	25.0	0.745	22.0	LOS B	0.4	3.1	0.09	0.01	0.13	42.5
2	T1	1331	8.2	1331	8.2	0.745	0.6	LOS A	0.4	3.1	0.09	0.01	0.13	58.1
3	R2	10	0.0	10	0.0	0.745	31.4	LOS C	0.4	3.1	0.09	0.01	0.13	52.7
Approach		1355	8.3	1355	8.3	0.745	1.0	NA	0.4	3.1	0.09	0.01	0.13	57.8
East: Rabaul Road														
4	L2	141	4.1	141	4.1	0.664	39.6	LOS C	1.3	9.5	0.95	1.18	1.62	33.8
Approach		141	4.1	141	4.1	0.664	39.6	LOS C	1.3	9.5	0.95	1.18	1.62	33.8
North: Henry Lawson Drive														
7	L2	2	0.0	2	0.0	0.743	26.7	LOS B	0.2	1.3	0.05	0.00	0.06	51.0
8	T1	1360	7.5	1360	7.5	0.743	0.3	LOS A	0.2	1.3	0.05	0.00	0.06	59.3
9	R2	7	0.0	7	0.0	0.743	29.0	LOS C	0.2	1.3	0.05	0.00	0.06	18.1
Approach		1369	7.5	1369	7.5	0.743	0.4	NA	0.2	1.3	0.05	0.00	0.06	59.1
West: Rabaul Road														
10	L2	3	0.0	3	0.0	0.023	26.4	LOS B	0.0	0.2	0.91	0.96	0.91	9.0
Approach		3	0.0	3	0.0	0.023	26.4	LOS B	0.0	0.2	0.91	0.96	0.91	9.0
All Vehicles		2868	7.7	2868	7.7	0.745	2.7	NA	1.3	9.5	0.11	0.07	0.17	55.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E

Drainage and Flooding Assessment

Memo

To:	Ana Perez		
CC:	Bhura Megwhar		
From:	Brendan O'Rourke	**Date:**	5/11/2020
Reference:	P.0043031 – Henry Lawson Drive / Rabaul Road –AFC Stage – Drainage memo	**Pages:**	35
File No.:	04-004-P0043031-MEM-CV-000		
Subject:	Drainage Design for the Henry Lawson Drive / Rabaul Road Road intersection.		

1 Background

1.1 Introduction

As part of the Pinch Point program, there are proposed changes to the existing road at the intersection of Henry Lawson Drive and Rabaul Road, Georges Hall. The proposed road works include:

- An additional through lane on Henry Lawson Drive southbound to create two southbound lanes through the Rabaul Road intersection. The new lane generally utilises the existing road shoulder area
- New kerb and gutter along Henry Lawson Drive southbound.
- A new footpath along Henry Lawson Drive southbound between Haig Avenue and Rabaul Road
- A dedicated left turn lane with new kerb and gutter from Beale Street into Henry Lawson Drive
- New kerb and gutter on Henry Lawson Drive southbound just south of Beale Street.

The purpose of this report is to provide background on the design criteria, assumptions, methodologies, design software, standards and parameters adopted for the drainage design and to provide design information for review by various parties including Transport for New South Wales (TfNSW), the Project Verifier, Road Safety Auditor and the wider project team.

1.2 Design objectives

The primary objectives in designing the drainage system are to:

- Capture surface water from road pavements and external catchments and direct it safely and efficiently towards Georges River.
- Ensure the drainage conditions in the proposed situation are not worse than the existing situation
- Retain existing drainage networks where possible
- Minimise infrastructure that requires maintenance

Design inputs

The performance criteria for drainage are outlined in the following engineering standards:

- Austroads Guide to Road Design Part 5 and 6.
- Australian Rainfall and Runoff (ARR 2019).

The drainage design is to be developed based on:

- Henry Lawson Drive and Rabaul Road Detailed Design geometry.
- Topographic feature survey, supplemented with ground survey within the road corridor provided by TfNSW.
- Aerial Laser Survey (ALS) survey
- GIS information provided by City of Canterbury-Bankstown Council.

1.3 Drainage design software

The design and hydraulic analysis of the underground pipe networks was undertaken using DRAINS (version 2020.06). A DRAINS model was established and used to represent the hydrologic/hydraulic characteristics of the pit and pipe drainage systems. It was also used to provide comparison of existing and proposed flow conditions.

1.4 Hydrologic model and parameters

The following standards and parameters were used for the estimation of design flows for the drainage system:

- Design flows are to be estimated using the ILSAX hydrological model within DRAINS
- East South Coast temporal patterns were sourced from the ARR data hub and Intensity Frequency Duration (IFD) depths from Australian Rainfall and Runoff (ARR 2019)/Bureau of Meteorology (Location: 33.9144S 150.9765E) were adopted.
- Standard inlet times of five minutes for paved area and six minutes for grassed area were generally adopted for the time of concentration in road catchments.
- Time of concentration in external urban catchments were calculated using the kinematic wave formula from ARR.
- Tailwater levels were adopted in the DRAINS model to represent the Georges River water level. The tailwater levels were sourced from the NSW Government Manly Hydraulics Laboratory website and the Georges River Flood Study (Bewsher, 2004)
    - 10 year ARI event: Tailwater of Georges River water level during high tide (0.9 m AHD)
    - 100 year ARI event: Tailwater of 20 year ARI flood level in Georges River (5.5 m AHD)

The following guidelines/software have been utilised for the assessment of surface flows:

- Hydraulic analysis of road surface flows has been completed using:
    - DRAINS software
    - Pit inlet capacities calculated using HEC22 procedures, as used in the DRAINS software.
- Pit spacing to control flow widths has been determined based on the road geometry, external catchment flows and inlet capacities of various pit types.
- Inlet pits have been provided at the low points of all sags (plus extra pits at landlocked sags), immediately upstream of where cross-carriageway flows occur and on-grade to comply with flow width requirements.

1.5 Pavement drainage: design criteria

The design approach adopted for this package is to ensure that the drainage conditions in the proposed situations are not worse than existing conditions, and where possible to meet the key design criteria as given in Table 1.

Table 1: Key design criteria

Design element	Design Criteria
General	The design approach adopted is to ensure that the drainage conditions in the proposed situation are not worse than existing conditions.
ARI storm event	Minor: 10 year Average Recurrence Interval (ARI) Major: 100 year ARI
Surface flow-aquaplaning	For the 50 mm per hour rainfall design event: The maximum water depths at any point on the pavement must not be more than 4 mm. The maximum change in the depth of flow across the pavement must not exceed 4 mm over 10 metres.
Drainage pipes	Installation: HS3 Class: in accordance with the Concrete Pipe Association's, "Concrete Pipe Selection and Installation" guide Type: spigot and socket with rubber ring sealed joints Size: 375 mm diameter for longitudinal drainage pipes and 450 mm diameter for transverse drainage pipes within the road reserve.
Minimum grade	1% desirable, 0.5% minimum
Drop through new pits	0.03 m
Blockage design at inlet pits	50 % in sag 20 % on grade
Minimum freeboard at pits	150 mm 10 year ARI (where possible)
Allowable spread of flow in gutters	1.5 m for 10 year ARI design rainfall event where possible; Where the kerbside traffic lane is greater than 3.5 m, then additional width (i.e. actual width of kerbside lane minus 3.5 m) may be added to the allowable spreads cited above. Not worse than existing flow widths
Pedestrian facilities	Maximum spread from the kerb immediately upstream of pedestrian crossing points should be 0.5 m (refer below). Maximum spread into the kerbside lane adjacent to bus stops or at other locations where pedestrians are expected in significant numbers, should be 0.75 m (refer below). The design rainfall intensity to use for pedestrian facilities should be the greater of the one year ARI 5 minute duration, or 50 mm/hr
Cross carriageway flows	Flows across the carriageway such as those occurring at superelevation changes, median breaks, T-intersections of local streets and at the ends of traffic islands to be less than 0.005 m^3/s to reduce the risk of aquaplaning. The rainfall intensity to use for this situation should be the lesser of the one year ARI five minute intensity or 50 mm/h.

1.6 Design development

The following changes have been made to the drainage design since the Concept Design:

- The existing drainage network has been reviewed and updated to remove any discrepancies between it and the available detailed survey data
- The proposed drainage network has been updated to suit the surveyed existing drainage network.
    - A new 450 diameter pipe crossing is proposed at Beale Street between pits C01\02 and EX L18 since the existing 300 mm pipe crossing Henry Lawson Drive is shallow and difficult to connect to. The new 450 mm transverse pipe allows upstream pits C01\06, C01\05, C01\04 and C01\03 to be constructed at a standard depth and achieve satisfactory freeboard during the 10 year ARI event. The bypass flow across Beale Street is reduced to zero in the 10 year ARI event due to the proposed design. The 300 mm existing pipe crossing Henry Lawson Drive from pit C01\02 to pit EX L16 is retained in proposed conditions such that pit C01\02 will have two outlet pipes (the proposed 450 mm pipe across Beale Street and the existing 300 mm pipe across Henry Lawson Drive).
- New grated inlet pit C01\06 has been added adjacent to 220 Henry Lawson Drive to drain the verge area behind the new kerb and gutter.
- Two drainage pits that were proposed on Endeavour Road during Concept Design have been removed from Detailed Design. There are no civil road works occurring in Endeavour Road, and a decision was made by the project team to reduce drainage scope in this location as additional drainage pits have been added in other locations during Detailed Design.
- The proposed drainage network has been updated to suit the Detailed Design road geometry. The Detailed Design road design has been updated from Concept Design to now enforce a one-way crossfall grading west to east at the Henry Lawson Drive and Rabaul Road intersection. This road work involves raising the southbound carriageway of Henry Lawson Drive at the Rabaul Road intersection between CH 270 and CH 350 (MCA01). The introduction of one-way crossfall changes the flow regime through the intersection and has resulted in a number of drainage upgrades to better control flows through the proposed intersection. These updates include;
    - Additional stormwater pits have been proposed on drainage line I01 on Henry Lawson Drive southbound carriageway to control flow widths upstream of the Henry Lawson Drive and Rabaul Road intersection and prevent overland flows from passing through the intersection due to the introduced one-way crossfall.
    - Pit I01\02A is a new inlet pit and will have a new 375 mm outlet pipe stub connecting into the existing 375 mm pipe that crosses Henry Lawson Drive southbound carriageway.
    - Pit A01\02 is proposed at the sag point at the north east corner of the intersection and connects to pit I01\02A via a 375 mm pipe.
    - Additional stormwater pits and pipes have been proposed on Rabaul Road east of the intersection and the drainage network configuration has been refined. The Detailed Design now includes new pits on Rabaul Road westbound and eastbound and a new 600 mm diameter transverse pipe crossing on Rabaul Road. A new outlet pipe from existing pit EX R7 to new pit D01\16 has also been introduced to improve freeboard within the system. The proposed drainage network here assists with the capture of surface flows and prevent cross carriageway flows.
- Pits K01\02, E01\02, J01\03 have been placed at sag points in the verge on the eastern side of Henry Lawson Drive south of Rabaul Road to catch external catchment flows before they drain onto the carriageway
- Additional stormwater pits including two SB pits at the driveway entrance to Coleman Park have been proposed on the drainage line D01 on Henry Lawson Drive southbound carriageway to control flow widths. The diameter of drainage line D01 has also been increased up to 750 mm to convey the additional flows captured at the Rabaul Road intersection.

- The proposed drainage network has been updated to suit detailed utilities survey and potholing information that has become available since Concept Design. This includes;
    - Drainage line D01 has been lowered to pass below the two rising sewer mains on Henry Lawson Drive. The 25 mm minimum clearance to the underside of the proposed 150 mm encasement of the two sewer mains has been coordinated with the ESC Utilities Team.
- The proposed drainage network has been updated to suit information from the Environment team that has become available since Concept Design regarding tree protection zones. In particular, an existing eucalyptus tree (T43) of high landscape significance is located just south of the sewer pump station on Henry Lawson Drive.
    - The existing pipe from pit EX L1 is now proposed to be retained
    - The transverse crossing on Henry Lawson Drive has moved southwards to avoid the tree
- The existing headwall at D01\01 was proposed to be adjusted during the Concept Design to accommodate the new larger diameter outlet pipe. However, discussions with the RMS Constructability team have identified that it will be easier to construct a new precast headwall at this location which will reduce construction time during the Georges River low tide.

2 Flood Assessment

The proposed road works are located adjacent to the Georges River. Flood maps obtained from Bankstown City Council show that the project area is flood affected. Henry Lawson Drive is subject to river flooding during large region-wide storm events and is also subject to stormwater flooding during local catchment storm events.

Henry Lawson Drive between Beale Street to Rabaul Road lies within a low risk river flooding area and Henry Lawson Drive south of Rabaul Road is a high risk river flooding area (refer Figure 2.1). When considering local stormwater flooding, the project extent south of Rabaul Road lies within a medium to high risk stormwater flooding area. (refer Figure 2.2).

Figure 2.1 - Existing conditions river flooding (yellow: low risk, blue: medium risk, pink: high risk)

Figure 2.2 - Existing conditions local catchment stormwater flooding extent (blue: medium risk, pink: high risk)

The proposed road design levels are similar to existing road levels and road crest levels are generally unchanged. No negative impact on flood levels in the vicinity of the project is expected since changes in the proposed road design are minimal when compared to the wider floodplain and the Georges River flows.

The project area south of Rabaul Road is affected by both river and local flood events. Road levels and road crest levels are generally unchanged by the proposed works. However, it should be noted that the road crest levels opposite the driveway entrance to Coleman Park have been raised by up to 80 mm in order to remove an existing sag point and enforce two-way 3% crossfall. Floodwaters can disperse either side of the raised road crest as required and therefore, flood levels are not expected to be affected in the area. The loss in flood storage would be generally compensated by the additional storage provided by the areas of proposed road that are lower than existing.

Henry Lawson Drive north of Rabaul Road is not expected to be affected by river flooding or local stormwater flooding in the 100 year ARI, therefore the proposed road design should not have impact on existing flooding in this area.

The southbound carriageway at the Henry Lawson Drive and Rabaul Road intersection has been raised to enforce one-way crossfall. This area is only affected by river flooding and is at the edge of the 100 year ARI flood extent. Therefore, the raised road levels are not expected to affect the river flood levels in this area. The loss of storage in this area is considered insignificant compared to the overall flooding.

3 Stormwater Management

3.1 Existing drainage conditions

3.1.1 Existing drainage network

The existing drainage network consists of four separate pipe networks that outlet into the Georges River (refer Figure 3.1). These are:

- Beale Street network
- Haig Avenue network
- Henry Lawson Drive and Rabaul Road intersection network
- Henry Lawson Drive south of Rabaul Road network

The existing drainage network is generally undersized for the 10 year ARI. This results in large flow widths and cross-carriageway flows under existing conditions.

Figure 3.1 - Existing drainage network

The existing drainage network was modelled using detailed survey data provided by the Roads and Maritime services, Bankstown City Council stormwater GIS data, site inspections, aerial imagery and ALS contour data.

3.1.1.1 Beale Street network

Detailed survey and ALS information indicates that in the 10 year ARI event, approximately 576 L/s of overland flow drains towards the Henry Lawson Drive and Beale Street intersection from catchments and properties east of the intersection. The existing sag pit EX L15 is located adjacent to property 227 Henry Lawson Drive and captures approximately 95 L/s of incoming flow. However, 126 L/s of flow is not captured by pit EX L15 and bypasses through the Beale Street intersection (refer Figure 3.2). It should be noted that existing 300 mm outlet pipe from EX L15 is very shallow and has only 200 mm cover and therefore has low capacity. In the 10 year ARI event, approximately 576 L/s is captured by the Beale Street drainage network and is conveyed to the Georges River while 421 L/s bypasses and continues northwards along Henry Lawson Drive.

Figure 3.2 – Beale Street network

3.1.1.2 Haig Avenue network

Detailed topographic survey and ALS information indicates that approximately 88 L/s of overland flow in the 10 year ARI event drains from Haig Avenue towards sag pit EX L12 at the intersection of Henry Lawson Drive. The existing network surcharges at the intersection, and a total of 121 L/s bypasses from EX L12 across Haig Avenue.

Approximately 136 L/s of overland flow in the 10 year ARI event drains from Endeavour Road towards sag pit EX L9 at the intersection of Henry Lawson Drive. Approximately 3 L/s of overland flow bypasses the existing pipe network to cross Endeavour Road and continue down Henry Lawson Drive southbound carriageway towards the Henry Lawson Drive and Rabaul Road intersection (refer Figure 3.3).

1190 L/s of flow is captured by the Haig Avenue drainage network in the 10 year ARI event and is discharged to the Georges River.

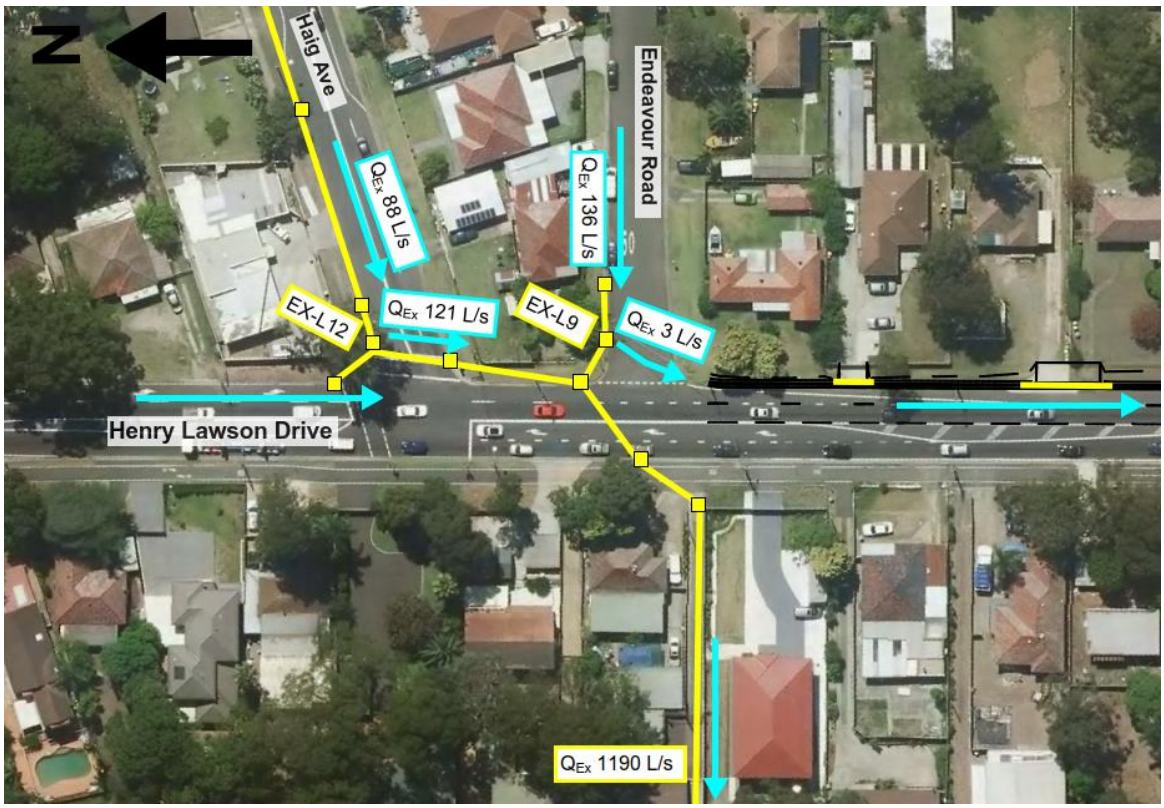

Figure 3.3 – Haig Avenue network

3.1.1.3 Henry Lawson Drive and Rabaul Road intersection network

Detailed topographic survey and ALS information indicates that in the 10 year ARI event, approximately 209 L/s of overland flow drains southwards on Henry Lawson Drive towards the existing sag pit EX L4 located at the Henry Lawson Drive and Rabaul Road intersection. A 375 mm pipe drains the existing sag point and connects into the 375 mm pipe which crosses Henry Lawson Drive. 258 L/s of overland flow drains westwards from Rabaul Road to pit EX L4 Henry Lawson Drive in the 10 year ARI event. 318 L/s of overland flow bypasses sag pit EX L4 and drains across the Henry Lawson Drive and Rabaul Road intersection (refer Figure 3.4). In the 10 year ARI event, approximately 443 L/s is captured by the Henry Lawson Drive and Rabaul Road intersection network and is conveyed to the Georges River while 353 L/s bypasses and continues southwards along Henry Lawson Drive. 31 L/s local road catchment flow drains westwards down Rabaul Road to the Georges River.

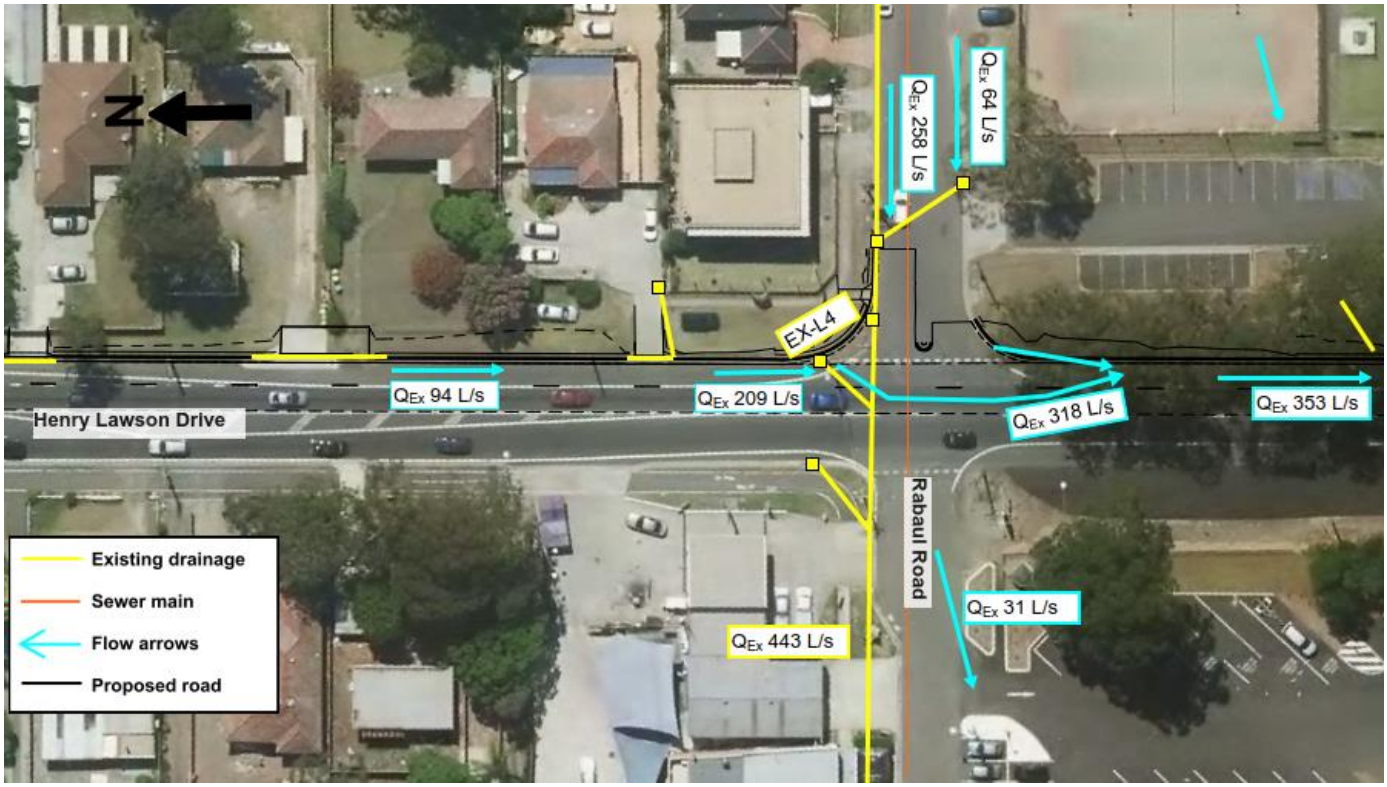

Figure 3.4 -Henry Lawson Drive and Rabaul Road intersection network

3.1.1.4 Henry Lawson Drive south of Rabaul Road network

Large external catchments south of Rabaul Road (the Coleman Park tennis courts and oval) drain onto Henry Lawson Drive from the east. A site visit undertaken on 05/05/20 identified drainage pits and pipes from the tennis courts in Coleman Park. The drainage pipes appear to be 150 mm diameter. The pipe alignments, connectivity and existence of a transverse drainage crossing at Henry Lawson Drive could not be confirmed through site visit or survey, and so this section of the drainage network was not included in the modelling.

Approximately 602 L/s of overland flow drains down Henry Lawson Drive south of the sewer pump station. Flows partially overtop the Henry Lawson Drive carriageway and enter the Georges River, whilst a portion of flow continues south towards the existing stormwater channel and transverse box culverts (refer Figure 3.5).

A surveyed existing drainage pit EX L1 and 450 mm drainage pipe outlets into the Georges River via an existing headwall structure. The surveyed downstream invert of the pipe is 0.38 m AHD. Site inspection could not locate the existing pit EX L1 due to tree growth and debris. It is not believed that there is any existing upstream drainage network connecting into this outlet pipe. However, CCTV indicates that this pipe may receive a direct connection from the adjacent sewer pump station. It should be noted that the 6 L/s calculated in the hydraulic model does not include potential inflows from the pump station. The existing headwall appears oversized for the 450 mm pipe. It is approximately 1.5 m high which is likely in order to retain the existing landform behind it. Rock rip rap and scour protection is located in front of the headwall apron which may suggest existing flows are larger than 6 L/s.

As detailed in the *Arboricultural Impact Report – Henry Lawson Drive Upgrade* (Landscape Matrix Pty Ltd, 13th Aug 2020), an existing eucalyptus tree (T43) of high landscape significance is located just south of the sewer pump station (refer Figure 3.5). The existing pipe from pit EX L1 to the headwall passes under this tree.

The existing headwall and scour protection appear to be in good condition (refer Figure 3.6). The site visit on 05/05/20 allowed inspection of the existing scour protection at the headwall. The dimensions were estimated as the following:

- Rock apron length = 1.5 m
- Rock protection median diameter (d50) = 400 mm
- Concrete apron length = 1.5 m

Figure 3.5 – Henry Lawson Drive south of Rabaul Road network

Figure 3.6 - Existing headwall and scour protection

3.1.2 Georges River water levels

Water levels in the Georges River determine the tailwater level for the drainage network. Water level data for the Georges River was sourced from NSW Government Manly Hydraulics Laboratory website. The nearest Georges River station with available data was at Lansvale. Lansvale river station is located approximately 2.5 km upstream of Rabaul Road. When the Georges River is in base flow, the water level during high tide is approximately 0.9 m AHD and the water level during low tide is approximately -0.45 m AHD (refer Figure 3.7).

This high tide level matches high water marks observed on-site at the existing headwall near the sewer pump station (refer Figure 3.8)

Tailwater levels were adopted accordingly in the DRAINS model to represent the Georges River water level. The tailwater levels were sourced from the NSW Government Manly Hydraulics Laboratory website and the Georges River Flood Study (Bewsher, 2004)

- 10 year ARI event: Tailwater of Georges River water level during high tide (0.9 m AHD)
- 100 year ARI event: Tailwater of 20 year ARI flood level in Georges River (5.5 m AHD)

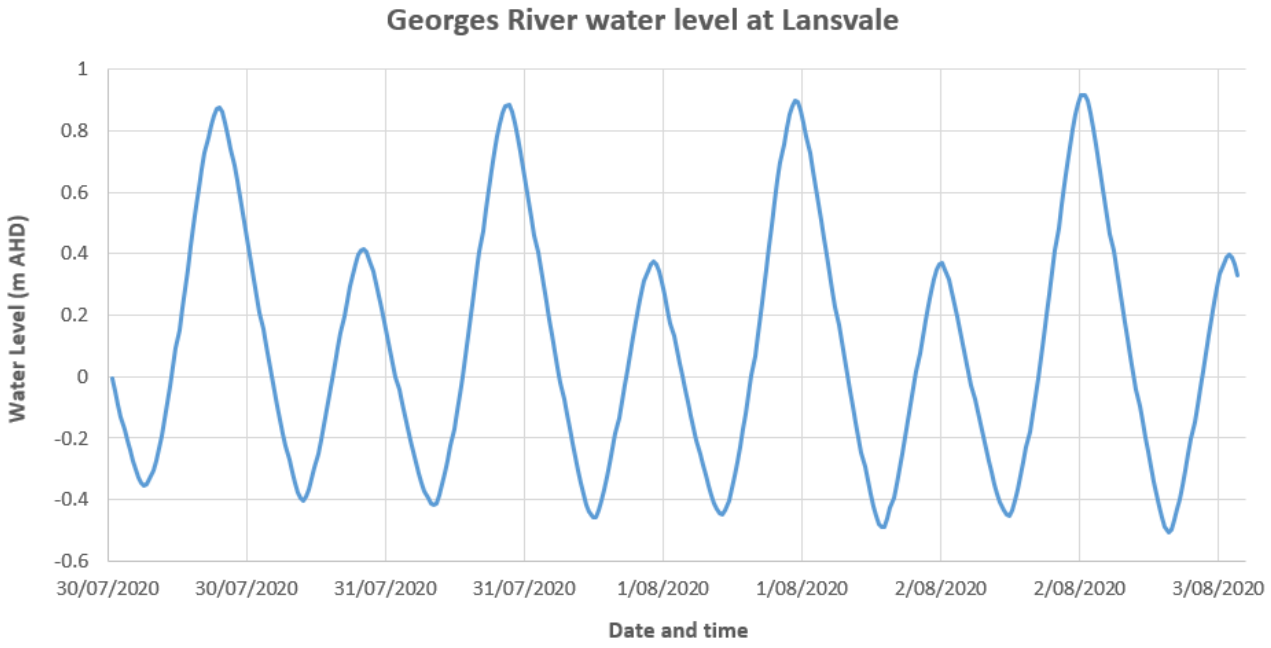

Figure 3.7 - Lansvale river station data 3/8/2020

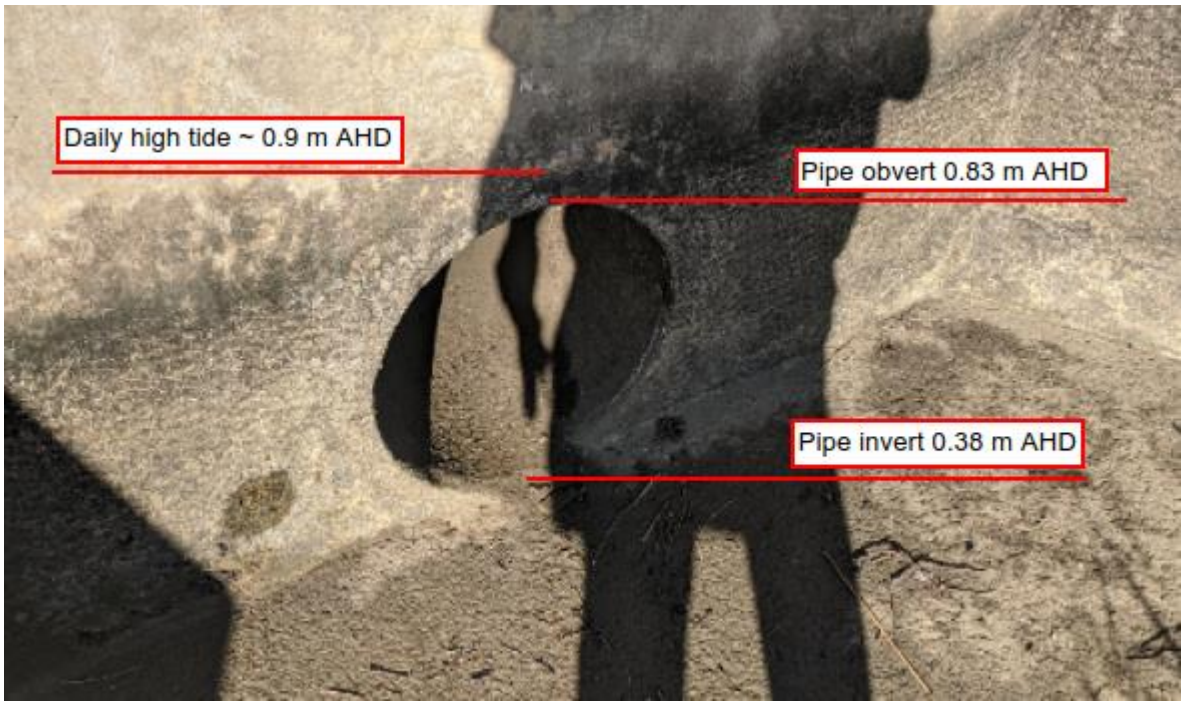

Figure 3.8 - High tide marks at existing headwall near pump station

3.2 Proposed Design

The proposed drainage network (refer to SM drawings) achieves the design criteria of the proposed situation not being worse than existing conditions. New drainage pits and pipes have been proposed to limit flow widths and bypass flows to allowable RMS design criteria.

3.2.1 Beale Street proposed network

The additional lane on Beale Street and the associated new kerb and gutter nominally increase impervious area at the intersection. New pits C01\05, C01\04, C01\03 and C01\02 and a 375 mm pipe are proposed on Henry Lawson Drive southbound to control existing large flow widths and bring flow widths to within RMS design criteria. A new 450 diameter transverse pipe between sag pit C01\02 and EX L18 proposed to provide improved upstream capture capacity. In AFC design stage, the existing 300 mm diameter pipe which crosses Henry Lawson Drive was proposed to be retained. This creates two outlet pipes for pit C01\02 (the existing 300 mm pipe and the proposed 450 mm pipe across Beale Street). The bypass flow from sag pit C01\02 in the 10 year ARI event across the Beale Street intersection is reduced from 126 L/s under existing conditions to 0 L/s under proposed conditions (refer Figure 3.9).

New grated pit C01\06 is proposed within the verge area to capture overland flows from the adjacent properties. The proposed road design introduces a new raised kerb and gutter that provides a minor obstruction to overland flows approaching Henry Lawson Drive. Minor ponding occurs behind the newly introduced raised kerb and gutter, and pit C01\06 therefore minimises this issue and any minor ponding that might occur at C01\06 will overflow into the Henry Lawson Drive carriageway and not impact adjacent properties. It should be noted that the adjacent properties (outside the area of project works) are sitting slightly lower than the existing road level at some locations in existing conditions, and that minor ponding also occurs in existing conditions.

Approximately 652 L/s is captured by the Beale Street drainage network under proposed conditions during the 10 year ARI event and is conveyed to the Georges River compared to 576 L/s under existing conditions. Approximately 337 L/s bypasses and continues northwards along Henry Lawson Drive in the 10 year ARI event which is a reduction when compared to the 421 L/s in existing conditions. The proposed drainage and road design reduces 10 year ARI flow widths along Henry Lawson Drive to within RMS design criteria.

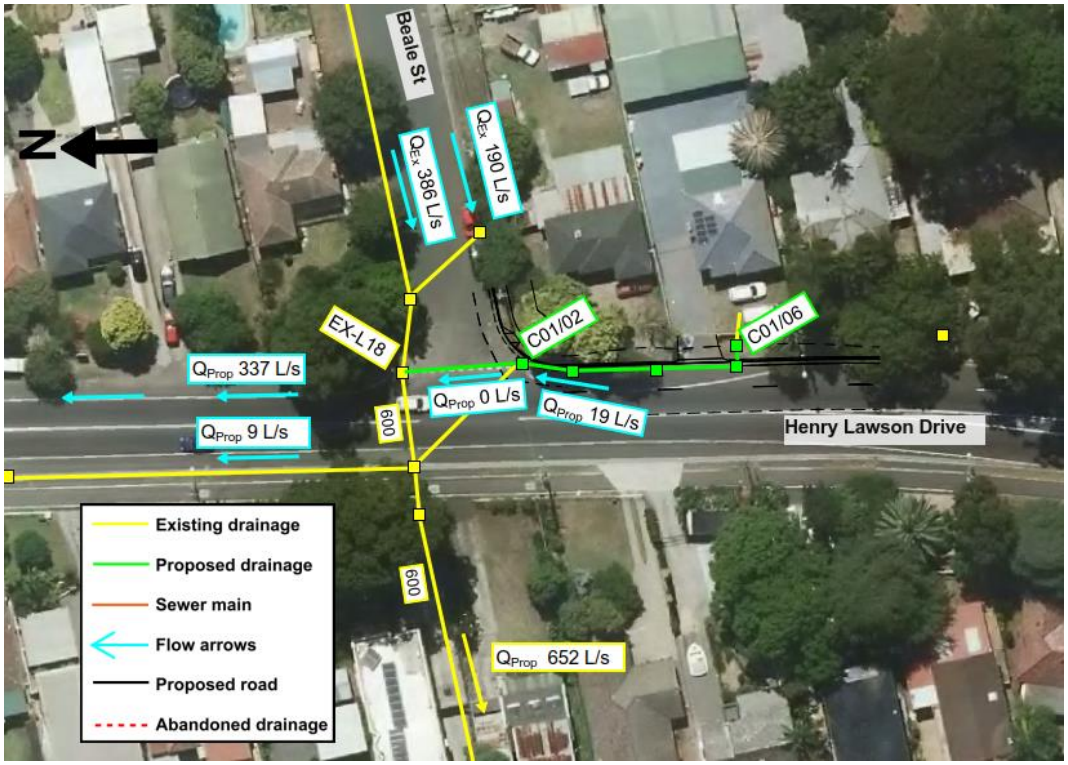

Figure 3.9 - Beale Street Network proposed network

3.2.2 Haig Avenue network

The new footpath between Haig Avenue and Endeavour Road does not change overland flow behaviour or direction in this area. The increase in imperviousness area here is considered minor. Runoff or discharge to the Georges River in the 10 year ARI event is not increased when measured to the nearest 1 L/s. Therefore, new pits and pipes have not been proposed on Henry Lawson Drive between Haig Avenue and Endeavour Road. Proposed drainage conditions are unchanged from the existing conditions shown in Figure 3.3.

3.2.3 Henry Lawson Drive and Rabaul Road intersection proposed network

The proposed road design includes a new one-way crossfall through the Rabaul Road intersection. This crossfall improves existing road geometry. However, the one-way crossfall now redirects approaching flows that are not captured by the upstream drainage network to pass through Henry Lawson Drive and Rabaul Road intersection across the HLD northbound carriageway instead of continuing within the southbound carriageway of Henry Lawson Drive southbound as was the case under existing conditions. Therefore, the proposed drainage at the Henry Lawson Drive and Rabaul Road intersection is designed to capture all incoming flow and to ensure proposed conditions are not worse than existing conditions.

New pits and new 375 mm pipe (line I01) are proposed on the Henry Lawson Drive southbound carriageway between Endeavour Road and Rabaul Road to control flow-widths to within RMS design criteria and to prevent new cross-carriageway flow passing through the Rabaul Road intersection due to the proposed one way crossfall. The proposed outlet pipe of the new SA2 pit I01\02A is a pipe stub which connects into a shallow 375 mm existing pipe (P I0\02B) that crosses Henry Lawson Drive.

New pits and pipes are proposed on Rabaul Road east of the intersection to capture the surface flows within the local road network before they approach Henry Lawson Drive. Pits B01\02, B01\03 and B01\04 are proposed on Rabaul Road eastbound. A new 600 mm transverse stormwater pipe connects pits B01\02 and D01\18. A new pit A01\02 is proposed at the new sag location. Pit A01\02 is located at the north-east corner of the intersection. Instead of haunching pit A01\02 onto the existing 450 mm pipe, pit A01\02 is a standard

SA1 pit with a 375 mm outlet pipe that connects to pit I01\02A. This is in response to comments from Engineering Services aimed to increase the ease of construction.

Under proposed conditions, approximately 290 L/s is discharged to the Georges River from the Rabaul Road drainage line in the 10 year ARI event. This is a reduction when compared to the 443 L/s discharged under existing conditions. There is less than 10 L/s bypass flow that drains through the intersection under proposed conditions compared to 318 L/s under existing conditions. A total flow of 502 L/s continues down Henry Lawson Drive southbound in the drainage network and overland which is an increase when compared to the 353 L/s under existing conditions. An overland flow of 42 L/s from the local road catchment drains westwards down Rabaul Road to the Georges River which is a slight increase when compared to the 31 L/s under existing conditions. This is due to the proposed one way crossfall which re-directs an area of road catchment (refer Figure 3.10) that is unable to be caught by drainage on the southbound side of Henry Lawson Drive. Flow widths at the Henry Lawson Drive and Rabaul Road intersection are brought down to within RMS design criteria

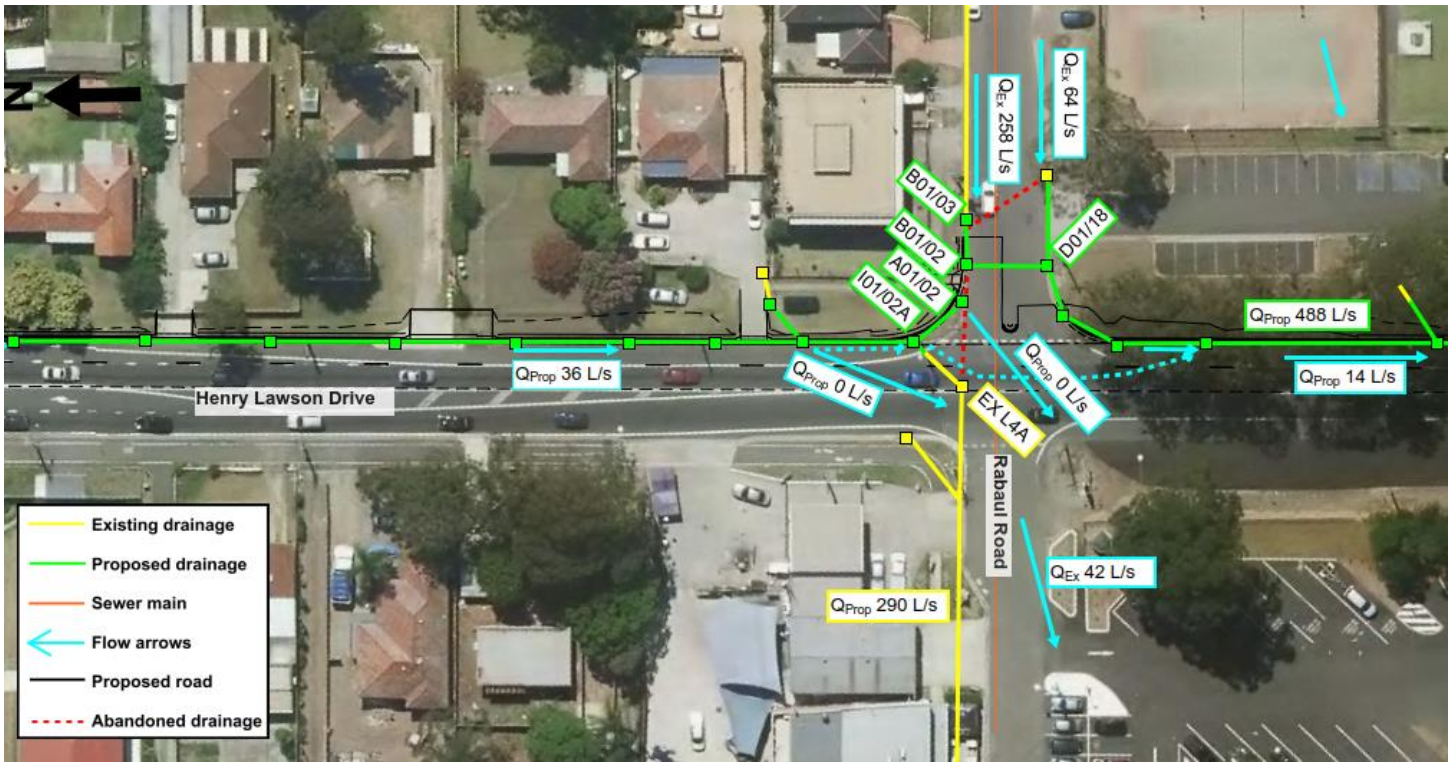

Figure 3.10 - Henry Lawson Drive and Rabaul Road intersection proposed network

3.2.4 Henry Lawson Drive south of Rabaul Road proposed network

New drainage lines (D01 and J01) are proposed along Henry Lawson Drive southbound to capture stormwater flows and control flow widths (refer Figure 3.11). Drainage pit D01\17 is an SA1 pit for ease of construction since it is located on the south-east corner of the intersection. The new drainage pits reduce flow widths when compared to existing conditions (refer to Table 2) such that the majority of flow widths are within RMS design criteria. The exceptions to this is at pit D01\11 where large external catchments drain onto the road in the vicinity of the driveway entrance to Coleman Park. However, flow widths at all locations are reduced when compared to existing conditions.

An SB drain and SB pits D01\11 and D01\10 have been incorporated into the design during the AFC stage at the interface between Henry Lawson Drive and the Coleman Park carpark driveway. The SB drain and pits have been proposed to control and capture external catchment flows before they drain onto the Henry Lawson Drive carriageway. Pit K01\02 has also been proposed during AFC stage within the verge area in an effort to further capture external catchment flows draining towards Henry Lawson Drive.

The two new pits (E01\02 and J01\03) proposed in the verge on Henry Lawson Drive southbound carriageway, behind the newly introduced raised kerb and gutter, are required to drain trapped sag points so that 10 year ARI ponding levels are not increased by the new raised kerb. At some locations where the newly introduced raised kerb and gutter is higher than the verge, external flows will run southwards behind the kerb before being able to drain into the pit E01\02 or J01\03. The back of kerb and verge area is to be protected using an Enkamat lining to reduce erosion. The construction team was consulted 12/10/2020 and recommended a width of Enkamat lining of up to 2 m from the back of kerb since the existing vegetation in this area will be removed or trampled during construction. The Enkamat lining will be installed to avoid disturbing any retained existing trees.

The new drainage line D01 receives flow from the drainage network at the Rabaul Road intersection as well as the large external catchments to the east of Henry Lawson Drive. Drainage line D01 consists of 600 mm to 750 mm diameter pipes. The drainage line passes under two rising sewer mains achieving 25 mm clearance from the top of stormwater pipe to the bottom of the proposed encasement of the sewer mains. The utilities team were consulted on 18/09/20 and advised that this clearance would be acceptable to Sydney Water and is constructible.

A new 750 mm transverse drainage crossing is proposed at Henry Lawson Drive between pits D01\04 and D01\03. A grated pit D01\02 is proposed in the parkland area west of Henry Lawson Drive. Inlet pipes to pit D01\02 are the existing 450 mm pipe from EX L1 and the proposed 750 mm drainage pipe from D01\03. A new 750 mm outlet pipe is proposed from pit D01\02 to outlet to Georges River at D01\01 with downstream invert matching existing (0.38 m AHD). Marine grade pipes are proposed in drainage line D01 for the pipes that have an invert less than the Georges River high tide level (approx. 0.9 m AHD) to improve durability. The existing headwall at D01\01 is to be replaced by a new pre-cast headwall and a one-way flap flood gate is also proposed in order to minimise the impact of tide and river levels on the stormwater network, improve pipe durability and reduce siltation and associated maintenance.

The new drainage line and associated civil and utility works were endorsed at the SID and Constructability Workshop held 10/07/20 and Engineering Services meeting held 06/08/20.

The alignment of the proposed 750 mm drainage pipe (which crosses Henry Lawson Drive and outlets at the existing headwall location) was adjusted in AFC stage. This was required in order to avoid an existing eucalyptus tree (T43) of high landscape significance that was identified in *the Arboricultural Impact Report – Henry Lawson Drive Upgrade* (Landscape Matrix Pty Ltd, 13th Aug 2020). The report defines the Tree Protection Zone (TPZ) for T43 as a circle with radius 8.9 m and centre at the tree. The trench for the new pipe alignment encroaches less than 10% into the TPZ which is defined as acceptable within the report.

Figure 3.11 - Henry Lawson Drive south of Rabaul Road proposed network

3.2.4.1 Installation of new pre-cast headwall

Installation of a new pre-cast headwall was determined to be a better option than modifying the existing headwall. The bottom of the new headwall will be at approximately -0.12 m AHD. When the Georges River is in base flow, the water level during high tide is approximately 0.9 m AHD and the water level during low tide is approximately -0.45 m AHD (refer Figure 3.7). From the water level data for the Georges River (refer Figure 3.7), this gives approximately a 4 - 5 hour window during low tide to install the new precast headwall. The construction team advised on the 29/7/20 that the new headwall would be able to be installed within eight hours or less and probably within the low tide window. However, it is also possible to stage construction over two low-tide windows since there is no risk to the pre-set concrete in the new headwall being damaged by tidal waters.

Modifying the existing headwall would take more time and require protecting the works area from tidal waters. Modifying and re-setting concrete within the existing headwall is considered to be more time-consuming and creates a risk of reduced structural integrity, particularly if tidal waters infiltrate the headwall.

3.2.4.2 Scour protection at new pre-cast headwall

Outflow velocities of the new 750 mm pipe at the new pre-cast headwall are approximately 3 m/s in the 100 year ARI event. According to Austroads Guide to Road Design Part 5B, the following dimensions would provide adequate scour protection:

- Rock apron length = 0.75 m
- Rock protection d50 = 280 mm
- Concrete apron length = 1.5 m

It is therefore acceptable to retain the existing scour protection which refer is estimated as having the dimensions below (refer Figure 3.6):

- Rock apron length = 1.5 m
- Rock protection d50 = 400 mm
- Concrete apron length = 1.5 m

3.2.4.3 Henry Lawson Drive south of Rabaul Road drainage optioneering

The Design Team also investigated alternative design options including:

1. Constructing two new drainage crossings and a new outlet to the Georges River such that there is no stormwater and sewer mains crossing. One new drainage crossing would be just upstream of the sewer main and would continue westwards to connect into a new proposed drainage line through the parkland west of Henry Lawson Drive and outlet at a new headwall into the Georges River. The second drainage crossing would be at the same location as shown in Figure 3.11, just south of the pump station, and outlet at the existing headwall. This option was deemed undesirable for the following reasons:
    - Two transverse drainage crossings involve more construction time and cost
    - A new drainage line through the parkland and a new headwall would require additional environmental approvals
    - Increasing the number of outlets to the Georges River and construction locations would be an undesirable environmental outcome and may involve additional clearing of vegetation
    - Indigenous Heritage land is located in the parkland area and would require additional approvals

2. Crossing above the sewer mains on Henry Lawson Drive southbound was not feasible because:
    - There is only 900 mm cover to the sewer mains and a drainage line would not achieve acceptable cover and clearance.
    - Lowering both sewer mains would be very costly, require a long construction time, have a high interface risk and require approvals from Sydney Water.

3. Crossing above the sewer mains on Henry Lawson Drive northbound was not feasible because:
    - There is only 1 m cover to the sewer mains and a drainage line would not achieve acceptable cover and clearance
    - Lowering both sewer mains would be very costly, require a long construction time, have a high interface risk and require approvals from Sydney Water.
    - This option would also require two drainage crossings and require more construction time and cost

4. Constructing a swale in the Henry Lawson Drive southbound verge between Rabaul Road and the golf course 2 x RCBC culvert crossing such that a Henry Lawson Drive drainage line on the southbound kerb and drainage crossing would not be required. However, this option was determined to not be feasible due to the following:
    - The area is very flat and maintaining a 0.5% grade for the swale requires 1.25 m of depth and 5 – 10 m of width at its downstream end where it connects to the stormwater channel from the golf course. This would not fit in the verge area
    - A significant number of trees would require removal for the construction of the swale.
    - Upgrade to the existing 2 RCBC transverse crossing would be required
    - Bank stabilisation and significant erosion protection works would be required

A number of discussions were held with the utilities team (04/06/20 and 23/06/20) and Design Management Team (15/04/20, 27/05/20, 09/06/20) where the options were presented and considered. Options 1, 2, 3 and the proposed design option were first presented to the design management team on 16/04/20. Options 1 and 2 were ruled out. Option 3, option 4 and the proposed design option was considered and presented to the design management team on 09/06/20. Option 3 and option 4 were determined to not be feasible for the reasons stated above and the proposed design was approved

3.3 Analysis

3.3.1 Flow widths

Flow widths have been estimated for both the existing and proposed conditions and are summarised in Table 2.

Table 2: Flow widths - 10 year ARI

Pit/Location	Existing (m)	Proposed (m)	Comment
Henry Lawson Drive southbound at Beale Street (C01\02)	2.24	1.25	
Beale Street westbound at Henry Lawson Drive (C01\02)	3.75	3.20	Flow width in proposed conditions is greater than design criteria (1.5 m) but less than existing conditions. The flow width is reduced by the change in road cross fall and the introduction of kerb and gutter. Also, bypass flow from EX L20 is reduced. The flow width at this pit cannot be further reduced due to the presence of utilities (sewer) upstream on Beale Street
Henry Lawson Drive southbound south of Beale Street (C01\04)	4.33	3.16	Flow width in proposed conditions is meets design criteria of shoulder width + 1 m due to the 3 m wide shoulder this location. Flow width is reduced from existing conditions
Henry Lawson Drive southbound, at Endeavour Road (I01\09)	1.79	1.79	Flow width in proposed conditions is greater than design criteria (1.5 m) but matches existing conditions. Flow width at this pit cannot be further reduced due to bypass flow from existing pit EX L9
Henry Lawson Drive southbound, south of Endeavour Road (I01\06)	3.39	1.30	
Henry Lawson Drive southbound at Rabaul Road (I01\02A)	1.15	0.34	
Rabaul Road eastbound at Henry Lawson Drive (A01\02)	2.97	1.00	
Rabaul Road eastbound (B01\02)	3.42	1.73	Flow width in proposed conditions is greater than design criteria (1.5 m) but less than existing conditions Flow width at this pit cannot be further reduced without constructing more pits and pipe on Rabaul Road east outside of the project extent
Henry Lawson Drive southbound, south of Rabaul Road (D01\15)	4.55	0.4	
Henry Lawson Drive southbound, driveway entrance to Coleman Park (D01\11)	6.6*	2.15	Flow width in proposed conditions is greater than design criteria (1.5 m) but less than existing conditions Flow widths at these pits are due to large external catchments spilling onto the road at this location. Flow widths at this location cannot be further reduced without constructing drainage in Coleman Park in Aboriginal heritage or Crown land

Henry Lawson Drive southbound, south of Rabaul Road (D01\10)	6.6*	1.05	
Henry Lawson Drive southbound, south of Rabaul Road (D01\09)	6.6*	0.92	
Henry Lawson Drive southbound, south of Rabaul Road (D01\04)	4.5	1.16	

Note: flow widths are reported just upstream of the named pit.

* Flow width covers SB carriageway of width 6.6 m and also extends into verge

A comparison of the flow widths at pedestrian crossings are shown in Table 3 for existing and proposed conditions.

Table 3: Flow widths at pedestrian crossings - 1 year ARI

Pit/Location	Existing (m)	Proposed (m)	Comment
Beale Street westbound at Henry Lawson Drive (C01\02)	2.09[1]	1.82[1]	Flow width in proposed conditions is greater than design criteria (0.5 m) but less than existing conditions. The flow width at this pit cannot be further reduced due to the presence of utilities (sewer) upstream on Beale Street
Endeavour Road eastbound at Henry Lawson Drive (EX L9)	0.24[1]	0.24[1]	
Endeavour Road westbound at Henry Lawson Drive (I01\09)	1.24[1]	1.24[1]	Flow width in proposed conditions is greater than design criteria (0.5 m) but matches existing conditions. There is no new kerb and gutter or widening on Endeavour Road so new pits are not proposed upstream of the pedestrian crossing to reduce flow widths.
Rabaul Road eastbound at Henry Lawson Drive (A01\02)	1.38[1]	0.35[1]	
Rabaul Road westbound at Henry Lawson Drive (D01\18)	0.29[2]	0[2]	

[1] flow width reported at the pedestrian crossing just upstream of the named pit

[2] flow width reported at the pedestrian crossing just downstream of the named pit

3.3.2 Bypass Flows

Bypass flows have been assessed and were found to have reduced at all locations within the project boundary.

The proposed drainage design generally satisfies the key design criteria whereby the proposed situation is to be no worse than existing conditions. Table 4 shows the 10 year ARI bypass flows at key locations

Table 4: Bypass flows - 10 year ARI

Bypass flow route from pit	Existing (m^3/s)	Proposed (m^3/s)	Comment
Henry Lawson Drive southbound at Beale Street (EX L18)	0.421	0.337	Bypass flows are similar in proposed and existing conditions. Bypass flows from this pit cannot be further reduced without upgrading the existing Henry Lawson Drive transverse crossing.
Beale Street at Henry Lawson Drive (C01\02)	0.126	0	Bypass flow in proposed conditions is 0 L/smeets RMS design criteria (10 L/s) and is less than existing conditions.
Henry Lawson Drive southbound north of Rabaul Road (I01\02)	0.209	0	Bypass flow from I01\02 is 0 L/s and reduces cross carriageway flow on Henry Lawson Drive to meet RMS design criteria (< 10 L/s)
Henry Lawson Drive southbound at Rabaul Road (I01\02A)	0.318	0	Bypass flow from I01\02A is 0 L/s and reduces cross carriageway flow on Henry Lawson Drive to meet RMS design criteria (< 10 L/s)
Rabaul Road eastbound at Henry Lawson Drive (A01\02)	0.177	0	Bypass flow from A01\02 is 0 L/s and reduces cross carriageway flow on Henry Lawson Drive to meet RMS design criteria (< 10 L/s)
Rabaul Road eastbound east of Henry Lawson Drive (B01\03)	0.223	0.72	Bypass flows from this pit cannot be further reduced without constructing more pits and pipe upstream and east of B01\03 on Rabaul Road, outside of the project extent

Note: bypass flows are reported just downstream of the named pit.

3.4 Ponding extents

3.4.1 Henry Lawson Drive and Beale Street

The 10 year ARI ponding depth and extent at the sag at Beale Street is reduced in proposed conditions when compared to existing conditions. The drainage upgrade works at the intersection have reduced the flow that passes through the Beale Street intersection (refer Figure 3.12).

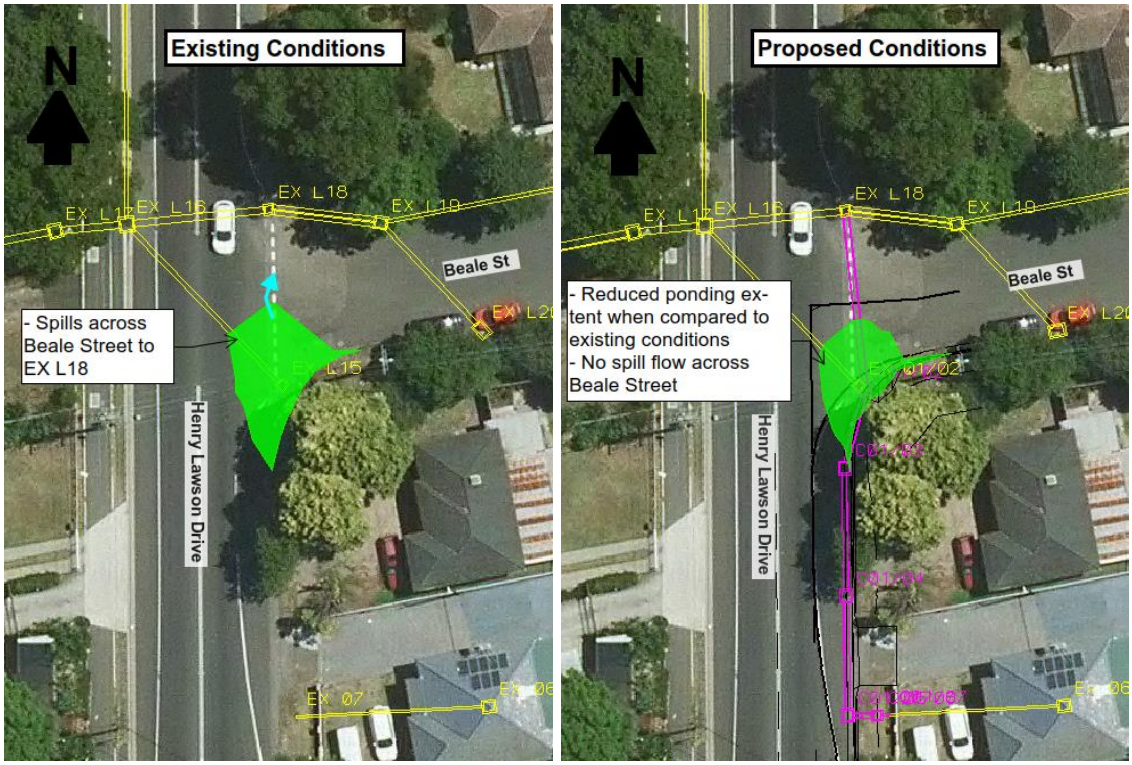

Figure 3.12 - 10 year ARI ponding extents at Beale Street

3.4.2 Henry Lawson Drive and Rabaul Road

The sag location at the north east corner of the Henry Lawson Drive and Rabaul Road intersection ponds until it spills across Rabaul Road under existing conditions.

The road geometry is modified in proposed conditions such that one-way crossfall is introduced through the Henry Lawson Drive and Rabaul Road intersection. The ponding extent is therefore reduced to only the storage that is contained within the SA gutter (refer Figure 3.13). The drainage upgrade works in this vicinity reduce flow through intersection in proposed conditions to less than 10 L/s.

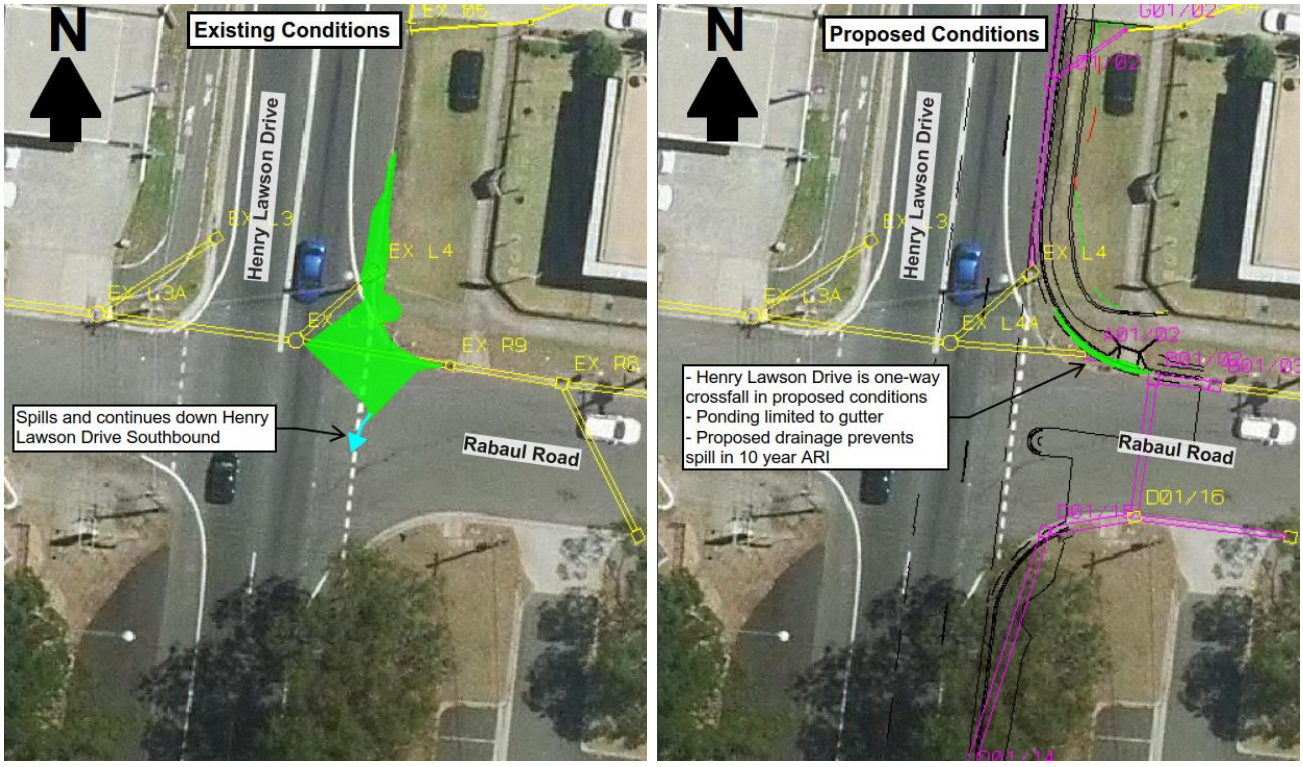

Figure 3.13 - 10 year ARI ponding extents at Rabaul Road

3.5 Aquaplaning

An aquaplaning analysis has been undertaken within the road reserve for the 50 mm per hour rainfall event as summarised in Table 5. Seven flow paths were assessed (refer Figure 3.14 and Figure 3.15). The depth of flow across the pavement for the flow paths ranged from 0.59 mm to 3.91 mm which meets the design criteria of 4 mm (refer Table 1).

Figure 3.14 - Aquaplaning flow paths near Beale Street intersection

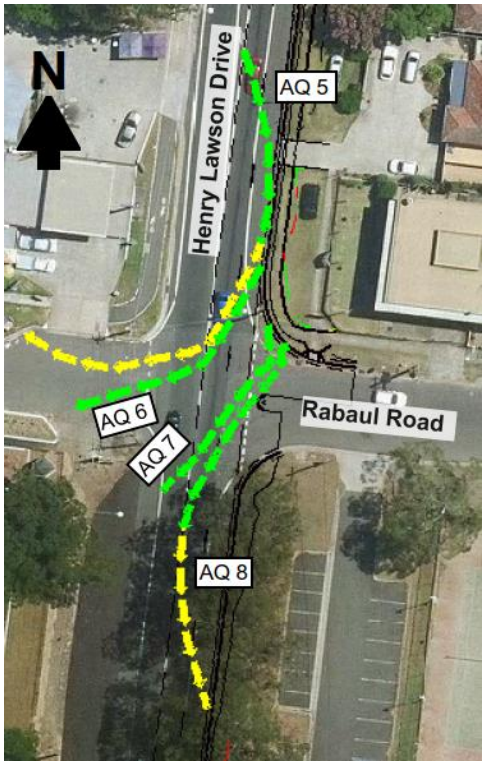

Figure 3.15 - Aquaplaning flowpaths at Rabaul Road intersection

Table 5: Aquaplaning Risk

Line No	Station (MC)	Location	Texture Depth	Length	u/s RL	d/s RL	Elevation Change	Slope	Intensity	Flow Depth	Check if	Check if < 4 mm	Comments
			TXD	L	Y1	Y2	Y	S	I	d	> 4mm		
			mm	m	m	m	m	%	mm/hr	mm			
AQ 1	35 (MCA01)	Henry Lawson Drive near Beale Street	0.5	21.97	9.723	9.411	0.312	1.42	50	2.63	OK	OK	
AQ 2	55 (MCA01)	Henry Lawson Drive near Beale Street	0.5	19.56	9.951	9.553	0.398	2.03	50	2.06	OK	OK	
AQ 3	77 (MCA01)	Henry Lawson Drive near Haig Ave	0.5	30.37	9.993	9.569	0.424	1.40	50	3.12	OK	OK	
AQ 4	78 (MCA01)	Henry Lawson Drive near Haig Ave	0.5	36.98	9.973	9.54	0.433	1.17	50	3.74	OK	OK	
AQ 5	265 (MCA01)	Henry Lawson Drive and Rabaul Road	0.5	66.09	6.731	4.92	1.811	2.74	50	3.31	OK	OK	
AQ 6	295 (MCA01)	Henry Lawson Drive and Rabaul Road	0.5	32.49	6.133	5.082	1.051	3.23	50	2.12	OK	OK	
AQ 7	300 (MCA01)	Henry Lawson Drive and Rabaul Road	0.5	26.90	5.998	5.358	0.64	2.38	50	2.25	OK	OK	
AQ 8	10 (MCA02)	Henry Lawson Drive and Rabaul Road	0.5	51.92	6.052	4.726	1.326	2.55	50	3.04	OK	OK	

4 Departure from Standards

Table 6: Key design criteria

Item	Detail of Departure	Reason for Departure	Proposed action	Status
1	Flow width approaching pit C01\02 at the south east corner of the Henry Lawson Drive and Beale Street intersection Design criteria: Flow widths are to be less than 1.5 m in the 10 year ARI event. Flow widths at pedestrian crossings are to be less than 0.5 m in the 1 year ARI event	10 year ARI flow width in proposed conditions is 3.2 m which is greater than the design criteria of 1.5 m but less than existing conditions of 3.75 m. 1 year ARI flow width at the proposed pram ramp is 1.82 m in proposed conditions which is greater than the design criteria of 0.5 m but less than existing conditions of 2.09 m. The flow width at this pit cannot be further reduced due to the presence of utilities (sewer) upstream on Beale Street preventing provision of additional upstream pits On 6 August Engineering Services (ES) suggested investigating retaining the existing 300 mm pipe across Henry Lawson Drive. This pipe has now been retained in AFC stage. This creates two outlet pipes for pit C01\02 (the existing 300 mm and the proposed 450 mm across Beale Street) and improves conditions at the intersection by reducing cross carriageway bypass flow from pit C01\02 to EX L18 to zero. However, the flow width approaching C01\02 is still unchanged as it is controlled by external flows approaching from Beale Street. The SB drain suggested by ES on 6 August was investigated and the RD team advised that would involve amending Beale Street road geometry and significant civil works. It has also been determined to not be necessary since cross-carriageway flow has been reduced to zero in proposed conditions The design and flow widths were presented to ES on 14 October. ES accepted the departure and justification.		ES accepted the design departure and justification on 14 Oct

Item	Detail of Departure	Reason for Departure	Proposed action	Status
2	Flow width at the proposed pedestrian ramp on Endeavour Road westbound near Henry Lawson Drive (I01\09) Design criteria: Flow widths at pedestrian crossings are to be less than 0.5 m in the 1 year ARI event	1 year ARI flow width in proposed conditions is 1.24 m which is greater than design criteria (0.5 m) but matches existing conditions. There is no new kerb and gutter or widening on Endeavour Road so new pits are not proposed upstream of the pedestrian crossing to reduce flow widths.		ES accepted the departure and justification at meeting 6 August
3	Freeboard at Henry Lawson Drive southbound north of Rabaul Road (I01\04, I01\05) Design criteria: Freeboard at proposed pits is to be greater than 150 mm in the 10 year ARI event.	Freeboard at pits I01\05 and I01\04 in proposed conditions is approximately 120 mm and 110 mm respectively which is less than the design criteria of 150 mm. The pits are not surcharging. Drainage line I01 is relatively shallow and constrained due to the existing 375 mm pipe at its downstream connection. The freeboard at pits I01\05 and I01\04 cannot be improved without upgrading the existing 375 mm pipe crossing Henry Lawson Drive southbound to a 450mm. Upgrading this existing pipe is not desirable due to construction cost and construction staging factors.		ES accepted the design departure and justification at meeting on 14 Oct
4	Flow width at Rabaul Road eastbound (B01\02) Design criteria: ensure flow widths are less than 1.5 m in the 10 year ARI event.	Flow width in proposed conditions is 1.73 m which is greater than the design criteria of 1.5 m but less than existing conditions of 2.97 m. The bypass flow and flow width approaching pit B01\02 cannot be reduced without proposing more pits upstream of B01\03 outside of the project extent. B01\03 is an SA3.6 pit and cannot be extended to an SA 4.8 pit because of an existing overhead wire pole which would be affected.		ES accepted the design departure and justification at meeting on 14 Oct
5	Flow width at Rabaul Road eastbound (B01\03) Design criteria: ensure flow widths are less than 1.5 m in the 10 year ARI event.	Flow width in proposed conditions is 3.12 m which is greater than the design criteria of 1.5 m but matches existing conditions. The bypass flow and flow width approaching pit B01\03 cannot be reduced without proposing more pits upstream of B01\03 outside of the project extent. B01\03 is an SA3.6 pit and cannot be extended to an SA		ES accepted the design departure and justification at meeting on 14 Oct

Item	Detail of Departure	Reason for Departure	Proposed action	Status
		4.8 pit because of an existing overhead wire pole which would be affected.		
6	Flow width at Henry Lawson Drive southbound south of Rabaul Road at pit D01\11 Design criteria: ensure flow widths are less than 1.5 m in the 10 year ARI event.	Flow width extending on to road in proposed conditions is 2.2 m at pit D01\11 and is greater than design criteria (1.5 m) but less than existing conditions An SB drain and SB pits D01\11 and D01\10 have been incorporated into the design during the AFC stage at the interface between Henry Lawson Drive and the carpark driveway. The SB drain and pits have been proposed to control and capture external catchment flows before they drain onto the Henry Lawson Drive carriageway. Pit K01\02 has also been proposed within the verge area in an effort to further capture external catchment flows draining towards Henry Lawson Drive. Flow width at pits D01\11, D01\10, D01\09 and D0\08 are 2.2 m, 1.08 m, 0.92 m and 0.59 m respectively. The design departure is at pit D01\11 where flow width is 2.2 m as this is where external catchment flows arrive at the SB drain. It is not possible to reduce flow widths further as drainage cannot be constructed outside the project boundary within Aboriginal Heritage Land or Crown Land. ES stated that the assumption that the existing drainage network located in Coleman Park which drains the tennis courts was not included in the modelling could mean that the flow widths at these pits are slightly over estimated. ES recommended including this in the report. Text has been added to Section 3.1.1.4 to this effect.		ES accepted the design departure and justification at meeting on 14 Oct.
7	Grade of drainage line D01 grade and drop at manholes. Design criteria: - Clearance from sewer main to drainage is generally required to be a minimum of 300 mm	Extensive optioneering has yielded that the best design option in this area would be to pass the drainage line under the sewer mains and outlet the drainage line at the location of the existing headwall at the Georges River near the pump station. Maintaining the existing invert at the headwall of 0.38 m AHD and avoiding a protected tree (Tree 43) required the drainage line to be graded back from the outlet level at 0.3% grade with a 0 drop at manholes in order to achieve a clearance of 25 mm below the concrete		Meeting with Engineering Services 6 August. ES accepted the departure and justification.

Item	Detail of Departure	Reason for Departure	Proposed action	Status
	- 0.5 % is the RMS required minimum grade of drainage pipes - 0.03 m is the RMS required drop within stormwater pits between outlet pipes and inlet pits	encased sewer mains. The minimum clearance achieved from the bottom of the 150 mm concrete encasement of the sewer mains to the top of the stormwater pipe is approximately 25 mm. The utilities team advised on 18/9/20 that this clearance would be acceptable to Sydney Water and it is constructible. A note has been added to the drawings to guide the contractor to build this section of pipe first to ensure the design grade and clearance is achieved. It should be noted that the span of the sewer mains is approximately 5.7 m and the length of standard stormwater pipe is 2.44 m. A note has also been added to the stormwater plans that directs the contractor in the placing of the pipe collars so that the socket does not compromise clearance. A special drainage long section will also be prepared showing the two sewer mains and their encasement, stormwater pipes, stormwater pipe collars, all clearances and setout information. Austroads states that the minimum grade for a 675 mm pipe is 0.18% which is achieved. The drainage line has been analysed for the 6 month storm and the minimum velocity is 1 m/s which meets the minimum RMS criteria of 0.6 m/s for self-cleaning. The new drainage line, shallow grades and associated clearances to the sewer mains were presented at the SID and Constructability Workshop held 10/07/20 and Engineering Services meeting held 06/08/20. The RMS constructability team confirmed the 0.3% grade pipe could be constructed accurately given appropriate construction monitoring. ES stated the drainage team should add notes to the stormwater plans and long sections to guide the contractor in stormwater construction staging. Constructing the pipe under the sewer mains first may assist with accurately constructing the drainage and reduce the risk of grades flatter than 0.3%. This has been included in the drawings RMS Assets and Maintenance has also been consulted regarding the 0.3% pipe grade and have raised no concerns.		

Item	Detail of Departure	Reason for Departure	Proposed action	Status
8	Proposed 375 mm transverse pipe (P I01\02A) has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved. - Transverse drainage pipes within the road reserve are to be 450 mm	The proposed pipe (P I01/02A) is a pipe stub which connects into a shallow 375 mm existing pipe (P I01\02B) that crosses Henry Lawson Drive. The proposed transverse stormwater pipe has 170 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 710 mm cover to finished surface level. It is **not** proposed to protect the proposed stormwater pipe P I01\02A since lowering and/or upsizing pipe P I01/02B would require laying pipe across Henry Lawson Drive southbound which has construction time and cost implications. This was discussed with the ESC Construction Team 7/10/2020 and deemed to be acceptable. The loading on the pipe during construction is not expected to cause damage to the pipe due to the nature of equipment used on this size project. Existing pipe (P I01\02B), which is of similar depth, will also not be concrete encased.		ES accepted the design departure and justification at meeting on 14 Oct
9	Existing 375 mm transverse pipe (P I01\02B) has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved. - Transverse drainage pipes within the road reserve are to be 450 mm	The existing pipe is a shallow 375 mm pipe (P I01\02B) that crosses Henry Lawson Drive. Lowering and/or upsizing pipe P I01\02B would require laying pipe across Henry Lawson Drive southbound which has construction time and cost implications. At its upstream end, the existing stormwater pipe has 230 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 770 mm cover to finished surface level. The pipe becomes deeper as it crosses Henry Lawson Drive. The pipe achieves 300 mm cover between the outside of the pipe and the underside of the SMZ layer approximately halfway along the Henry Lawson Drive southbound carriageway It is **not** proposed to concrete encase the existing pipe P I01\02 B since this would create similar time and cost implications as replacing it. This was discussed with the ESC Construction Team 7/10/2020 and deemed to be acceptable. The loading on the pipe during construction is not expected to cause damage to the pipe due to the nature of equipment		ES accepted the design departure and justification at meeting on 14 Oct

Item	Detail of Departure	Reason for Departure	Proposed action	Status
		used on this size project.		
10	Proposed 450 mm transverse pipe (P C01\02) has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed pipe (P C01\02) ties into a shallow existing drainage pit (EX L18) at the corner of Henry Lawson Drive and Beale Street. The drainage line cannot be lowered without lowering the existing downstream drainage line which crosses Henry Lawson Drive The proposed transverse stormwater pipe has 160 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 610 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using concrete encasement as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
11	Proposed 375 mm pipe (P C01\03) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed drainage line (C01) ties into a shallow existing drainage pit (EX L18) at the corner of Henry Lawson Drive and Beale Street. The drainage line cannot be lowered without lowering the existing downstream drainage line which crosses Henry Lawson Drive. The proposed stormwater pipe under the kerb encroaches 15 mm into the SMZ layer. The pipe achieves 625 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
13	Proposed 375 mm pipe (P C01\04) under the kerb has less than 300 mm clearance to the underside of the SMZ layer	The proposed drainage line (C01) ties into a shallow existing drainage pit (EX L18) at the corner of Henry Lawson Drive and Beale Street. The drainage line cannot be lowered without lowering the existing downstream drainage line which crosses Henry Lawson Drive.		ES accepted the design departure and justification at meeting on 14 Oct

Item	Detail of Departure	Reason for Departure	Proposed action	Status
	Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed stormwater pipe under the kerb has 120 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 760 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details		
14	Proposed 375 mm pipe (P C01\05) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed drainage line (C01) ties into a shallow existing drainage pit (EX L18) at the corner of Henry Lawson Drive and Beale Street. The drainage line cannot be lowered without lowering the existing downstream drainage line which crosses Henry Lawson Drive. The proposed stormwater pipe under the kerb has 90 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 730 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
15	Proposed 375 mm pipe (P I01\03) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed drainage line (I01) connects into a shallow existing pipe (P I01\02B) downstream which crosses Henry Lawson Drive. Lowering pipe P I01\02B would require laying pipe across Henry Lawson Drive southbound which has construction time and cost implications. The proposed stormwater pipe under the kerb has 230 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 870 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct

Item	Detail of Departure	Reason for Departure	Proposed action	Status
16	Proposed 375 mm pipe (P I01\02) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed drainage line (I01) connects into a shallow existing pipe (P I01\02B) downstream which crosses Henry Lawson Drive. Lowering pipe P I01\02B would require laying pipe across Henry Lawson Drive southbound which has construction time and cost implications. The proposed stormwater pipe under the kerb has 100 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 740 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
17	Proposed 375 mm pipe (P A01\02) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The proposed drainage line (A01) connects into a shallow existing pipe (P I01\02B) downstream which crosses Henry Lawson Drive. Lowering pipe P I01\02B would require laying pipe across Henry Lawson Drive southbound which has construction time and cost implications. The proposed stormwater pipe under the kerb has 10 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 550 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
18	Proposed 600 mm pipe (P B01\03) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria:	The proposed pipe (P B01\03) connects into the proposed transverse drainage pipe P B01\02. The levels of pipe P B01\02 are constrained. Pipe P B01\02 passes over a sewer main which runs along Rabaul Road with 300 mm clearance and therefore cannot be lowered. The proposed stormwater pipe under the kerb has 115 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 565 mm cover to		ES accepted the design departure and justification at meeting on 14 Oct

Item	Detail of Departure	Reason for Departure	Proposed action	Status
	- Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details		
19	Proposed transverse 600 mm pipe (P B01\02) has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The levels of the proposed pipe (P B01/02) are constrained. Pipe P B01\02 passes over a sewer main which runs along Rabaul Road with 300 mm clearance and therefore cannot be lowered. The proposed transverse stormwater pipe has 175 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 625 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using concrete encasement as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
20	Proposed 375 mm pipe (P EX R7) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	Pipe P EX R7 is a new outlet pipe for the existing pit EX R7. The upstream invert of pipe P EX R7 is constrained by the existing invert of pit EX R7. The downstream invert of pipe P EX R7 is constrained since the stormwater pipe passes over an existing comms utility with 210 mm clearance. The utilities team advised this clearance was acceptable. The proposed stormwater pipe under the kerb has 10 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 545 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct
21	Proposed 600 mm pipe (P D01\18) under the kerb has less than 300 mm clearance	The invert levels of proposed pipe P D01\18 are constrained since it connects directly into pipe P D01\17. The inverts of pipe P D01\17 are constrained since the pipe passes over an existing electrical utility with		ES accepted the design departure and justification

Item	Detail of Departure	Reason for Departure	Proposed action	Status
	to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	just over 300 mm clearance. The utilities team advised this clearance was acceptable. The proposed stormwater pipe under the kerb has 225 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 765 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		at meeting on 14 Oct
22	Proposed 600 mm pipe (P D01\17) under the kerb has less than 300 mm clearance to the underside of the SMZ layer Design criteria: - Provide a minimum clearance of 300 mm from the top of pipes to the underside of the Selected Material Zone (SMZ), unless otherwise approved.	The invert levels of pipe P D01\17 are constrained since the pipe passes over an existing electrical utility with just over 300 mm clearance. The utilities team advised this clearance was acceptable. The proposed stormwater pipe under the kerb has 290 mm cover between the outside of pipe and the underside of the SMZ layer which is less than the required 300 mm. The pipe achieves 830 mm cover to finished surface level. It is therefore proposed to protect the stormwater pipe using no fines concrete protection as per the ESC Standard Details.		ES accepted the design departure and justification at meeting on 14 Oct

Appendix F

Arboricultural Impact Assessment

ARBORICULTURAL IMPACT REPORT

HENRY LAWSON DRIVE UPGRADE
GEORGES HALL NSW

20TH JANUARY 2021

PREPARED FOR TRANSPORT FOR NSW

Prepared by:
Guy Paroissien
Landscape Matrix Pty Ltd.
ABN 53 110 564 102
T/F. 9943 6510, M. 0425 342 051
40 Timbarra Road St Ives NSW 2075
E-mail: landscapematrix@optusnet.com.au

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1. BACKGROUND

Landscape Matrix Pty Ltd has been engaged by Transport NSW to prepare an Arboricultural Impact Report in respect to 45 trees adjacent to proposed upgrade works to Henry Lawson Drive at Georges Hall (the site). The trees are potentially impacted by proposed road widening works and drainage upgrades at the site.

This report has been prepared by Guy Paroissien a Director of Landscape Matrix Pty Ltd. The site was inspected on 23rd July 2020.

The assessment of the trees was based upon a visual inspection of the trees from ground level using the Visual Tree Assessment (VTA) approach developed by Mattheck & Breloer (1994). The visual inspection included examination of the trees' dimensions, foliage density and foliage health, form, structure, structural condition, overall health and vigour and landscape significance.

The inspection was limited to visual inspection of the trees without dissection, probing or coring. No aerial inspection of the trees was carried out and the assessment did not include any woody tissue testing or root investigation.

The tree heights and canopy spreads were estimated and expressed in metres and the tree diameters at breast height (DBH) were measured with a standard metal tape at approximately 1.4 metres above ground level and expressed in millimetres.

2. TREES ON SITE

45 trees on the site have been individually assessed in preparing this report. A summary of these trees, their dimensions, condition, Useful Life Expectancy (ULE) and landscape significance is attached in Appendix B.

The tree numbers in Appendix B correspond with the tree numbers marked on the attached Concept Design Plans prepared by Transport for NSW. (Appendix C). The detailed design plans that were used for the assessments in this report are attached at Appendix D.

The trees that have been assessed on the site and adjoining properties are summarised in table 1 as follows:

Table 1: Summary of species present, number and height range.

SPECIES	COMMON NAME	NUMBER PRESENT	HEIGHT RANGE (metres)
Acacia binervia	Coastal Myall	1	7
Angophora floribunda	Rough Barked Apple	5	12 to 21
Callistemon viminalis	Weeping Bottlebrush	3	3 to 6
Corymbia citriodora	Lemon Scented Gum	4	16 to 22
Cupressus macrocarpa 'Brunniana'	Brunning's Golden Cypress	1	12
Dead Tree	Dead Tree	1	16
Eucalyptus baueriana	Blue Box	9	6 to 19 (I failed)
Eucalyptus microcorys	Tallowwood	1	24
Eucalyptus spp.	Rough Barked Eucalypt	1	5
Eucalyptus tereticornis	Forest Red Gum	18	7 to 28
Tristaniopsis laurina	Water Gum	1	5.5
Total number of trees		**45**	**3 to 28 metres**

None of the trees assessed for this report is listed individually as a threatened species on the Schedules of the NSW *Biodiversity Conservation Act 2016* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

However, the trees impacted in the southern extent of the proposed works south of the vehicle crossing to Coleman Park (about 13 of the trees assessed plus the other vegetation in the reserve) are collectively part of an identified threatened ecological community (River Flat Eucalypt Forest) which is protected under the NSW and Commonwealth legislation.

A separate biodiversity assessment has been prepared by AECOM to assess the potential biodiversity impacts related to the River Flat Eucalypt Forest ecological community.

In addition to the above trees there is a group of juvenile to semi mature trees planted in the last 10 years in the vicinity of tree number 43 within the reserve next to the treatment facility. These trees range up to 10 metres in height and include the following trees:

Casuarina glauca (Swamp Oak) x 8 specimens

Eucalyptus robusta (Swam Mahogany) x 2 specimens
Eucalyptus baueriana Blue Box) x 8 specimens
Melaleuca styphelioides (Prickly Paperbark) x 13 specimens
Melaleuca linariifolia (Budjur, Flax-leaved Paperbark) x 3 specimens
Eucalyptus spp. (Possibly *E. tereticornis* - Forest Red Gum) x 3 specimens

These trees were assessed/summarised as a group only and not individually assessed in detail.

3. TREES IDENTIFIED AS A PRIORITY FOR RETENTION/PROTECTION.

The identification of trees as priorities for retention is based upon a number of factors including; species, dimensions, health, maturity, Useful Life Expectancy (ULE) and landscape significance.

Following assessment of the trees it is considered that 13 of trees assessed are of high landscape significance and medium to long life expectancy and should be considered as priorities for retention/protection.

Table 2: Trees identified as a priority for retention/protection.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
6	*Eucalyptus microcorys* (Tallowwood)	14.4 metres	3.8 metres	A mature, single trunked specimen approximately 24 metres in height with a canopy spread of 18 metres and a diameter at breast height (DBH) of ca. 1200mm. In good health and of high landscape significance. The tree displays fair branch attachment with evidence of past failures. At the time of inspection the tree exhibited low levels of deadwood.
8	*Eucalyptus tereticornis* (Forest Red Gum)	9.6 metres	3.3 metres	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 12 metres and a DBH of 800mm. In good health and of high landscape significance. The tree's past canopy development has been suppressed. Tissue dysfunction in lower trunk possibly due to fungal canker and tissue loss due to Longicorn Beetle larvae activity. Mistletoe present through crown. At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low levels of dieback. Past mechanical damage to lower trunk on north. The tree exhibits fair branch attachment with codominant leaders from 2.5 metres with some evidence of poor attachment at the junction - not considered at risk of failure in the short term.
26	*Corymbia citriodora* (Lemon Scented Gum)	5.8 metres	2.7 metres	A mature, single trunked specimen approximately 26 metres in height with a canopy spread of 12 x 16 metres and a DBH of 480mm. In good health and of high landscape significance. The tree displays fair branch attachment with evidence of past branch failures.
27	*Eucalyptus tereticornis* (Forest Red Gum)	5 metres	2.5 metres	A mature, single trunked specimen approximately 25 metres in height with a canopy spread of 10 metres and a DBH of 420mm. In good health and of high landscape significance. The tree displays fair to poor branch attachment with a past failure (and associated wounding) at 8 metres - possible decay at wound site.

28	*Eucalyptus tereticornis* (Forest Red Gum)	13.2 metres	3.5 metres	A mature, single trunked specimen approximately 28 metres in height with a canopy spread of 19 metres and a DBH of 1100mm. In good health and significant in the landscape. The tree displays fair branch attachment with codominant leaders from 2 metres (not considered at risk of failure in the short term) and evidence of past branch failures.
29	*Angophora floribunda* (Rough Barked Apple)	7.6 metres	3 metres	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 12 metres and a DBH of 630mm. In good health and of high landscape significance. The tree exhibits cracked and displaced bark from ground level to 5 metres possibly due to torsional stress under wind loading. At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback.
30	*Angophora floribunda* (Rough Barked Apple)	7 metres	2.7 metres	A mature, single trunked specimen approximately 16 metres in height with a canopy spread of 12 metres and a DBH of 580mm. In good health and of high landscape significance. The tree exhibits cracked and displaced bark from ground level to 4 metres possibly due to torsional stress under wind loading. At the time of inspection the tree was of moderate health and fair vigour and exhibited low to moderate levels of dieback.
31	*Angophora floribunda* (Rough Barked Apple)	6.8 metres	2.7 metres	A mature, single trunked specimen approximately 16 metres in height with a canopy spread of 12 metres and a DBH of 570mm. In good health and of high landscape significance. At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback.
33	*Eucalyptus baueriana* (Blue Box)	8.9 metres	3 metres	A mature, single trunked specimen approximately 19 metres in height with a canopy spread of 12 metres and a DBH of 740mm. In good health and of high landscape significance. Slight canopy bias to the south. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback and epicormic growth.
38	*Eucalyptus baueriana* (Blue Box)	6.5 metres	2.7 metres	A mature, single trunked specimen approximately 17 metres in height with a canopy spread of 12 metres and a DBH of 540mm. In good health and of high landscape significance. Moderate canopy bias to the west. At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback.
40	*Eucalyptus baueriana* (Blue Box)	9.6 metres	3.1 metres	A mature, single trunked specimen approximately 19 metres in height with a canopy spread of 18 metres and a DBH of 800mm. In good health and of high landscape significance. At the time of inspection the tree exhibited low levels of dieback. Lineal splits in bark from 3 to 6 metres likely to be from torsional stress under wind loading.
43	*Eucalyptus baueriana* (Blue Box)	8.9 metres	3.2 metres	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 12 metres and a DBH of 740mm. In good health and of high landscape significance. Continued next page…

				The tree displays fair branch attachment with codominant leaders from 9 metres (possibly following past failure of the main trunk at this point in the past) - limited view. At the time of inspection the tree exhibited low levels of dieback.
45	*Corymbia citriodora* (Lemon Scented Gum)	5 metres	2.5 metres	A mature, single trunked specimen approximately 19 metres in height with a canopy spread of 12 metres and a DBH of 420mm. In good health and of high landscape significance. Moderate canopy bias to the east. The tree displays fair to poor branch attachment with multiple leaders from 8 metres following past failure of the main leaders - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term.

A number of methods to determine the likely extent of root zones and appropriate setbacks for tree root protection zones for trees on development sites have been developed in the past. The key criteria used in determining setbacks is the tree's trunk diameter at breast height (DBH) in conjunction with other factors including the sensitivity of the species in question to environmental disturbance/change, the age of the tree and the tree's health and vigour at the time.

Harris et al (2004) provide formulae for calculating tree protection zones based on the above criteria and modified from the 1991 British Standard for protection of trees on construction sites (BS 5837:1991). The 2005 version of the British Standard (BS 5837:2005) recommends a radius of 12 times the tree's DBH. For multi trunked trees BS 5837:2005 recommends a setback of 10 times the basal trunk diameter.

The Australian Standard AS 4970-2009 Protection of Trees on Construction Sites also identifies a 'Tree Protection Zone' (TPZ) of 12 times the tree's DBH. AS 4790-2009 also provides a formula for calculating the "Structural Root Zone' of trees on development sites. This is the area required for stability. In regard to palms, other monocots, cycads and tree ferns the Standard identifies the Tree Protection Zone should not be less than 1 metre outside the crown projection. (Australian Standards Association 2009)

The tree protection zones identified above have been calculated using the Australian Standard 'AS 4970 Protection of trees on construction sites' and are the identified setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc.) should be minimised to reduce potential impacts on the long-term health of the trees. Preferably, no more than 10% of the tree protection zone should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed.

Where greater than 10% of the tree protection zone is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist. The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

4. TREES THAT SHOULD BE CONSIDERED FOR RETENTION/PROTECTION

The identification of trees for consideration (but not as a priority) for retention is based upon the same factors as those for priority for retention (species, dimensions, health, maturity, ULE and landscape significance).

Following assessment of the trees it is considered the following 20 trees are of moderate or moderate to high landscape significance and medium to long life expectancy and should be considered for retention/protection, if possible:

Table 3: Trees identified for consideration for retention/protection.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
1	*Cupressus macrocarpa 'Brunniana'* (Brunning's Golden Cypress)	9.4 metres	3 metres	A mature, multi trunked specimen approximately 12 metres in height with a canopy spread of 9 metres and DBH of up to 370mm (780mm above the root flare). In good health and of moderate landscape significance. The tree's past canopy development has been suppressed. The tree displays fair branch attachment with multiple leaders from near ground level with some evidence of poor attachment at the junctions - not considered at risk of failure in the short term but the increase of failure will increase as the tree ages.
7	*Eucalyptus tereticornis* (Forest Red Gum)	4.3 metres	2.3 metres	A semi mature, single trunked specimen approximately 11 metres in height with a canopy spread of 7 metres and a DBH of ca. 360mm. In good health and of moderate landscape significance.
9	*Eucalyptus tereticornis* (Forest Red Gum)	6.8 metres	2.8 metres	A mature, single trunked specimen approximately 22 metres in height with a canopy spread of 8 x 12 metres and a DBH of 560mm. In good health and of moderate to high landscape significance. Continued next page…

				The tree's past canopy development has been suppressed. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback. Possible decay at 1.6 metres on east side following past wounding (branch failure)
12	*Eucalyptus tereticornis* (Forest Red Gum)	6.2 metres	2.7 metres	A mature, multi trunked specimen approximately 18 metres in height with a canopy spread of 5 x 12 metres and DBH of 200, 210 and 430mm. In good health and of moderate to high landscape significance. The tree's past canopy development has been significantly suppressed. Evidence of past mechanical damage to lower trunk on north. Th tree displays fair branch attachment with multiple leaders - not considered at risk of failure.
13	*Eucalyptus tereticornis* (Forest Red Gum)	3.7 metres	2.2 metres	A semi mature, single trunked specimen approximately 12 metres in height with a canopy spread of 6 metres and a DBH of 310mm. In good health and of moderate landscape significance. The tree's past canopy development has been suppressed.
14	*Eucalyptus tereticornis* (Forest Red Gum)	6.2 metres	2.6 metres	A mature, single trunked specimen approximately 22 metres in height with a canopy spread of 9 metres and a DBH of 520mm. In good health and of moderate to high landscape significance. The tree's past canopy development has been suppressed. Decay in trunk on west side following past tissue loss - fruiting body at 1.5 metres (Phellinus spp.) Extent of decay not known without further testing.
15	*Eucalyptus tereticornis* (Forest Red Gum)	5.5 metres	2.6 metres	A mature, single trunked specimen approximately 18 metres in height with a canopy spread of 6 x 9 metres and a DBH of 460mm. In good health and of moderate to high landscape significance. The tree's past canopy development has been suppressed.
17	*Corymbia citriodora* (Lemon Scented Gum)	4 metres	2.3 metres	A mature, single trunked specimen approximately 22 metres in height with a canopy spread of 10 x 12 metres and a DBH of 330mm. In good health and of moderate to high landscape significance. Evidence of past tissue loss (mechanical damage) to lower trunk on NW side.
18	*Eucalyptus tereticornis* (Forest Red Gum)	4.6	2.4	A semi mature, single trunked specimen approximately 18 metres in height with a canopy spread of 6 x 8 metres and a DBH of 380mm. In good health and of moderate to high landscape significance.
19	*Corymbia citriodora* (Lemon Scented Gum)	3.4 metres	2.1 metres	A semi mature, single trunked specimen approximately 16 metres in height with a canopy spread of 9 metres and a DBH of 280mm. In good health and of moderate landscape significance.

21	*Eucalyptus tereticornis* (Forest Red Gum)	2.9 metres	1.9 metres	A semi mature, single trunked specimen approximately 11 metres in height with a canopy spread of 5 metres and a DBH of 240mm. In good health and of moderate landscape significance.
22	*Eucalyptus tereticornis* (Forest Red Gum)	2.6 metres	2.1 metres	A semi mature, single trunked specimen approximately 16 metres in height with a canopy spread of 6 metres and a DBH of 220mm. In good health and of moderate landscape significance.
23	*Eucalyptus tereticornis* (Forest Red Gum)	3.5 metres	2.2 metres	A semi mature, single trunked specimen approximately 12 metres in height with a canopy spread of 5 metres and a DBH of 290mm. In good health and of moderate landscape significance. The tree displays fair branch attachment with multiple regrowth following past pruning for OH wires.
24	*Eucalyptus tereticornis* (Forest Red Gum)	4.9 metres	2.2 metres	A semi mature, twin trunked specimen approximately 13 metres in height with a canopy spread of 6 x 8 metres and DBH of 240 and 330mm. In good health and of moderate landscape significance.
25	*Eucalyptus tereticornis* (Forest Red Gum)	5.3 metres	2.4 metres	A mature, single trunked specimen approximately 21 metres in height with a canopy spread of 8 x 10 metres and a DBH of 440mm. In good health and of moderate to high landscape significance. The tree's past canopy development has been suppressed.
32	*Angophora floribunda* (Rough Barked Apple)	3.7 metres	2.1 metres	A semi mature, single trunked specimen approximately 12 metres in height with a canopy spread of 4 x 6 metres and a DBH of 310mm. In good health and of moderate landscape significance. The tree's past canopy development has been significantly suppressed. At the time of inspection the tree exhibited low levels of dieback. There is evidence of past damage to the leader at 6 metres - appears sound.
34	*Angophora floribunda* (Rough Barked Apple)	6.2 metres	2.7 metres	A mature, single trunked specimen approximately 21 metres in height with a canopy spread of 13 metres and a DBH of 520mm. In good health and of moderate to high landscape significance. The tree displays fair branch attachment with codominant leaders from 7 metres with some evidence of poor attachment at the junction - not considered at risk of failure in the short term. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback.
36	*Eucalyptus baueriana* (Blue Box)	6.1 metres	2.6 metres	A mature, single trunked specimen approximately 9 metres in height with a canopy spread of 9 x 12 metres and a DBH of 510mm. In good health and of moderate landscape significance.

				Slight canopy bias to the south. At the time of inspection the tree was of moderate health and fair vigour and exhibited moderate to high levels of dieback and epicormic growth.
42	*Eucalyptus baueriana* (Blue Box)	5.3 metres	2.5 metres	A mature, twin trunked specimen approximately 16 metres in height with a canopy spread of 6 x 12 metres and DBH of 200 and 390mm. In good health and of moderate landscape significance. The tree's past canopy development has been significantly suppressed. DGL estimated as fill at ground level around the tree prevented measurement. At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low levels of dieback.
44	*Acacia binervia* (Coastal Myall)	6.1 metres	2.5 metres	A mature, multi trunked specimen approximately 7 metres in height with a canopy spread of 9 metres and DBH of up to 320mm (510mm above the root flare). In good health and of moderate landscape significance. At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback (mostly internal dieback).

TPZ = Tree Protection Zone under AS4970-2009, SRZ = Structural Root Zone under AS4970-2009

The tree protection zones identified above have been calculated using the Australian Standard 'AS 4970 Protection of trees on construction sites' and are the identified setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc.) should be minimised to reduce potential impacts on the long-term health of the trees. Preferably, no more than 10% of the tree protection zone should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed.

Where greater than 10% of the tree protection zone is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist.

The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

5. TREES THAT SHOULD BE CONSIDERED FOR REMOVAL

Following assessment of the trees on the site it is considered the following 4 trees should be considered for removal due to poor/declining health or condition and/or inappropriate species:

Table 4: Trees recommended for consideration for removal.

TREE NO.	SCIENTIFIC AND COMMON NAME	REASON
35	Dead Tree	The tree is dead.
37	*Eucalyptus baueriana* (Blue Box)	The tree has failed in the past.
39	*Eucalyptus baueriana* (Blue Box)	At the time of inspection the tree was of fair vigour and exhibited low levels of dieback and moderate levels of epicormic growth. Low to moderate landscape significance. Appears stable but has a distinct trunk lean and canopy bias to the south - will be at increased risk of failure following significant rainfall events.
41	*Eucalyptus baueriana* (Blue Box)	The tree's past canopy development has been significantly suppressed. The tree displays fair branch attachment with codominant leader from 0.7 metres - not considered at risk of failure. At the time of inspection the tree was of poor health and poor vigour and exhibited significantly reduced foliage density, epicormic growth and high levels of dieback. Jewel Beetle larvae exit holes in lower trunk.

6. TREES NOT IDENTIFIED FOR REMOVAL OR RETENTION

The following 8 trees have not been identified as being of specific design consideration:

- Tree numbers 2, 3, 4, 5, 10, 11, 16 and 20.

These trees are currently in good condition and do perform some landscape function of low to moderate significance. However, these trees individually are not considered significant enough to warrant specific design consideration.

7. POTENTIAL IMPACTS ON TREES

The potential impacts of the proposal have been assessed using the following plans:

- Utilities Impact Assessment Plan prepared by Transport for NSW dated 6/11/2020 and identified as Registration Number DS2020/000130, Sheets 1 to 5;
- General Arrangement Plan prepared by Transport for NSW dated 6/11/2020 and identified as Registration Number DS2020/000130, Sheets 1 to 5; and
- Stormwater Management Plan prepared by Transport for NSW dated 6/11/2020 and identified as Registration Number DS2020/000130, Sheets 1 to 5.

Trees requiring removal or proposed to be removed to facilitate the proposed road works, utilities relocation and drainage upgrades

To facilitate construction of the proposed road works, utilities relocation and drainage upgrades the following 33 trees would require removal due to their location within or immediately next to the proposed road widening location, utilities relocation and/or drainage upgrades (taking into account the extent of TPZ encroachment).

Table 5: Trees requiring removal to facilitate construction of the proposed road works, utilities relocation and drainage upgrades.

TREE NO.	SCIENTIFIC AND COMMON NAME	COMMENTS
2	*Tristaniopsis laurina* (Water Gum)	Immediately adjacent to the footprint of works and will require removal.
3	*Callistemon viminalis* (Weeping Bottlebrush)	Immediately adjacent to the footprint of works and will require removal.
4	*Callistemon viminalis* (Weeping Bottlebrush)	Immediately adjacent to the footprint of works and will require removal.
5	*Callistemon viminalis* (Weeping Bottlebrush)	Immediately adjacent to the footprint of works and will require removal.
7	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
8	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
9	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
11	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.

12	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
13	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
14	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
15	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
16	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
17	*Corymbia citriodora* (Lemon Scented Gum)	Immediately adjacent to the footprint of works and will require removal.
18	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
19	*Corymbia citriodora* (Lemon Scented Gum)	Immediately adjacent to the footprint of works and will require removal.
20	*Eucalyptus spp.* (Rough Barked Eucalypt)	Immediately adjacent to the footprint of works and will require removal.
21	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
22	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
23	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
24	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
25	*Eucalyptus tereticornis* (Forest Red Gum)	Immediately adjacent to the footprint of works and will require removal.
29	*Angophora floribunda* (Rough Barked Apple)	Immediately adjacent to the footprint of works and will require removal.
30	*Angophora floribunda* (Rough Barked Apple)	Immediately adjacent to the footprint of works and will require removal.

31	*Angophora floribunda* (Rough Barked Apple)	Immediately adjacent to the footprint of works and will require removal.
32	*Angophora floribunda* (Rough Barked Apple)	Immediately adjacent to the footprint of works and will require removal.
34	*Angophora floribunda* (Rough Barked Apple)	Immediately adjacent to the footprint of works and will require removal.
35	Dead Tree	Immediately adjacent to the footprint of works and will require removal. (NB: Dead tree)
36	*Eucalyptus baueriana* (Blue Box)	Immediately adjacent to the footprint of works and will require removal.
37	*Eucalyptus baueriana* (Blue Box)	Immediately adjacent to the footprint of works and will require removal.
39	*Eucalyptus baueriana* (Blue Box)	Immediately adjacent to the footprint of works and will require removal.
40	*Eucalyptus baueriana* (Blue Box)	Immediately adjacent to the footprint of works and will require removal.
41	*Eucalyptus baueriana* (Blue Box)	Immediately adjacent to the footprint of works and will require removal.

Four of the 33 trees proposed for removal are recommended for removal, regardless of the proposed works in table 5 of this report (tree numbers 35, 37, 39 and 41).

In addition to the above trees there is a group of juvenile to semi mature trees planted in the last 10 years in the vicinity of tree number 43 within the reserve next to the treatment facility. These trees range up to 10 metres in height and include the following trees:

Casuarina glauca (Swamp Oak) x 8 specimens
Eucalyptus robusta (Swam Mahogany) x 2 specimens
Eucalyptus baueriana Blue Box) x 8 specimens
Melaleuca styphelioides (Prickly Paperbark) x 13 specimens
Melaleuca linariifolia (Budjur, Flax-leaved Paperbark) x 3 specimens
Eucalyptus spp. (Possibly *E. tereticornis* - Forest Red Gum) x 3 specimens

A small number of these trees, towards the western (river) end of the group, may be impacted or require removal as part of the drainage works – these trees could easily be replaced in the short term by replacement plantings at the conclusion of the drainage works. The group is illustrated in photograph 7 on page 26 of this report.

Trees potentially impacted by the proposed road works, utilities relocation and drainage upgrades

A total of 12 trees assessed for the report are in the vicinity of the proposed road works and have the potential to be impacted by the proposal. Using the plans referred to in the preceding section of the report an analysis has been undertaken of the potential impacts to these trees.

The extent of impacts to the trees in table 6 has been rated using the following guideline:

0% of root zone impacted – no impact of significance
0 to 10% of TPZ impacted – low level of impact
10 to 15% of TPZ impacted – low to moderate level of impact
15 to 20% of TPZ impacted – moderate level of impact
20 to 25% of TPZ impacted – moderate to high level of impact
25 to 35% of TPZ impacted – high level of impact
>35% of TPZ impacted – significant level of impact

The root zone calculations referred to in this report were made using scale drawings of the trees' identified tree protection zones (TPZ) in a CAD program (TurboCAD®) with potentially affected areas added to the drawing. The area of potential impact was converted to a percentage of TPZ using a spreadsheet (Microsoft Excel®). The potential impacts to these 12 trees are identified in table 6 as follows:

Table 6: Trees potentially affected by the proposed road works, utilities relocations and drainage upgrades.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS*
1	*Cupressus macrocarpa 'Brunniana'* (Brunning's Golden Cypress)	9.4 metres	3 metres	The proposed works are located 3.99 metres from the tree at the closest point and are calculated to encroach within 52.19m^2 or 18.97% of the tree's identified TPZ – this is a moderate level of impact and within an acceptable threshold. In addition, the actual impacts will be reduced as the works are within the existing area of road where it is likely there will be less root growth. New stormwater pits indicate a new drainage pipeline approx. 4.9 metres from the tree – this pipeline is outside the tree's structural root zone and is within the works area identified above – the potential impact will be within an acceptable threshold.

6	*Eucalyptus microcorys* (Tallowwood)	14.4 metres	3.8 metres	The proposed works are located 11.16 metres from the tree at the closest point and are calculated to encroach within 45.29m^2 or 6.96% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold. In addition, the actual impacts will be reduced as the works are within the existing area of road where it is likely there will be less root growth.
10	*Eucalyptus tereticornis* (Forest Red Gum)	3 metres	2 metres	The proposed works, including drainage works, are located 5.5 metres from the tree at the closest point and are outside the tree's identified TPZ – no impact of substance.
26	*Corymbia citriodora* (Lemon Scented Gum)	5.8 metres	2.7 metres	The proposed works, including drainage works, are located 5.3 metres from the tree at the closest point and are calculated to encroach within 1.11m^2 or 1.07% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold.
27	*Eucalyptus tereticornis* (Forest Red Gum)	5 metres	2.5 metres	The proposed works, including drainage works, are located 5 metres from the tree at the closest point and are at the outer edge of the tree's identified TPZ – no impact of substance.
28	*Eucalyptus tereticornis* (Forest Red Gum)	13.2 metres	3.5 metres	The proposed works are located 9.75 metres from the tree at the closest point and are calculated to encroach within 42.54m^2 or 7.78% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold. In addition, the actual impacts will be reduced as the works are within the existing area of road where it is likely there will be less root growth.
33	*Eucalyptus baueriana* (Blue Box)	8.9 metres	3 metres	The proposed works are located 2.9 metres from the tree at the closest point and are calculated to encroach within 76.36m^2 or 30.84% of the tree's identified TPZ – this is a high level of impact that is likely to affect the tree's long-term health and reduce its ULE. In addition, the works are partially within the tree's SRZ with potential to affect structural roots and the tree's structural integrity. If retention of this tree is to be pursued then it is recommended works within the tree's TPZ be monitored by an AQF level 5 arborist to identify the extent of actual root loss and determine whether the tree can be sustainably be retained.
38	*Eucalyptus baueriana* (Blue Box)	6.5 metres	2.7 metres	The proposed works, including drainage works, are located 3.88 metres from the tree at the closest point and are calculated to encroach within 20.61m^2 or 15.63% of the tree's identified TPZ – this is a moderate level of impact and within an acceptable threshold.
42	*Eucalyptus baueriana* (Blue Box)	5.3 metres	2.5 metres	The proposed works, including drainage works, are located 3 metres from the tree at the closest point and are calculated to encroach within 14.14m^2 or 16.15% of the tree's identified TPZ – this is a moderate level of impact and within an acceptable threshold.

43	*Eucalyptus baueriana* (Blue Box)	8.9 metres	3.2 metres	The proposed excavation works for the pipeline are located ca. 6.4 metres from the tree at the closest point and are calculated to encroach within 20.88m^2 or 8.43% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold.
44	*Acacia binervia* (Coastal Myall)	6.1 metres	2.5 metres	The proposed excavation works for the pipeline are located ca. 9.8 metres from the tree at the closest point and are outside the tree's identified TPZ - no impact of substance is predicted for this tree.
45	*Corymbia citriodora* (Lemon Scented Gum)	5 metres	2.5 metres	The proposed works, including drainage works, are located ca. 7.52 metres from the tree at the closest point and are outside the tree's identified TPZ – no impact of substance.

The potential TPZ encroachments can be summarised as follows:
0% of root zone impacted – no impact of significance = 4 trees (tree #s 10, 27, 44 and 45)
0 to 10% of TPZ impacted – low level of impact = 4 trees (tree #s 6, 26, 28 and 43)
10 to 15% of TPZ impacted – low to moderate level of impact = 0 trees
15 to 20% of root zone impacted – moderate level of impact = 3 trees (tree #s 1, 38 and 42)
20 to 25% of TPZ impacted – moderate to high level of impact = 0 trees
25 to 35% of TPZ impacted – high level of impact = 1 tree (tree # 33)
> 35% of TPZ impacted – significant level of impact = 0 trees

In Summary:

- The proposed works are outside the identified tree protection zones (TPZ) for tree numbers 10, 27, 44 and 45 and no impact of substance is anticipated for these trees.
- The proposed works will encroach on less than 10% of the TPZs of tree numbers 6, 26, 28 and 43 and is considered to be a low level of impact and within an acceptable threshold for these trees.
- The proposed works will encroach on 15 to 20% of the TPZs of tree numbers 1, 38 and 42 and is considered to be a moderate level of impact and within an acceptable threshold for these trees.
- The proposed works will encroach on 30.84% of the TPZ of tree number 33 - this is a high level of impact that is likely to affect the tree's long-term health and reduce its ULE. In addition, the works are partially within the tree's SRZ with potential to affect structural roots and the tree's structural integrity. If retention of this tree is to be pursued then it is recommended works within the tree's TPZ be monitored by an AQF level 5 arborist to identify the extent of actual root loss and determine whether the tree can be sustainably be retained.

Electrical and telecommunications services
The existing overhead electricity and telecommunications services are proposed to be relocated together with installation of new sections of overhead electricity wires and associated support poles.

The relocated sections are generally proposed at offsets that are 2.3 to 3 metres eastwards (and closer to existing trees) than the existing alignments and have some potential for above and below ground impacts. Given the presence of existing wires it is considered that past pruning for clearance will minimise the need for significant additional pruning.

However, the installation of new poles has the potential to impact on roots. The proposed poles will require an excavation of 500mm width and up to 2.2 metres depth. To minimise potential impacts on the trees it is recommended that the poles be located by hand excavation (under direction of an AQF Level 5 arborist) in the vicinity of trees to a depth of 400mm to ensure that large woody roots will not be impacted by the works. Trees that may be impacted in this respect include tree numbers 6, 10, 26, 27, 28, 33, 38, 42 and 45.

Where large woody roots are encountered it is recommended the pole location be moved (north or south) to avoid damage to, or removal of, roots of 50mm diameter or greater.

8. TREE PROTECTION MEASURES

The following generic tree protection measures are recommended to assist in minimising potential impacts that may arise during the works (including the implementation of landscape works on the site).

A. Measures to be implemented prior to the commencement of any works on the site.

1. Trees to be retained are to be clearly identified by signage as protected trees.

2. The tree protection zones (TPZ) of trees to be retained are to be protected by fencing during the entire construction period except for specific areas directly required to achieve construction works. Where installation of fencing is not possible due to the need for construction access the trees can be protected by a combination of trunk and ground protection in accordance with Figure 4 of AS4970-2009.

3. The tree protection fence (where able to be installed) shall be constructed of galvanised pipe at 2.4 metre spacing and connected by securely attached chain mesh fencing to a minimum height of 1.8 metres and shall be installed prior to work commencing.

4. The tree protection fencing shall be installed as closely as possible to the alignment of the identified TPZ and shall be approved and certified by the site arborist prior to commencement of any construction or demolition works on the site.

B. Measures to be implemented and maintained during the life of construction works on the site.

5. Any excavation within the identified TPZ of trees to be retained shall be carried out by hand to minimize disturbance to tree roots. Roots greater than 25mm are not to be damaged or severed without prior assessment by a minimum level 5 AQF arborist to determine likely level of impact and the restorative actions required to minimise the impacts of root damage.

6. Tree roots between 10mm and 25mm diameter, severed during excavation, shall be cleanly severed using sterilised hand tools (i.e. secateurs or a pruning saw) – all root pruning work shall be done, or directly supervised, by a minimum level 5 AQF arborist.

7. The following activities/actions are prohibited from the tree protection zones:

- Soil cut or fill including excavation and trenching (except where required for approved works and under the supervision of an AQF level 5 arborist)
- Soil cultivation, disturbance or compaction (except where required for approved works and under the supervision of an AQF level 5 arborist)
- Stockpiling storage or mixing of materials
- The parking, storing, washing and repairing of tools, equipment and machinery

- The disposal of liquids and refueling
- The disposal of building materials
- The sitting of offices or sheds
- Any action leading to the impact on tree health or structure

8. Canopy pruning of trees identified for protection which is necessary to accommodate approved building works shall be undertaken in accordance with Australian Standard 4373-2007 'Pruning of Amenity Trees'.

9. To minimise potential impacts arising from installation of new electricity and telecommunications poles it is recommended that the poles be located by hand excavation (under direction of an AQF Level 5 arborist) in the vicinity of trees to a depth of 400mm to ensure that large woody roots will not be impacted by the works. This requirement applies to tree numbers 6, 10, 26, 27, 28, 33, 38, 42 and 45.

10. Where large woody roots are encountered it is recommended the pole location be moved (north or south) to avoid damage to, or removal of, roots of 50mm diameter or greater.

9. USE OF TREES BY WILDLIFE

During the inspection on 23rd July 2020 the trees on the site were checked for signs of use by wildlife during the inspection. A number of the trees showed signs of usage by wildlife such as scratch marks or the presence of scats consistent with usage by Common Brushtail Possum (*Trichosurus vulpecula*) or Common Ringtail Possum (*Pseudocheirus peregrinus*).

It is probable that a number of the trees would be used by native fauna at various times for food, shelter and roosting purposes and the retention and replacement of trees on and adjoining the site will retain this opportunity.

The following bird species were noted on site (or heard in the immediate vicinity of the site) during the inspection on 23rd July 2020: Willie Wagtail (*Rhipidura leucophrys*) Noisy Miner (*Manorina melanocephala*), Sulphur-crested Cockatoo (*Cacatua galerita*), Little Corella (*Cacatua sanguinea*), Rainbow Lorikeet (*Trichoglossus haematodus*) and other, unidentified, Lorikeet species.

10. CONCLUSIONS/RECOMMENDATIONS

Of the 45 trees adjacent to the proposed upgrade works to Henry Lawson Drive at Georges Hall that have been assessed 13 were identified as having high landscape significance and as a priority for retention. A further 20 trees have been identified as worthy of specific consideration for retention/protection if possible.

Four of the trees assessed for this report were identified as recommended for removal regardless of any development proposal.

The remaining 8 trees are identified in section 6 of the report as not requiring specific design consideration (i.e. are either of low landscape significance or short life expectancy).

To facilitate construction of the proposed development works the following 33 trees will require removal or are proposed to be removed as part of the works:
Tree # 2 *Tristaniopsis laurina* (Water Gum)
Tree # 3 *Callistemon viminalis* (Weeping Bottlebrush)
Tree # 4 *Callistemon viminalis* (Weeping Bottlebrush)
Tree # 5 *Callistemon viminalis* (Weeping Bottlebrush)
Tree # 7 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 8 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 9 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 11 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 12 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 13 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 14 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 15 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 16 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 17 *Corymbia citriodora* (Lemon Scented Gum)
Tree # 18 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 19 *Corymbia citriodora* (Lemon Scented Gum)
Tree # 20 *Eucalyptus spp.* (Rough Barked Eucalypt)
Tree # 21 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 22 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 23 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 24 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 25 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 29 *Angophora floribunda* (Rough Barked Apple)
Tree # 30 *Angophora floribunda* (Rough Barked Apple)
Tree # 31 *Angophora floribunda* (Rough Barked Apple)
Tree # 32 *Angophora floribunda* (Rough Barked Apple)
Tree # 34 *Angophora floribunda* (Rough Barked Apple)
Tree # 35 Dead Tree
Tree # 36 *Eucalyptus baueriana* (Blue Box)
Tree # 37 *Eucalyptus baueriana* (Blue Box)
Tree # 39 *Eucalyptus baueriana* (Blue Box)
Tree # 40 *Eucalyptus baueriana* (Blue Box)
Tree # 41 *Eucalyptus baueriana* (Blue Box)

Four of the 33 trees proposed for removal are recommended for removal, regardless of the proposed works in table 4 of this report (tree numbers 35, 37, 39 and 41).

In addition to the above trees there is a group of juvenile to semi mature trees planted in the last 10 years in the vicinity of tree number 43. These trees range up to 10 metres in height and include the following trees:

Casuarina glauca (Swamp Oak) x 8 specimens
Eucalyptus robusta (Swam Mahogany) x 2 specimens
Eucalyptus baueriana Blue Box) x 8 specimens
Melaleuca styphelioides (Prickly Paperbark) x 13 specimens
Melaleuca linariifolia (Budjur, Flax-leaved Paperbark) x 3 specimens
Eucalyptus spp. (Possibly *E. tereticornis* - Forest Red Gum) x 3 specimens

A small number of these trees, towards the western (river) end of the group, may be impacted or require removal as part of the drainage works – these trees could easily be replaced in the short term by replacement plantings at the conclusion of the drainage works. The group is illustrated in photograph 7 on page 26 of this report.

It is recommended that the replacement plantings be selected from the characteristic species identified in the listing for the threatened ecological community identified as River Flat Eucalypt Forest.

To facilitate construction of the proposed road works the following 12 trees are proposed for retention and may be potentially affected:
Tree # 1 *Cupressus macrocarpa 'Brunniana'* (Brunning's Golden Cypress)
Tree # 6 *Eucalyptus microcorys* (Tallowwood)
Tree # 10 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 26 *Corymbia citriodora* (Lemon Scented Gum)
Tree # 27 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 28 *Eucalyptus tereticornis* (Forest Red Gum)
Tree # 33 *Eucalyptus baueriana* (Blue Box)
Tree # 38 *Eucalyptus baueriana* (Blue Box)
Tree # 42 *Eucalyptus baueriana* (Blue Box)
Tree # 43 *Eucalyptus baueriana* (Blue Box)
Tree # 44 *Acacia binervia* (Coastal Myall)
Tree # 45 *Corymbia citriodora* (Lemon Scented Gum)

<u>The potential TPZ encroachments can be summarised as follows</u>:
0% of root zone impacted – no impact of significance = 4 trees (tree #s 10, 27, 44 and 45)
0 to 10% of TPZ impacted – low level of impact = 4 trees (tree #s 6, 26, 28 and 43)
10 to 15% of TPZ impacted – low to moderate level of impact = 0 trees
15 to 20% of root zone impacted – moderate level of impact = 3 trees (tree #s 1, 38 and 42)
20 to 25% of TPZ impacted – moderate to high level of impact = 0 trees
25 to 35% of TPZ impacted – high level of impact = 1 tree (tree # 33)
> 35% of TPZ impacted – significant level of impact = 0 trees

In Summary:

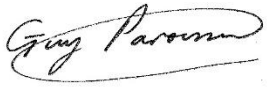
- The proposed works are outside the identified tree protection zones (TPZ) for tree numbers 10, 27, 44 and 45 and no impact of substance is anticipated for these trees.
- The proposed works will encroach on less than 10% of the TPZs of tree numbers 6, 26, 28 and 43 and is considered to be a low level of impact and within an acceptable threshold for these trees.
- The proposed works will encroach on 15 to 20% of the TPZs of tree numbers 1, 38 and 42 and is considered to be a moderate level of impact and within an acceptable threshold for these trees.
- The proposed works will encroach on 30.84% of the TPZ of tree number 33 - this is a high level of impact that is likely to affect the tree's long-term health and reduce its ULE. In addition, the works are partially within the tree's SRZ with potential to affect structural roots and the tree's structural integrity. If retention of this tree is to be pursued then it is recommended works within the tree's TPZ be monitored by an AQF level 5 arborist to identify the extent of actual root loss and determine whether the tree can be sustainably be retained.

The installation of new poles for electrical and telecommunications services has the potential to impact on roots. The proposed poles will require an excavation of 500mm width and up to 2.2 metres depth. To minimise potential impacts on the trees it is recommended that the poles be located by hand excavation (under direction of an AQF Level 5 arborist) in the vicinity of trees to a depth of 400mm to ensure that large woody roots will not be impacted by the works.

Trees that may be impacted in this respect include tree numbers 6, 10, 26, 27, 28, 33, 38, 42 and 45.

Where large woody roots are encountered it is recommended the pole location be moved (north or south) to avoid damage to, or removal of, roots of 50mm diameter or greater.

Generic tree protection measures are identified in section 8 of this report to minimise potential impacts to the trees to be retained.



Guy Paroissien, MAIH, MIACA, MISA, MAA
M Env. Mgt & Restor., Dip. Arboriculture, Hort Cert., Tree Care Cert.
Director
Landscape Matrix Pty Ltd
20th January 2021

BIBLIOGRAPHY/REFERENCES

Australian Standards Association (2007) *AS 4373- 2007 - Australian Standard 4373-2007 'Pruning of Amenity Trees'*.

Australian Standards Association (2009) AS 4970- 2009 - *Australian Standard 4970-2009 'Protection of trees on development sites'*.

Barrell J (1996) - Pre-planning Tree Surveys: SULE is the Natural Progression. Arboricultural Journal 17, 33-46.

Harris et al (2004). Harris RW, Clark JR, Matheny NP: Arboriculture – Integrated Management of Landscape Trees Shrubs and Vines 4TH Edition. Prentice Hall, New Jersey 07458.

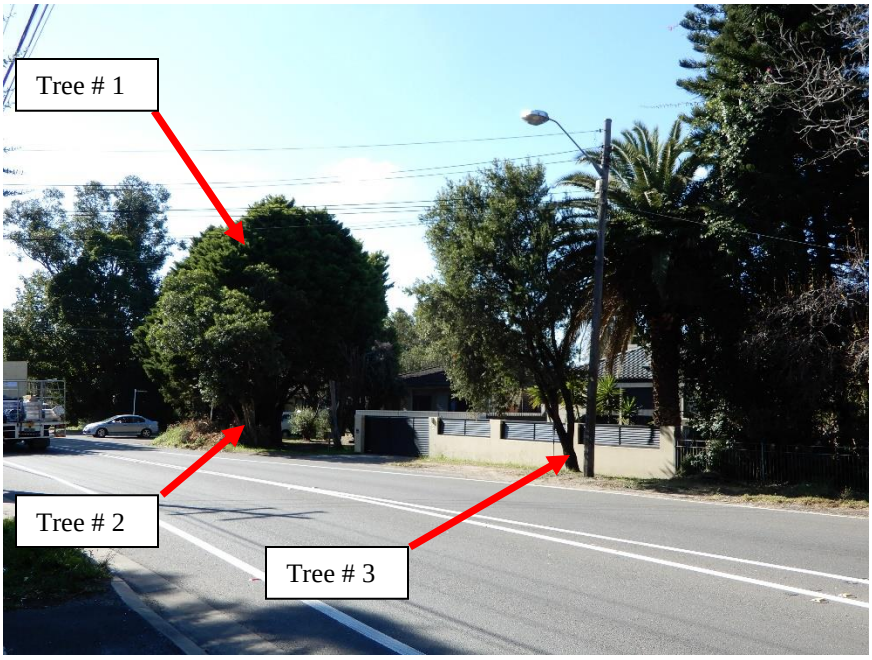
Pizzey G and Knight F 1997. Field Guide to the Birds of Australia. Updated and reprinted 2001 edition. Published by Angus and Robertson, Harper Collins Publishing, Pymble NSW Australia.

Transport for NSW (2020) - General Arrangement Plan prepared by Transport for NSW dated 6/11/2020 and identified as Registration Number DS2020/000130, Sheets 1 to 5.

Transport for NSW (2020) - Stormwater Management Plan prepared by Transport for NSW dated 6/11/2020 and identified as Registration Number DS2020/000130, Sheets 1 to 5.

Transport for NSW (2020) - Utilities Impact Assessment Plan prepared by Transport for NSW dated 6/11/2020 and identified as Registration Number DS2020/000130, Sheets 1 to 5.

APPENDIX A



Photograph 1: Illustrating the location and context of trees 1, 2 and 3.

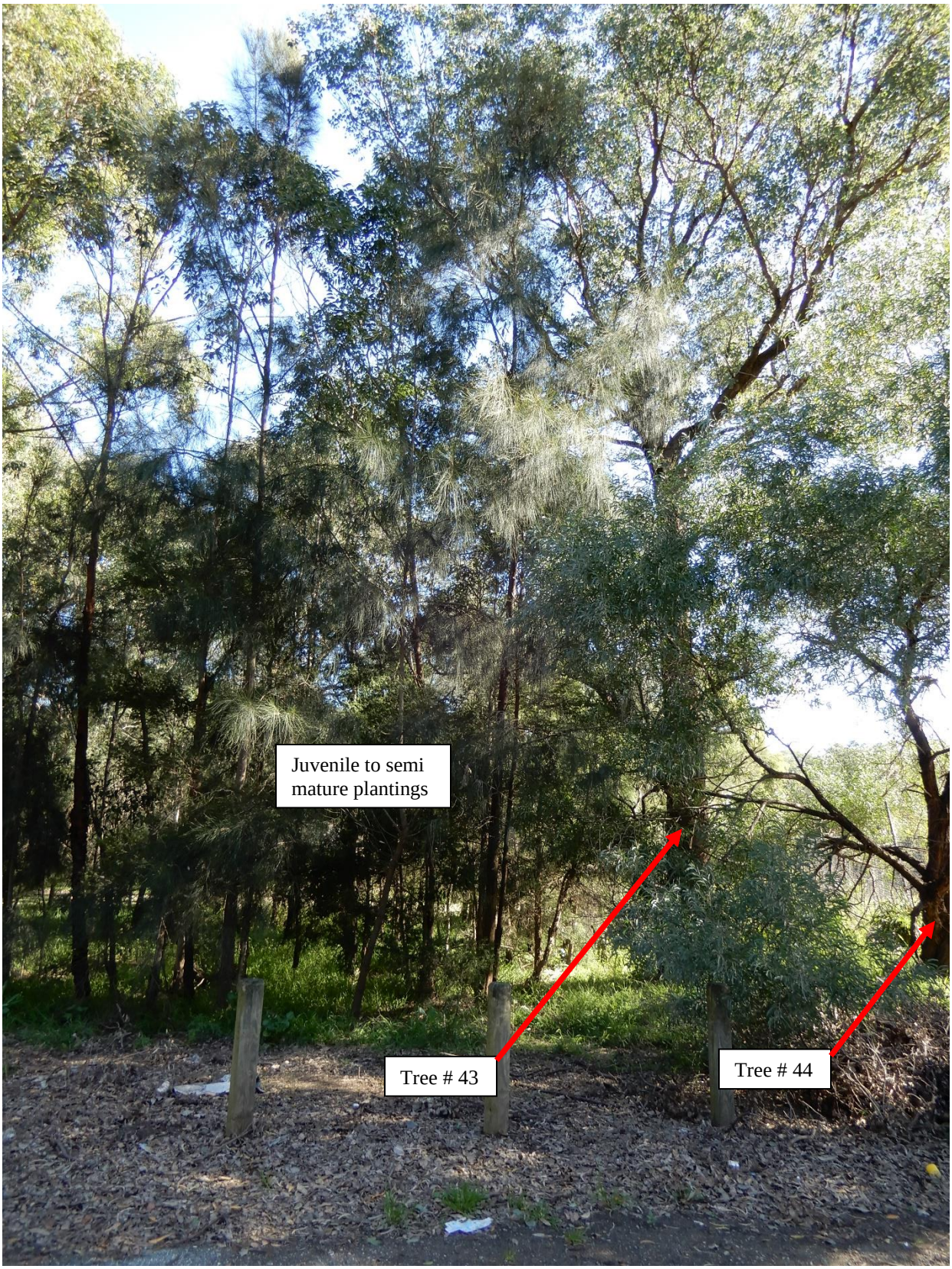
Photograph 2: Tree # 6 – Illustrating the tree's location and context.

Photograph 3: Illustrating the location and context of tree 7.

Photograph 4: Illustrating the location and context of trees 8 to 28 and tree 45

Photograph 5: Illustrating the location and context of trees 29, 30 and 31.

Photograph 6: the location and context of trees 32 to 42



Photograph 7: Illustrating the location and context of tree 43 and 44 and the adjacent semi mature plantings.

Photograph 8: Illustrating the proximity of trees 8 to 27 to the existing road alignment.

APPENDIX B - TREE DATA SUMMARY - HENRY LAWSON DRIVE GEORGES HALL

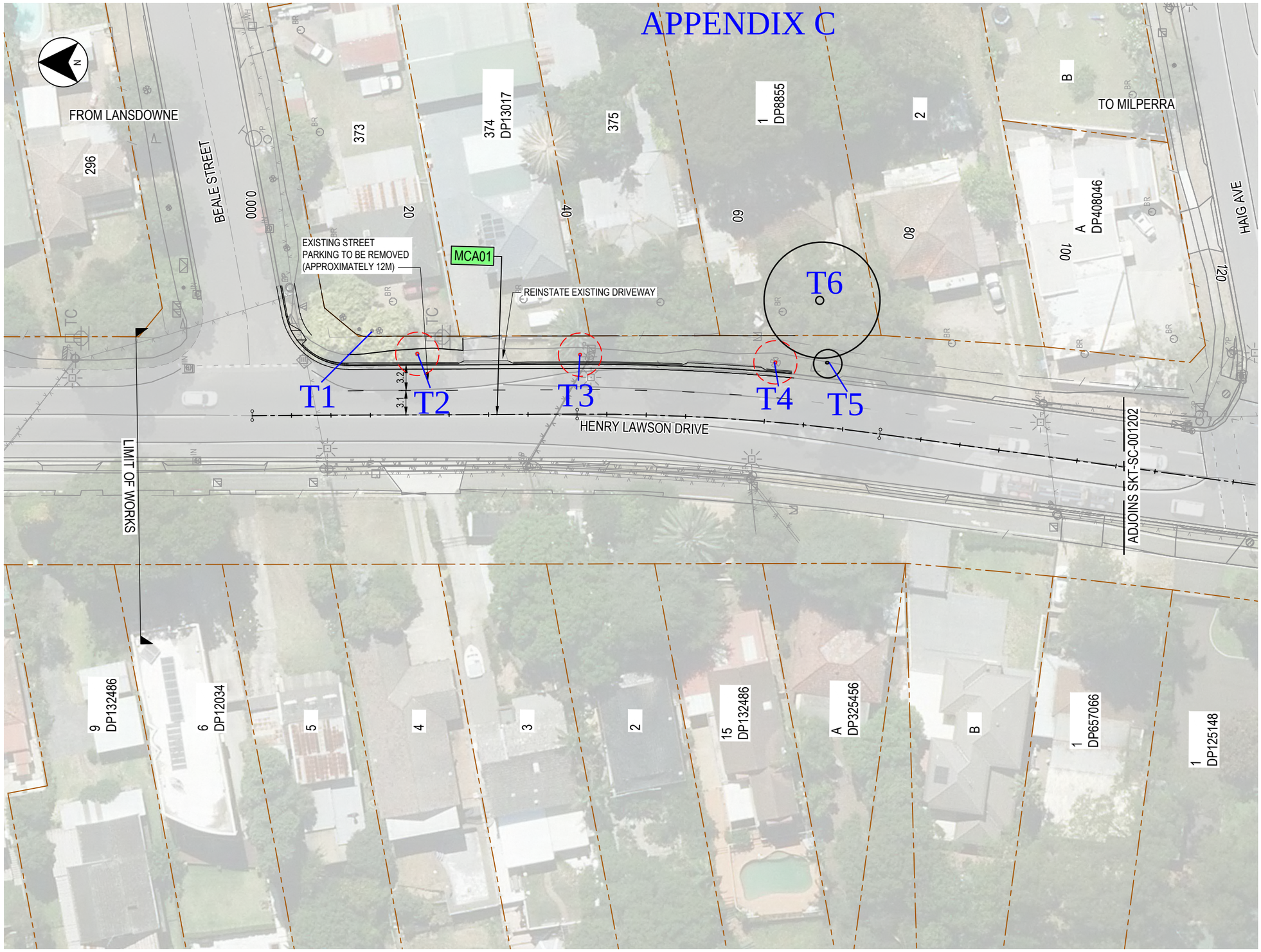
Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
1	*Cupressus macrocarpa 'Brunniana'* (Brunning's Golden Cypress)	12	9	Up to 370 (780 above the root flare)	780	780	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy to the SW	Lower limbs pruned in past to 3 metres	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	The tree's past canopy development has been suppressed. The tree displays fair branch attachment with multiple leaders from near ground level with some evidence of poor attachment at the junctions - not considered at risk of failure in the short term but the increase of failure will increase as the tree ages.
2	*Tristaniopsis laurina* (Water Gum)	5.5	4 x 7	Up to 210 (420 x 460 above the root flare)	440	440	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy to the SW	Lower limbs pruned in past to 2 metres	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low to moderate landscape significance	3	The tree's past canopy development has been suppressed. The tree displays fair branch attachment with multiple leaders from near ground level with some evidence of poor attachment at the junctions - not considered at risk of failure.
3	*Callistemon viminalis* (Weeping Bottlebrush)	6	4 x 5	Up top 210 (340 above the root flare)	340	340	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy to the north	Lower limbs pruned in past to 2.5 metres, upper branches pruned for OH wires on south	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low to moderate landscape significance	3	Canopy bias due to past pruning. The tree displays fair branch attachment with multiple leaders from 0.8 metres with some evidence of poor attachment at the junctions - not considered at risk of failure.
4	*Callistemon viminalis* (Weeping Bottlebrush)	6	3	Up to 150 (160, 220 above the root flare)	270	270	Fair foliage condition	Mature	Multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 2.5 metres	Appears stable	Sound branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low landscape significance	3	At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low to moderate levels of dieback.
5	*Callistemon viminalis* (Weeping Bottlebrush)	3	1.5	60, 80	100	150	Fair foliage condition	Semi Mature	Multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 1.5 metres	Appears stable	Sound branch attachment	Moderate health	Poor vigour	35%	No visual evidence of significant pest or disease	3 Short (5 to 15 years)	Low landscape significance	3	At the time of inspection the tree was of moderate health and poor vigour and exhibited reduced foliage density and high levels of dieback.
6	*Eucalyptus microcorys* (Tallowwood)	24	18	ca. 1200	1200	1400	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 4 metres	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree displays fair branch attachment with evidence of past failures. At the time of inspection the tree exhibited low levels of deadwood.
7	*Eucalyptus tereticornis* (Forest Red Gum)	11	7	ca. 360	360	410	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	
8	*Eucalyptus tereticornis* (Forest Red Gum)	18	12	700 x 900	800	980	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the north	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	Tissue dysfunction in lower trunk possibly due to fungal canker and tissue loss due to Longicorn Beetle larvae activity.	2 Medium (15 to 40 years)	High landscape significance	1	The tree's past canopy development has been suppressed. Tissue dysfunction in lower trunk possibly due to fungal canker and tissue loss due to Longicorn Beetle larvae activity. Mistletoe present through crown. At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low levels of dieback. Past mechanical damage to lower trunk on north. The tree exhibits fair branch attachment with codominant leaders from 2.5 metres with some evidence of poor attachment at the junction - not considered at risk of failure in the short term.
9	*Eucalyptus tereticornis* (Forest Red Gum)	22	8 x 12	560 x 580	570	690	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy on an east x west axis	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Fair vigour	5%	Possible decay at 1.6 metres on east side following past wounding (branch failure)	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	The tree's past canopy development has been suppressed. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback. Possible decay at 1.6 metres on east side following past wounding (branch failure)
10	*Eucalyptus tereticornis* (Forest Red Gum)	7	4	250	250	290	Good foliage condition	Semi Mature	Single trunk	Slight trunk lean to the east	All canopy to the east	Lower limbs pruned in past to 2 metres	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low to moderate landscape significance	3	The tree's past canopy development has been significantly suppressed. The tree displays fair branch attachment with evidence of past branch failure.

Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
11	*Eucalyptus tereticornis* (Forest Red Gum)	21	6 x 14	290, 380	480	580	Fair foliage condition	Mature	Twin trunked	Upright trunk	Majority of canopy on an east x west axis	No evidence of significant past pruning	Appears stable	Fair branch attachment	Moderate health	Fair vigour	15%	High levels of tissue loss on lower trunk of east leader	3 Short (5 to 15 years)	Moderate to high landscape significance	3	The tree's past canopy development has been significantly suppressed. High levels of tissue loss on lower trunk of east leader. At the time of inspection the tree was of moderate health and fair vigour and exhibited reduced foliage density and moderate to high levels of dieback.
12	*Eucalyptus tereticornis* (Forest Red Gum)	18	5 x 12	200, 210, 430	520	620	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy on an east x west axis	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate to high landscape significance	1	The tree's past canopy development has been significantly suppressed. Evidence of past mechanical damage to lower trunk on north. Th tree displays fair branch attachment with multiple leaders - not considered at risk of failure.
13	*Eucalyptus tereticornis* (Forest Red Gum)	12	6	310	310	370	Good foliage condition	Semi Mature	Single trunk	Slight trunk lean to the west	Majority of canopy to the west	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	The tree's past canopy development has been suppressed.
14	*Eucalyptus tereticornis* (Forest Red Gum)	22	9	440 x 600	520	540	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the south west	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	Decay in trunk on west side following past tissue loss - fruiting body at 1.5 metres (Phellinus spp.)	2 Medium (15 to 40 years)	Moderate to high landscape significance	2	The tree's past canopy development has been suppressed. Decay in trunk on west side following past tissue loss - fruiting body at 1.5 metres (Phellinus spp.) Extent of decay not known without further testing.
15	*Eucalyptus tereticornis* (Forest Red Gum)	18	6 x 9	460	460	540	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the east	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate to high landscape significance	2	The tree's past canopy development has been suppressed.
16	*Eucalyptus tereticornis* (Forest Red Gum)	8	3 x 5	260	260	300	Good foliage condition	Semi Mature	Single trunk	Slight trunk lean to the NW	Majority of canopy on an east x west axis	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Low to moderate landscape significance	3	The tree's past canopy development has been significantly suppressed. Evidence of past mechanical damage to lower trunk at 1.6 metres on south side.
17	*Corymbia citriodora* (Lemon Scented Gum)	22	10 x 12	330	330	410	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate to high landscape significance	2	Evidence of past tissue loss (mechanical damage) to lower trunk on NW side.
18	*Eucalyptus tereticornis* (Forest Red Gum)	19	6 x 8	380	380	480	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	Longicorn Beetle larvae damage to tissue on lower trunk on SE.				Longicorn Beetle larvae damage to tissue on lower trunk on SE. The tree displays fair branch attachment with codominant leaders from 4.5 metres - appears sound.
19	*Corymbia citriodora* (Lemon Scented Gum)	16	8	280	280	320	Good foliage condition	Semi Mature	Single trunk	Distinct trunk lean to the west	All canopy to the west	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	
20	*Eucalyptus spp.* (Rough Barked Eucalypt)	5	6	210	210	300	Good foliage condition	Semi Mature	Single trunk	Distinct trunk lean to the NE	All canopy to the NE	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Low landscape significance	3	The tree's past canopy development has been significantly suppressed. No fruit available to confirm species.
21	*Eucalyptus tereticornis* (Forest Red Gum)	11	5	240	240	280	Good foliage condition	Semi Mature	Single trunk	Slight trunk lean to the NW	Majority of canopy to the west	No evidence of significant past pruning	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	
22	*Eucalyptus tereticornis* (Forest Red Gum)	16	6	220	220	340	Good foliage condition	Semi Mature	Single trunk	Slight trunk lean to the NW	All canopy to the NW	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	
23	*Eucalyptus tereticornis* (Forest Red Gum)	17	5	290	290	380	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Majority of canopy to the west	Upper branches pruned for OH wires on west	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	The tree displays fair branch attachment with multiple regrowth following past pruning for OH wires.
24	*Eucalyptus tereticornis* (Forest Red Gum)	13	6 x 8	240, 330	410	360	Good foliage condition	Semi Mature	Twin trunked	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	
25	*Eucalyptus tereticornis* (Forest Red Gum)	21	8 x 10	440	440	470	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the west	Upper branches pruned for OH wires on west	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate to high landscape significance	2	The tree's past canopy development has been suppressed.

Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
26	*Corymbia citriodora* (Lemon Scented Gum)	21	12 x 16	480	480	610	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the SW	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	The tree displays fair branch attachment with evidence of past branch failures.
27	*Eucalyptus tereticornis* (Forest Red Gum)	25	10	380 x 460	420	500	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair to poor branch attachment	Good health	Good vigour	<5%	Possible decay at 8 metres	2 Medium (15 to 40 years)	High landscape significance	1	The tree displays fair to poor branch attachment with a past failure (and associated wounding) at 8 metres - possible decay at wound site.
28	*Eucalyptus tereticornis* (Forest Red Gum)	28	19	960 x 1240	1100	1120	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 2 metres and upper branches pruned for OH wires on SW	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Significant in the landscape	1	Significant in the landscape. The tree displays fair branch attachment with codominant leaders from 2 metres (not considered at risk of failure in the short term) and evidence of past branch failures.
29	*Angophora floribunda* (Rough Barked Apple)	18	12	590 x 670	630	780	Good foliage condition	Mature	Single trunk	Slight trunk lean to the south	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree exhibits cracked and displaced bark from ground level to 5 metres possibly due to torsional stress under wind loading. At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback.
30	*Angophora floribunda* (Rough Barked Apple)	16	12	580	580	630	Good foliage condition	Mature	Single trunk	Slight trunk lean to the north	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Moderate health	Fair vigour	10 to 15%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree exhibits cracked and displaced bark from ground level to 4 metres possibly due to torsional stress under wind loading. At the time of inspection the tree was of moderate health and fair vigour and exhibited low to moderate levels of dieback.
31	*Angophora floribunda* (Rough Barked Apple)	16	12	550 x 590	570	640	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	High landscape significance	1	At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback.
32	*Angophora floribunda* (Rough Barked Apple)	12	4 x 6	310	310	330	Good foliage condition	Semi Mature	Single trunk	Upright trunk	All canopy to the west	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate landscape significance	2	The tree's past canopy development has been significantly suppressed. At the time of inspection the tree exhibited low levels of dieback. There is evidence of past damage to the leader at 6 metres - appears sound.
33	*Eucalyptus baueriana* (Blue Box)	19	12	740	740	800	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the south	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	Slight canopy bias to the south. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback and epicormic growth.
34	*Angophora floribunda* (Rough Barked Apple)	21	13	520	520	600	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	Moderate to high landscape significance	2	The tree displays fair branch attachment with codominant leaders from 7 metres with some evidence of poor attachment at the junction - not considered at risk of failure in the short term. At the time of inspection the tree was of fair vigour and exhibited low levels of dieback.
35	Dead Tree	16	11	680	N/A	750	The tree is dead										100%				4	The tree is dead.
36	*Eucalyptus baueriana* (Blue Box)	9	9 x 12	510	510	560	Good foliage condition	Mature	Single trunk	Slight trunk lean to the south	Majority of canopy to the south	No evidence of significant past pruning	Appears stable	Fair branch attachment	Moderate health	Fair vigour	10 to 15%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	Slight canopy bias to the south. At the time of inspection the tree was of moderate health and fair vigour and exhibited moderate to high levels of dieback and epicormic growth.
37	*Eucalyptus baueriana* (Blue Box)	0	0	0	0	0	Tree has failed in the past										100%				4	The tree has failed in the past.
38	*Eucalyptus baueriana* (Blue Box)	17	12	540	540	600	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the west	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	High landscape significance	1	Moderate canopy bias to the west. At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback.
39	*Eucalyptus baueriana* (Blue Box)	6	5	280	280	320	Good foliage condition	Semi Mature	Single trunk	Distinct trunk lean to the south	Majority of canopy to the south	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Low to moderate landscape significance	3	At the time of inspection the tree was of fair vigour and exhibited low levels of dieback and moderate levels of epicormic growth. Appears stable but has distinct trunk lean - may be at increased risk of failure following significant rainfall events.
40	*Eucalyptus baueriana* (Blue Box)	19	18	800	800	840	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	At the time of inspection the tree exhibited low levels of dieback. Lineal splits in bark from 3 to 6 metres likely to be from torsional stress under wind loading.

Tree No.	*Genus, Species (Common Name)*	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	ULE	Landscape Significance	Retention Value*	Comments
41	*Eucalyptus baueriana* (Blue Box)	11	5 x 12	310, 380	490	620	Poor foliage condition	Mature	Twin trunked	Upright trunk	Majority of canopy on an east x west axis	No evidence of significant past pruning	Appears stable	Fair branch attachment	Poor health	Poor vigour	55%	Jewel Beetle larvae exit holes in lower trunk.	4 (< 5 years)	Low to moderate landscape significance	4	The tree's past canopy development has been significantly suppressed. The tree displays fair branch attachment with codominant leader from 0.7 metres - not considered at risk of failure. At the time of inspection the tree was of poor health and poor vigour and exhibited significantly reduced foliage density, epicormic growth and high levels of dieback. Jewel Beetle larvae exit holes in lower trunk.
42	*Eucalyptus baueriana* (Blue Box)	16	6 x 12	200, 390	440	520	Good foliage condition	Mature	Twin trunked	Upright trunk	Majority of canopy on an east x west axis	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	The tree's past canopy development has been significantly suppressed. DGL estimated as fill at ground level around the tree prevented measurement. At the time of inspection the tree was of fair vigour and exhibited reduced foliage density and low levels of dieback.
43	*Eucalyptus baueriana* (Blue Box)	18	12	740	740	920	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	1 Long (> 40 years)	High landscape significance	1	The tree displays fair branch attachment with codominant leaders from 9 metres (possibly following past failure of the main trunk at this point in the past) - limited view. At the time of inspection the tree exhibited low levels of dieback.
44	*Acacia binervia* (Coastal Myall)	7	9	Up to 320 (510 above the root flare)	510	510	Good foliage condition	Mature	Multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned in past to 3 metres on north side	Appears stable	Sound branch attachment	Good health	Fair vigour	5 to 10%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	Moderate landscape significance	2	At the time of inspection the tree was of fair vigour and exhibited low to moderate levels of dieback (mostly internal dieback).
45	*Corymbia citriodora* (Lemon Scented Gum)	19	11	420	420	510	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Majority of canopy to the east	No evidence of significant past pruning	Appears stable	Fair to poor branch attachment	Good health	Good vigour	5%	No visual evidence of significant pest or disease	2 Medium (15 to 40 years)	High landscape significance	1	Moderate canopy bias to the east. The tree displays fair to poor branch attachment with multiple leaders from 8 metres following past failure of the main leaders - the junction is a weak point in the tree's structure with increased risk of failure but is not considered at risk of failure in the short term.
ca = approximate diameter at breast height (DBH) estimated from nearest property boundary or fence where trees were located on adjoining properties																						
* Retention Values: 1 - High (Priority for retention); 2 - Moderate (Consider for retention); 3 - Low or short ULE (Not warranting specific design consideration) and 4 - Remove (very short ULE, structurally unsound, weed species etc.)																						

APPENDIX C



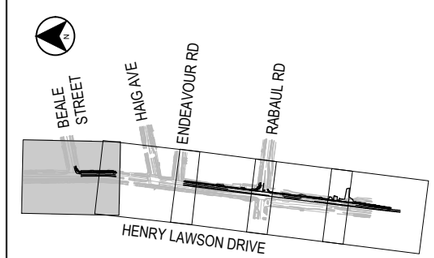
LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. PROPERTY ADJUSTMENTS YET TO BE AGREED UPON BY PROPERTY OWNERS.
3. APPROXIMATELY 38m KERB SIDE PARKING TO BE REMOVED ON THE SOUTHBOUND OF HENRY LAWSON DRIVE DUE TO PROPOSED CARRIAGEWAY WIDENING.

KEYPLAN



CHECK PRINT

Last saved by: BLESS.VARGHESE(2020-06-09) Last Plotted: 2020-06

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RD-001201.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 9-Jun-20 / 2:48:01 PM

PLOT BY: BLESS.VARGHESE

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	05.02.2020	DRAFT ISSUE (STRATEGIC)		P. Manager

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: GREATER SYDNEY DIVISION, EASING SYDNEY'S CONGESTION, PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

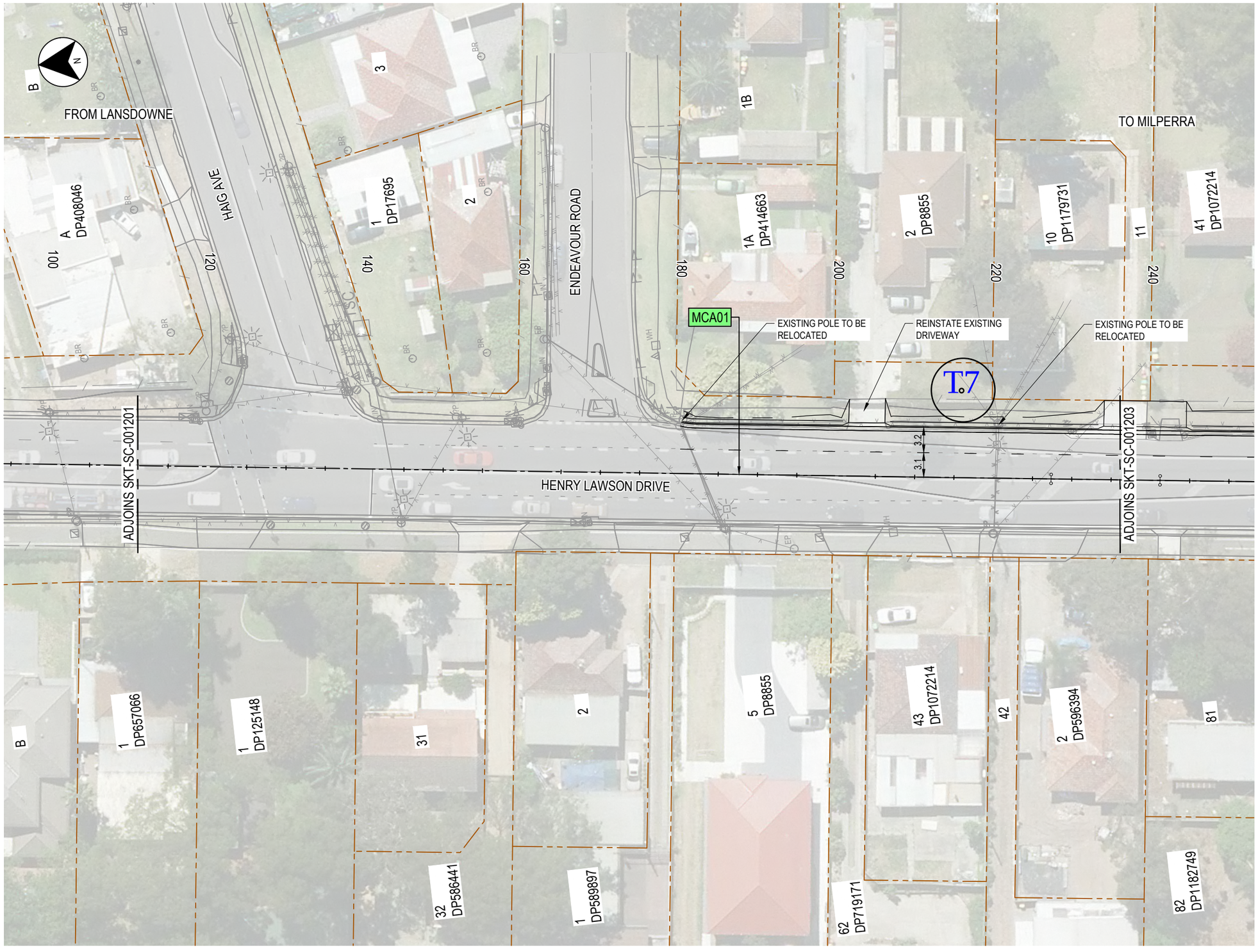
HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 1 OF 5

RMS REGISTRATION No.: DSxxxx/xxxxxx — PART 1

ISSUE STATUS: CONCEPT DESIGN — EDMS No.: - — SHEET No.: SHT-RD-001201 — ISSUE 0



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

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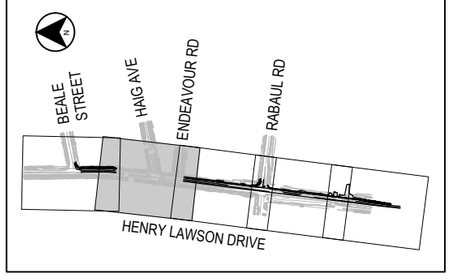
2. PROPERTY ADJUSTMENTS YET TO BE AGREED UPON BY PROPERTY OWNERS.
3. APPROXIMATELY 38m KERB SIDE PARKING TO BE REMOVED ON THE SOUTHBOUND OF HENRY LAWSON DRIVE DUE TO PROPOSED CARRIAGEWAY WIDENING.

KEYPLAN



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PLOT DATE / TIME	PLOT BY
9-Jun-20 / 2:48:24 PM	MASURKARP

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
GREATER SYDNEY DIVISION
EASING SYDNEY'S CONGESTION
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

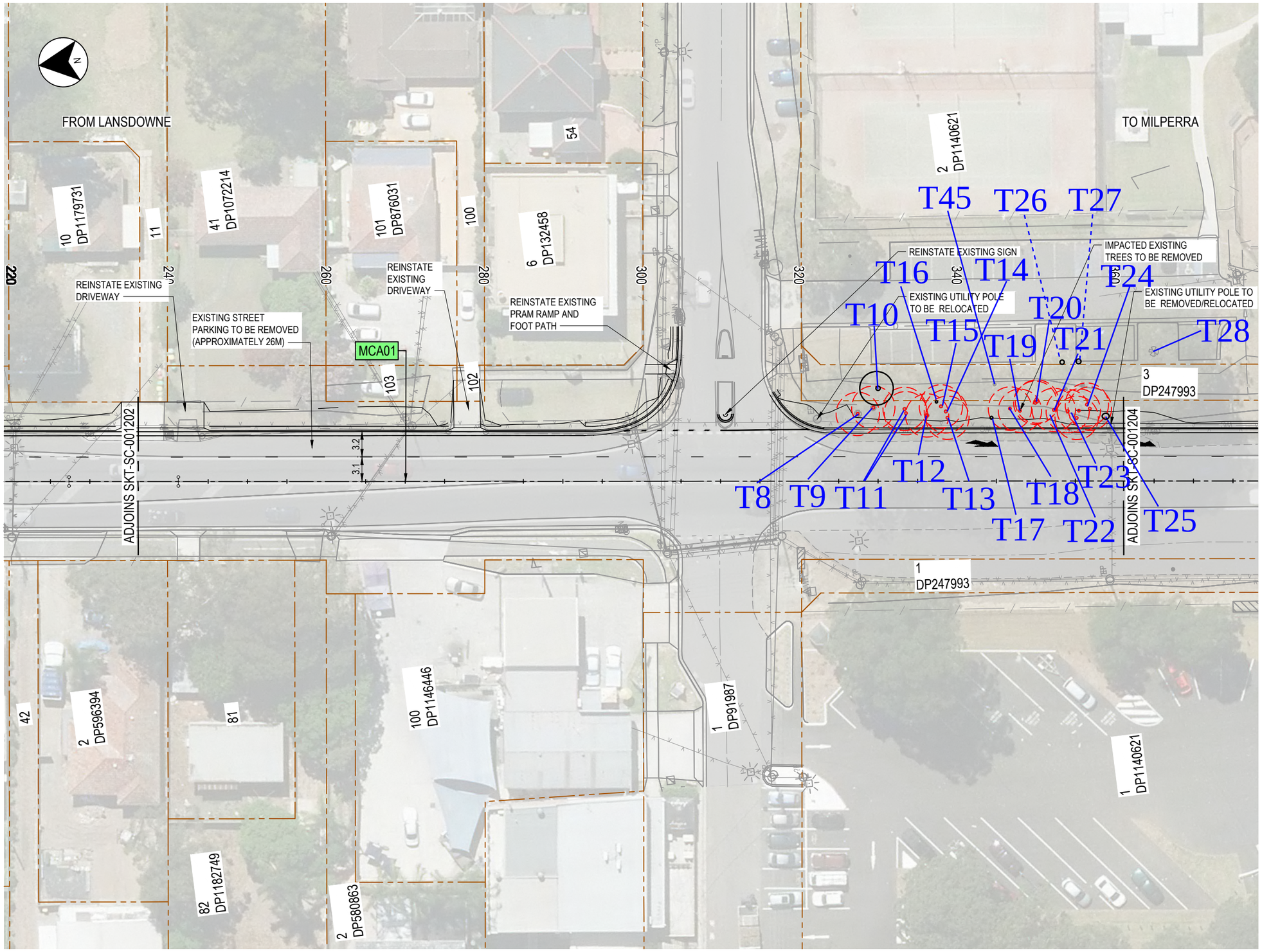
HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 2 OF 5

RMS REGISTRATION No.		PART
DSxxxx/xxxxxx		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
CONCEPT DESIGN	-	SHT-RD-001202 / 0

Last saved by: MASURKARP(2020-06-09) Last Plotted: 2020-06-09



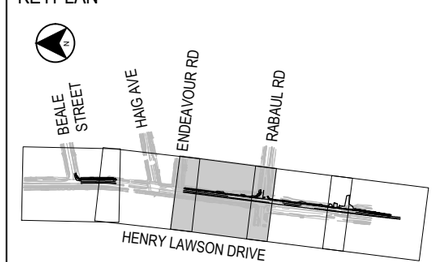
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. PROPERTY ADJUSTMENTS YET TO BE AGREED UPON BY PROPERTY OWNERS.
3. APPROXIMATELY 38m KERB SIDE PARKING TO BE REMOVED ON THE SOUTHBOUND OF HENRY LAWSON DRIVE DUE TO PROPOSED CARRIAGEWAY WIDENING.

KEYPLAN



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			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD	

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: GREATER SYDNEY DIVISION, EASING SYDNEY'S CONGESTION PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 3 OF 5

RMS REGISTRATION No.			PART
DSxxxx/xxxxxx			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
CONCEPT DESIGN	-	SHT-RD-001203	0

Last saved by: MASURKARP(2020-06-09) Last Plotted: 2020-06-09

FROM LANSDOWNE

TO MILPERRA

2 DP1140621

3 DP585387

360 380 400 420 440 460 480 500

EXISTING TREES IMPACTED BY CARRIAGEWAY WIDENING TO BE REMOVED

MCA01

EXISTING POLE TO BE RELOCATED

REINSTATE EXISTING DRIVEWAY

RELOCATE EXISTING UTILITY POLE AND THE FLOOD GAUGE SIGN

EXISTING TREES IMPACTED BY CARRIAGEWAY WIDENING TO BE REMOVED

T33

3 DP247993

ADJOINS SKT-SC-001203

3.1

3.5

HENRY LAWSON DRIVE

T29 T30 T31 T32

ADJOINS SKT-SC-001205

1 DP247993

1 DP1140621

DP580839

LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
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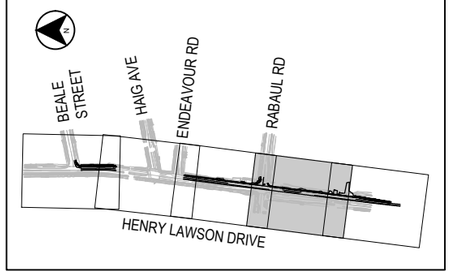
KEYPLAN



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50mm ON A3 SIZE ORIGINAL

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PLOT DATE / TIME	PLOT BY
9-Jun-20 / 2:49:06 PM	MASURKARP

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT

NSW GOVERNMENT Transport for NSW

PREPARED FOR
GREATER SYDNEY DIVISION
EASING SYDNEY'S CONGESTION
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 4 OF 5

RMS REGISTRATION No.			PART
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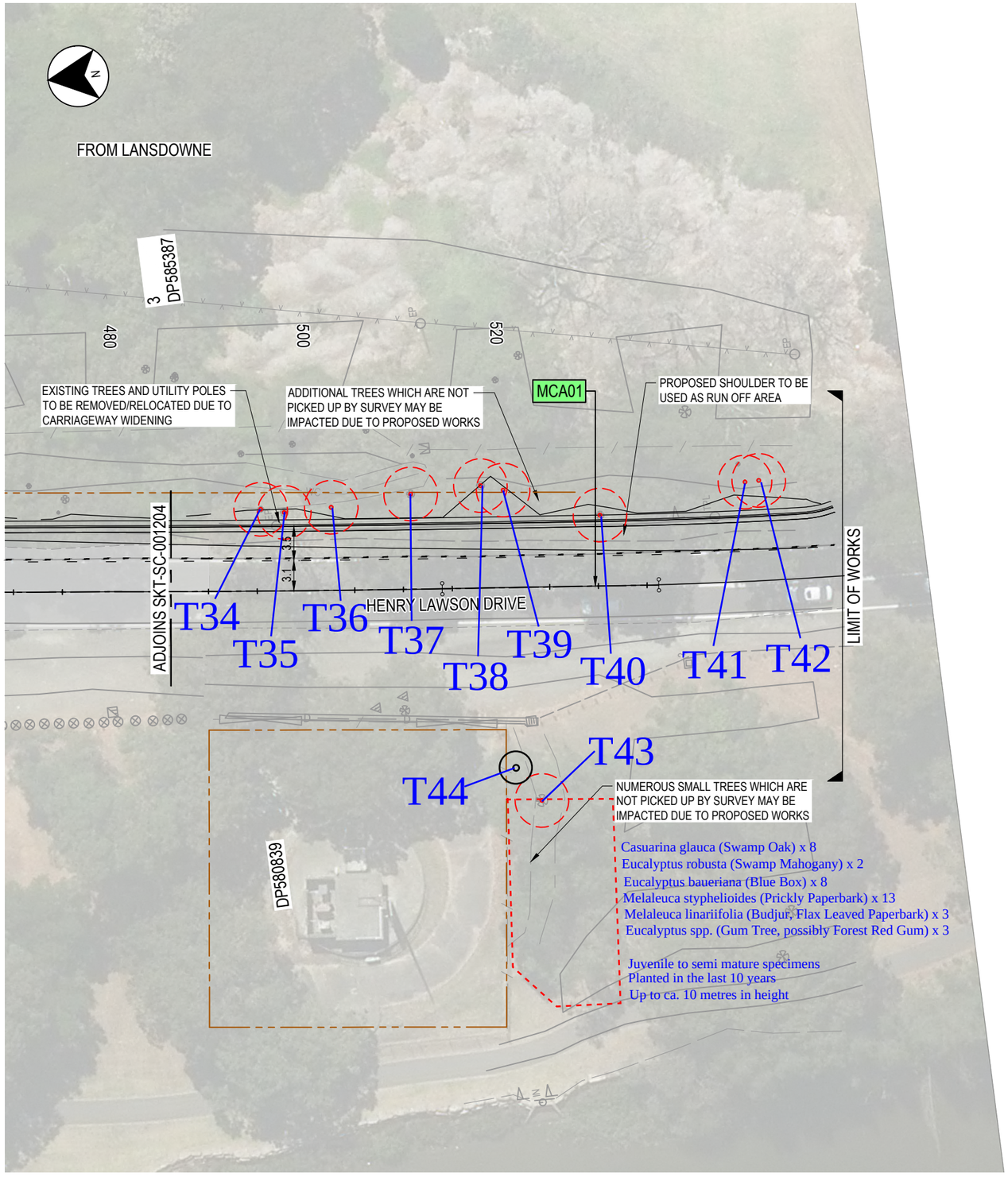
CONCEPT DESIGN	-	SHT-RD-001204	0



LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

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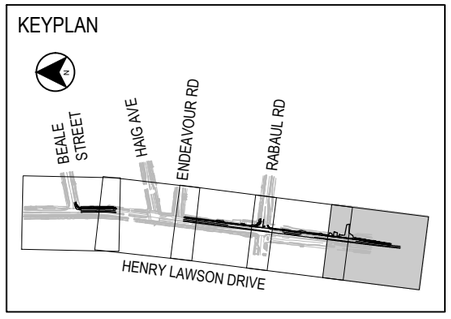
3. APPROXIMATELY 38m KERB SIDE PARKING TO BE REMOVED ON THE SOUTHBOUND OF HENRY LAWSON DRIVE DUE TO PROPOSED CARRIAGEWAY WIDENING.

KEYPLAN



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			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD	-

PLOT DATE / TIME: 9-Jun-20 / 2:49:26 PM — PLOT BY: MASURKARP

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: GREATER SYDNEY DIVISION
EASING SYDNEY'S CONGESTION
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 5 OF 5

RMS REGISTRATION No.: DSxxxx/xxxxxx — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
CONCEPT DESIGN	-	SHT-RD-001205	0

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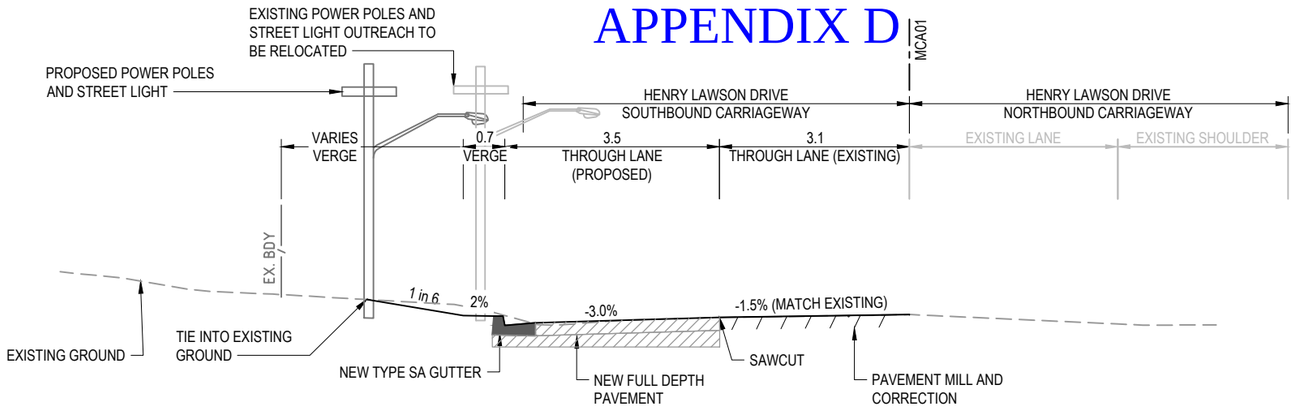
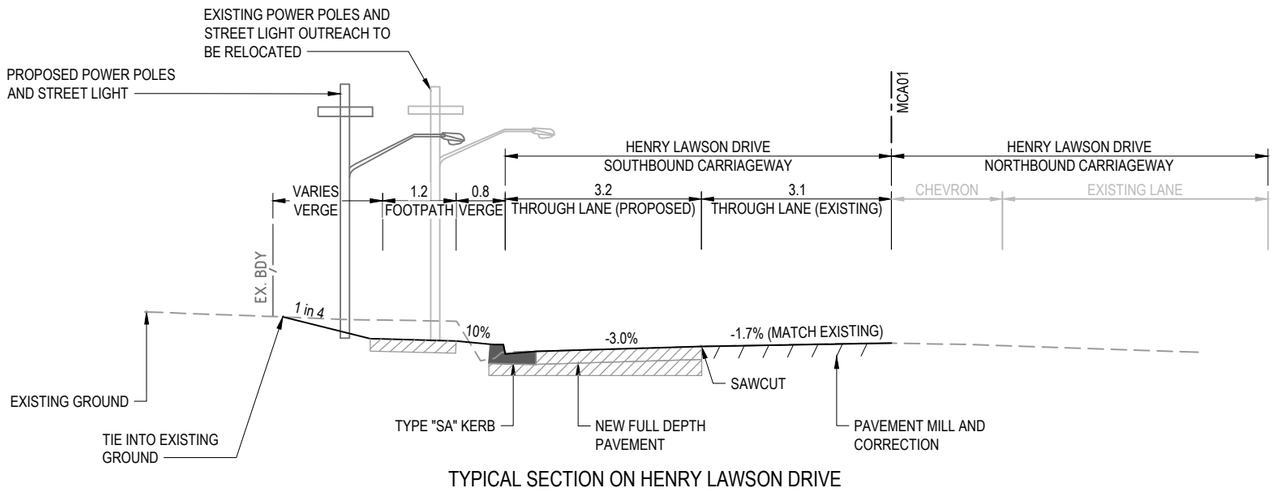
APPENDIX D



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH360 (APPROX.)
SCALE 1:100



TYPICAL SECTION ON HENRY LAWSON DRIVE
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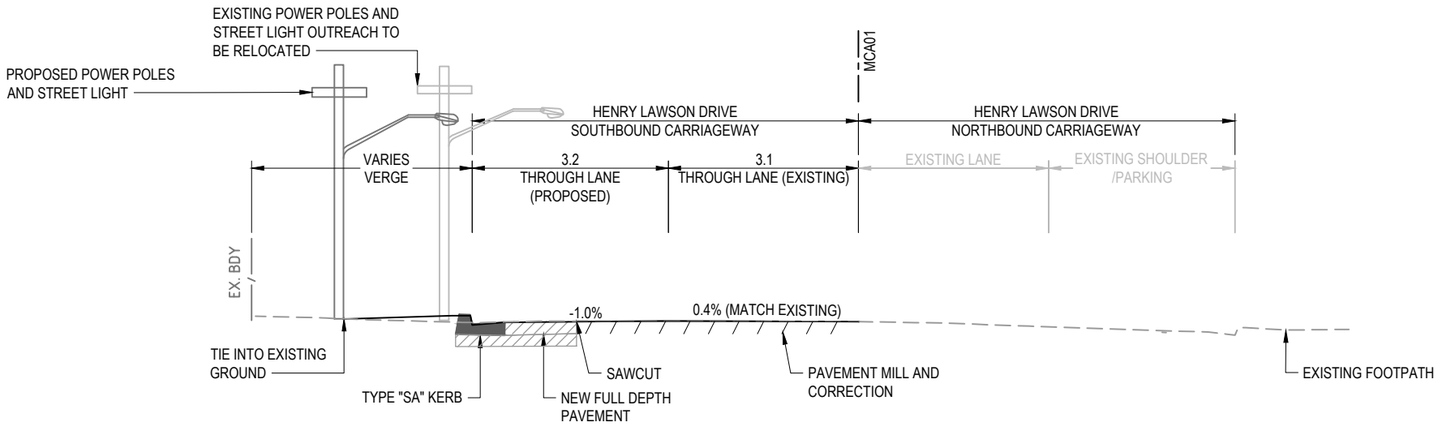
SCALE 1:100



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH40 (APPROX.)
SCALE 1:100

LEGEND

- EXISTING SURFACE
- MILL AND CORRECTION
- NEW PAVEMENT (REFER NOTE 1)

NOTES

1. FOR PAVEMENT PROFILES REFER TO PAVEMENT DRAWINGS PV-000501 TO PV-000502, FOR PAVEMENT DETAILS REFER TO DRAWINGS PV-000521 TO PV-000533.
2. FOR GENERAL NOTES REFER TO DRAWINGS GE-000021 TO GE-000023.
3. FOR CROSS FALL DETAILS ON EXISTING AND PROPOSED ROADS REFER TO CROSS SECTION DRAWINGS RC-005001 TO RC-005012.

CHECK PRINT

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DESIGN LOT CODE: WVR No. | APPROVAL: A. PEREZ 06.11.2020
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:25:58 PM | PLOT BY: MEGHWARB

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	1	06.11.2020	PRE-AFC

REVISION IN PROGRESS

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CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

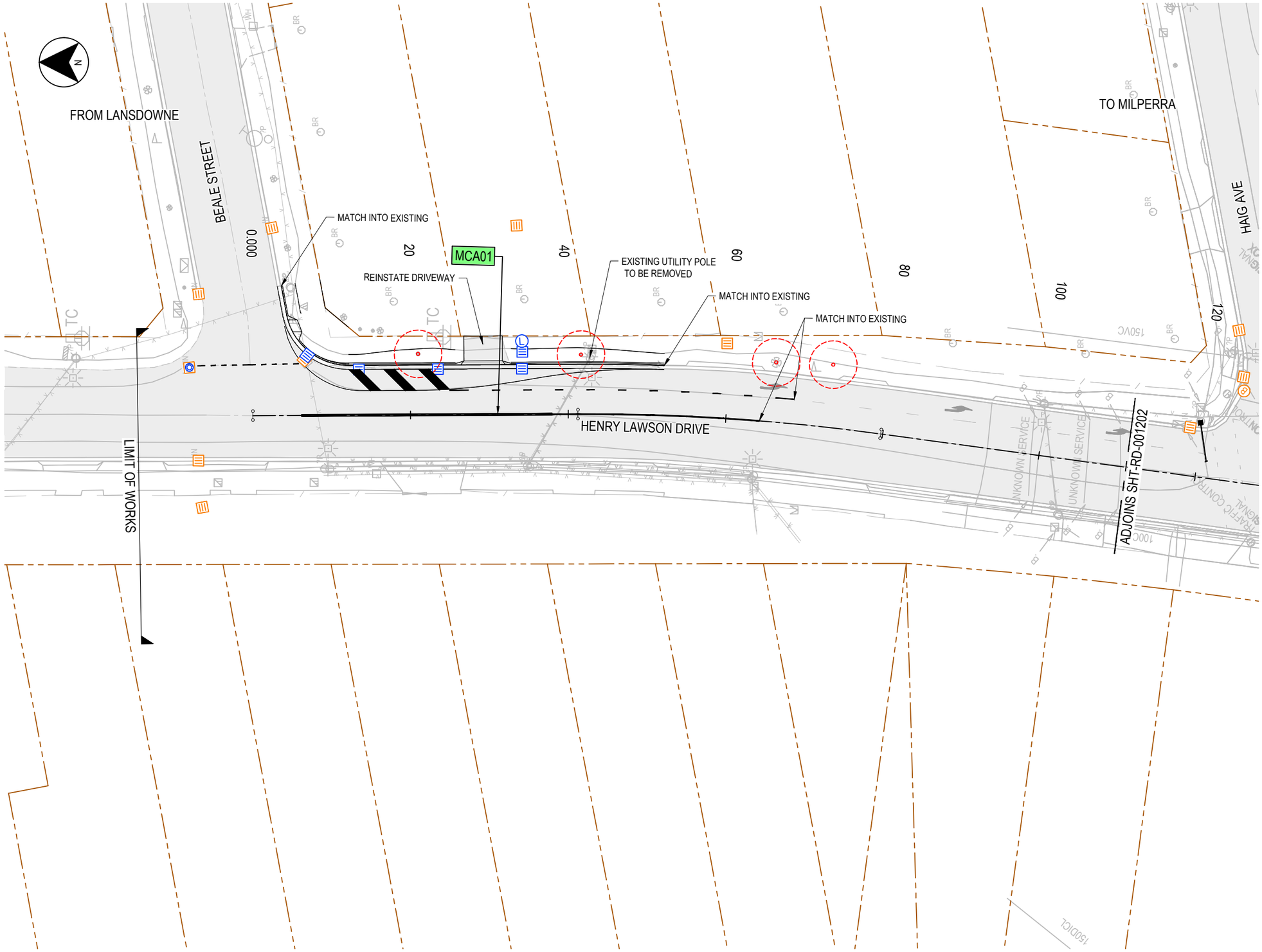
CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
TYPICAL CROSS SECTIONS

A3
SHEET 1 OF 1

TfNSW REGISTRATION No. DS2020/000130 | PART 1
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-GE-000051 | ISSUE 1



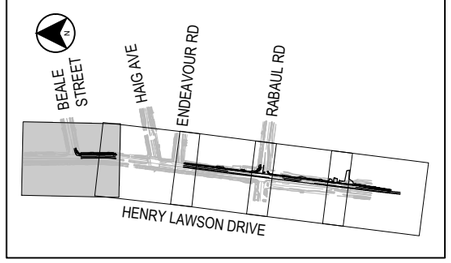
LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:28:17 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

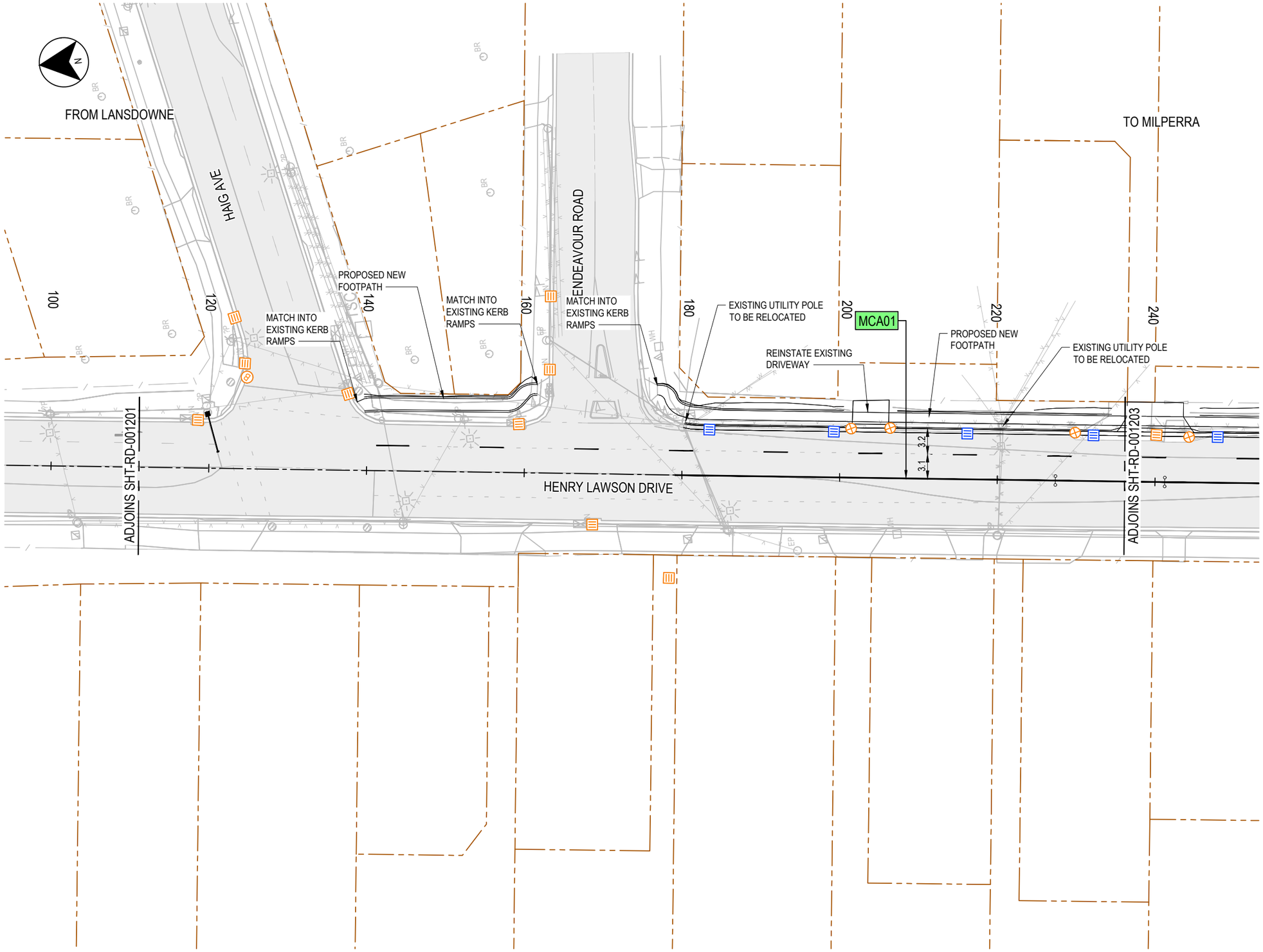
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3
SHEET 1 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001201	1



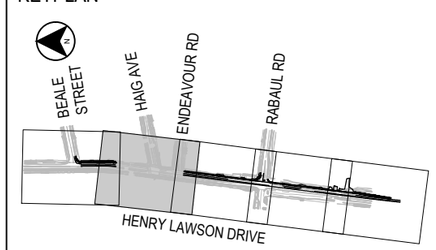
LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:28:33 PM	MEGHWARB

CHECK PRINT (PRELIM. / FINAL)

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

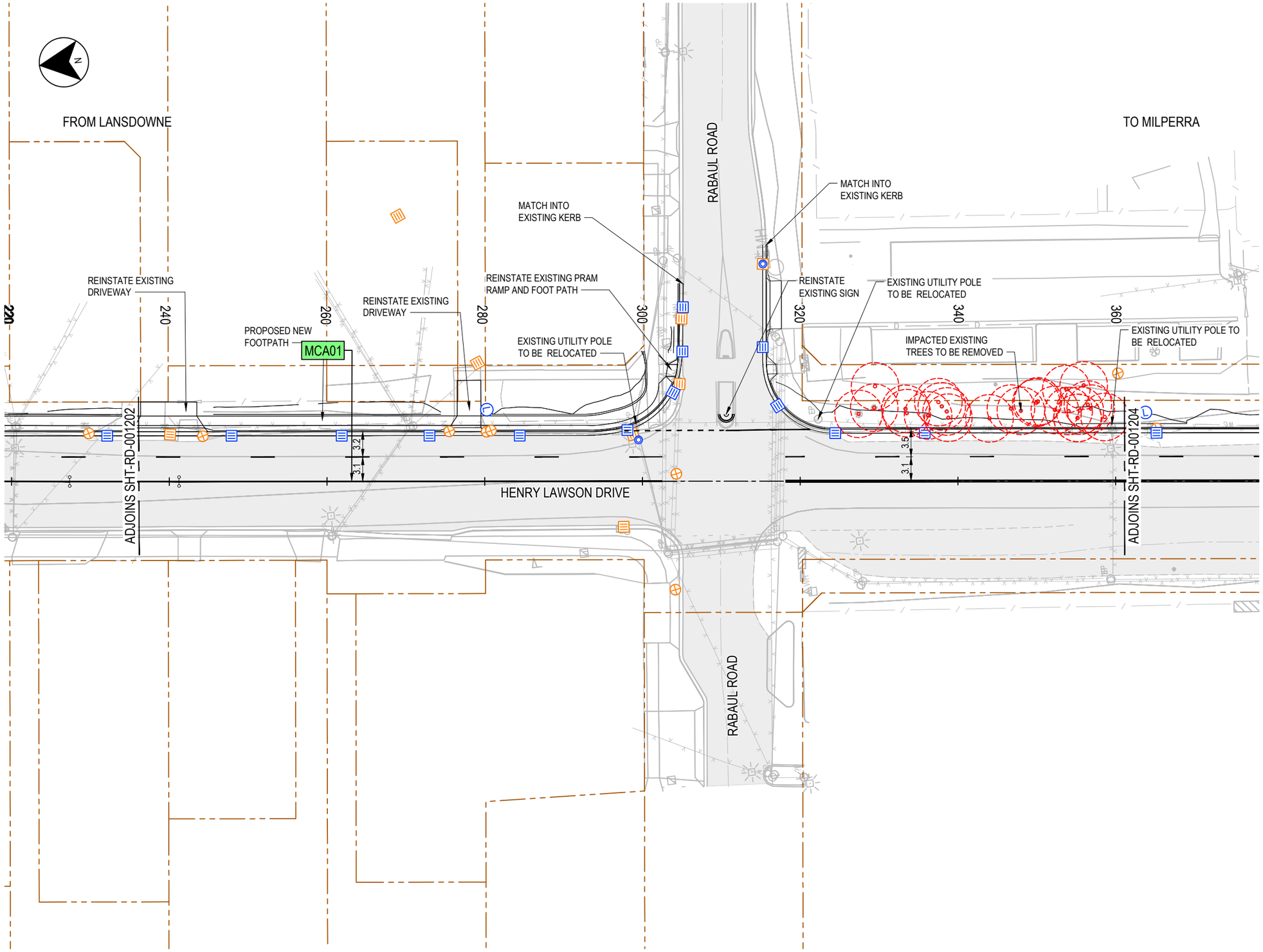
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL GENERAL ARRANGEMENT PLAN

A3

SHEET 2 OF 5

TINSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RD-001202 / 1



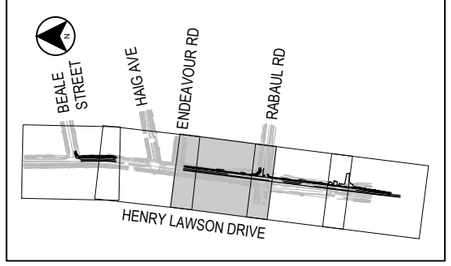
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3

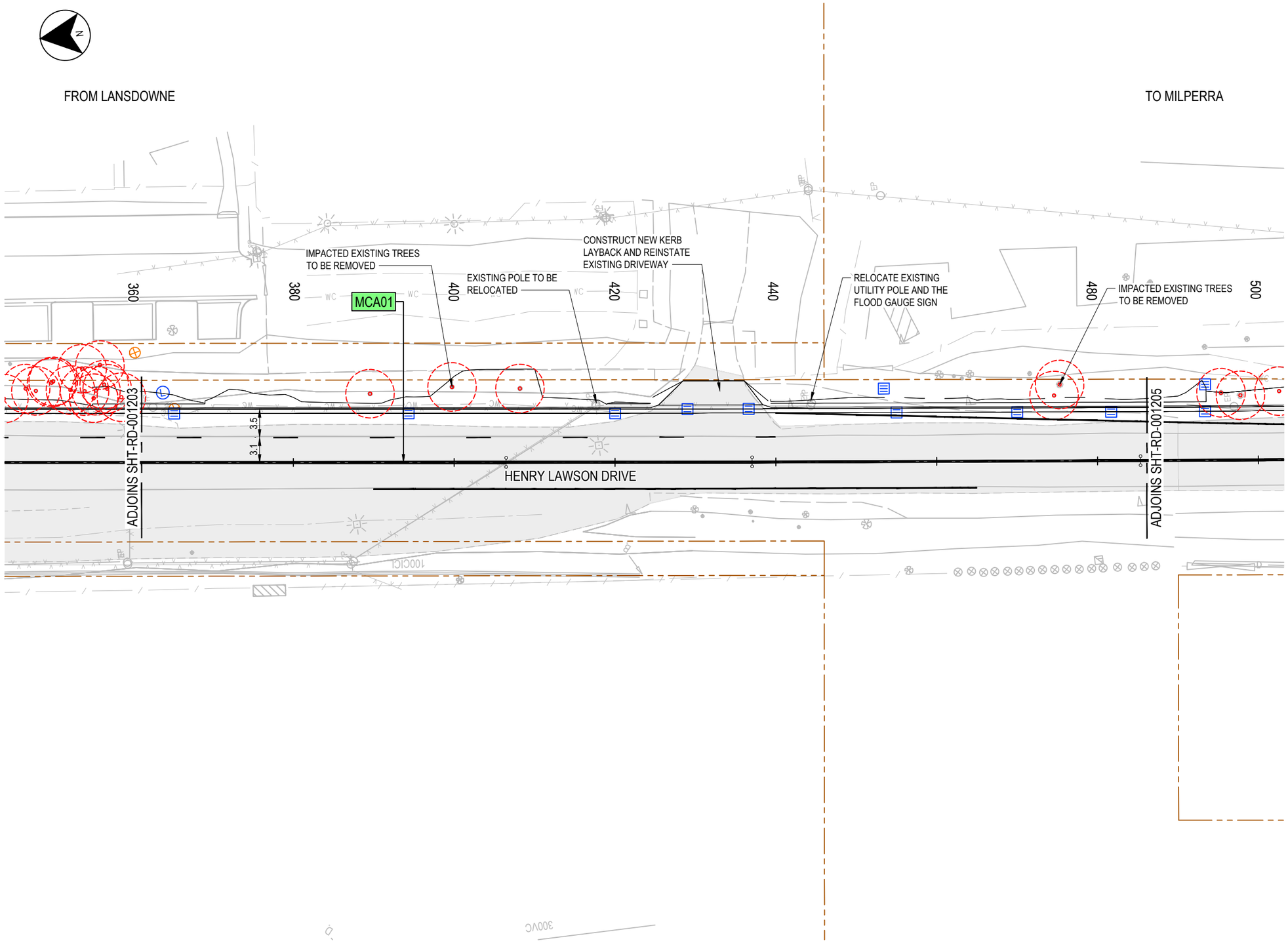
SHEET 3 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001203	1

FROM LANSDOWNE

TO MILPERRA



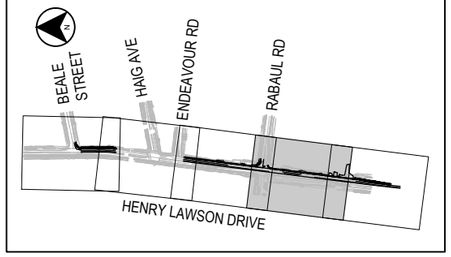
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:27:31 PM	MEGHWARB

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

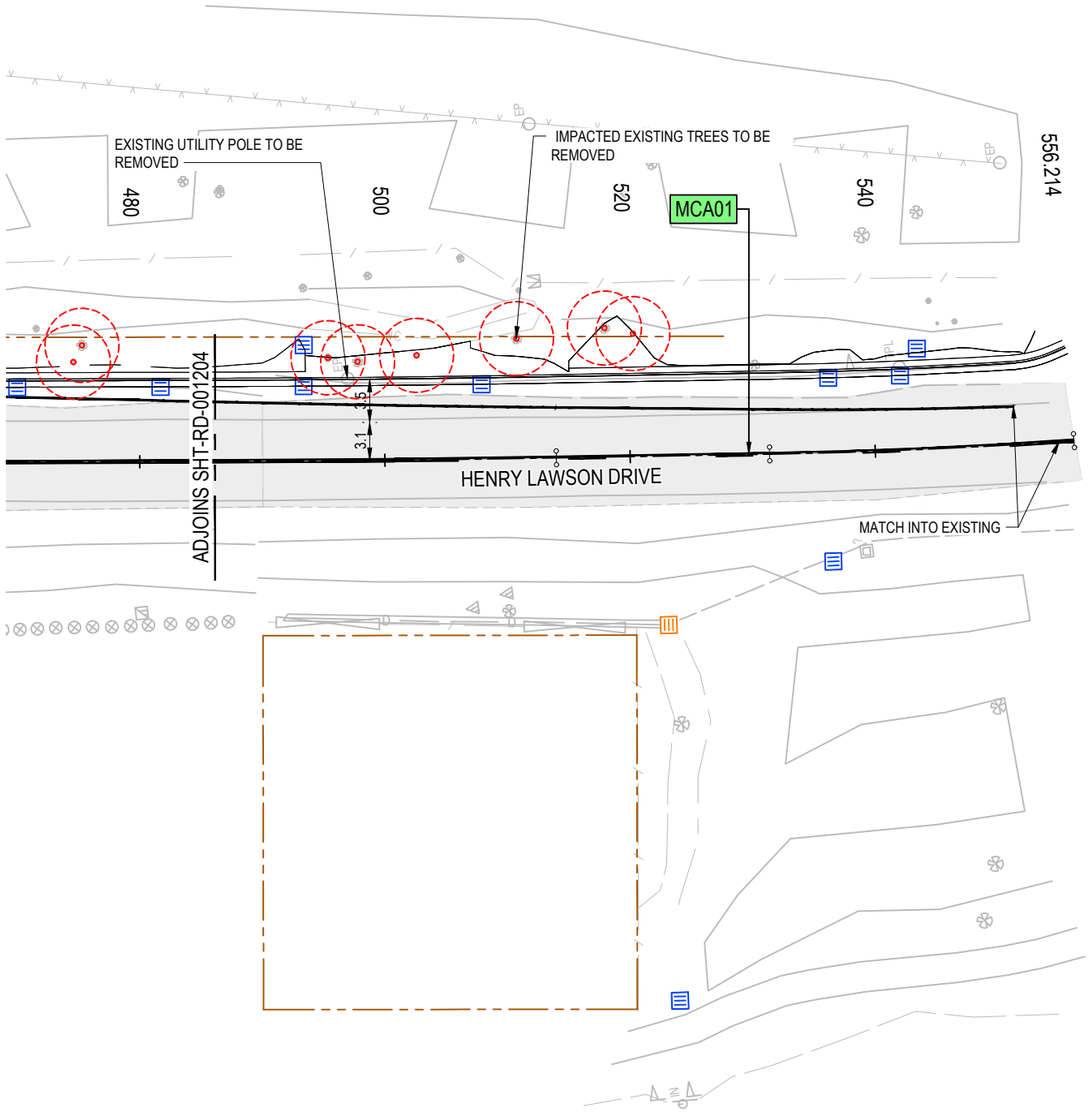
A3

SHEET 4 OF 5

TINSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001204	1

FROM LANSDOWNE

TO MILPERRA



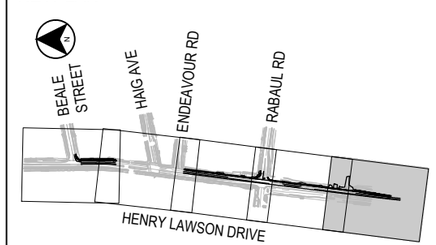
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:27:46 PM	MEGHWARB

CHECK PRINT — PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RD-001205 / 1

FROM LANSDOWNE

TO MILPERRA

BEALE STREET

HAIG AVE

HENRY LAWSON DRIVE

LIMIT OF WORKS

ADJOINS SHT-SM-001002

MCA01

CONCRETE ENCASE NEW PIPE. REFER TO 'PV SERIES' FOR ENCASEMENT DETAIL.

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMPHOLE. POSITION OF LAMPHOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION.

CONNECT NEW PIPE INTO EXISTING GRATED PIT. CONFIRM INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW STORMWATER PIPE

CONTRACTOR TO ADJUST POSITION AND GRATE LEVEL OF PIT WITHIN VERGE TO SUIT LOW POINT, FLOW PATH AND LANDSCAPING.

SHALLOW PIPES BETWEEN C01\02 AND C01\05. REFER TO 'PV SERIES' FOR EDGE DETAIL.

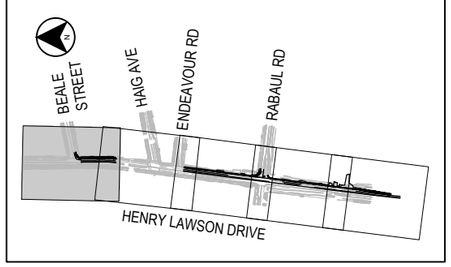
ABANDON EXISTING PIT. CONNECT EXISTING PIPE INTO NEW PIT. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT

RETAIN EXISTING PIPE BETWEEN C01\02 AND EX L16. C01\02 TO HAVE TWO OUTLET PIPES (EXISTING 300 mm PIPE AND PROPOSED 450 mm PIPE).

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- NEW STORMWATER PIPE
- EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:16:00 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER MANAGEMENT PLAN

A3

SHEET 1 OF 5

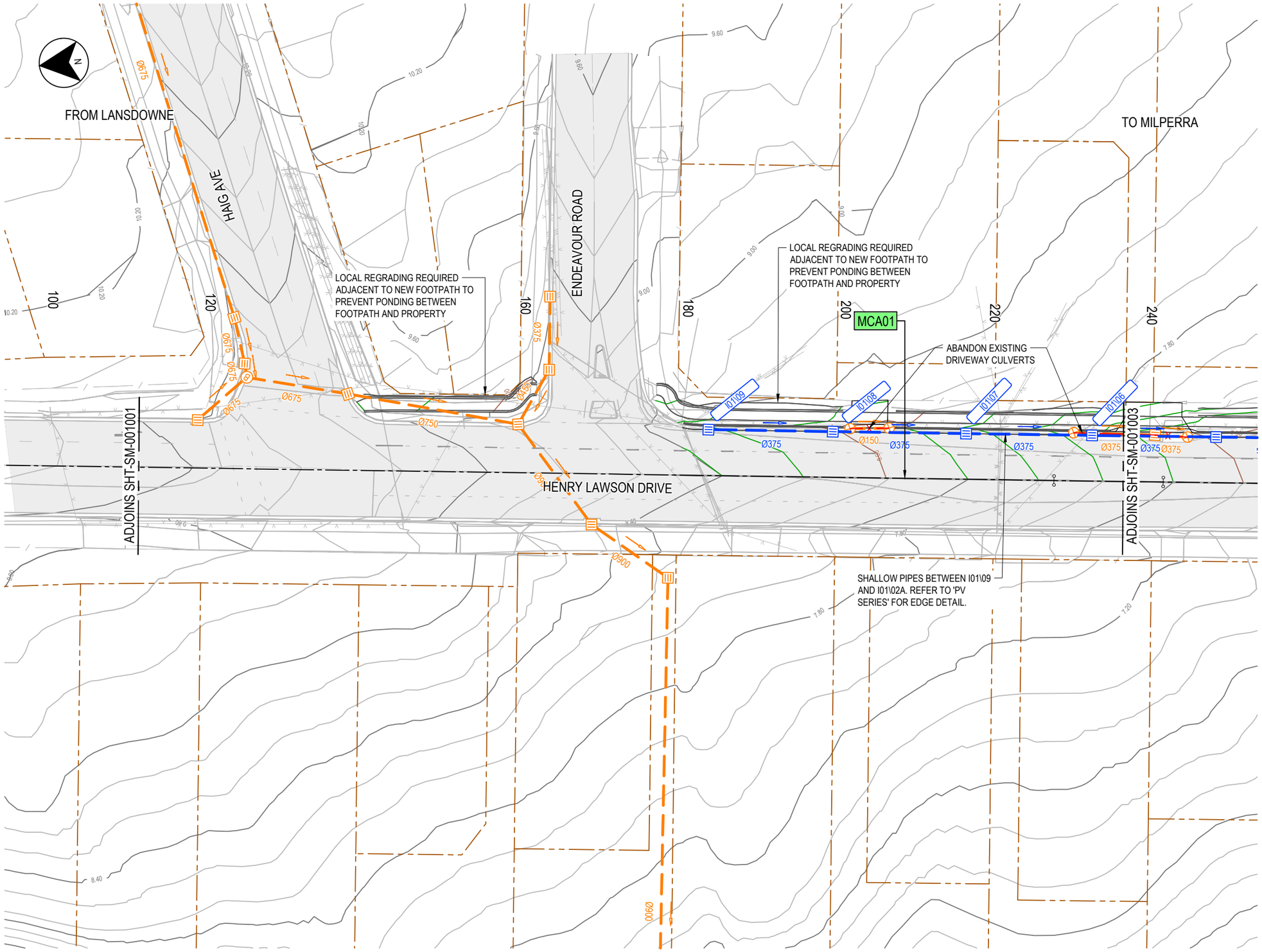
TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-001001

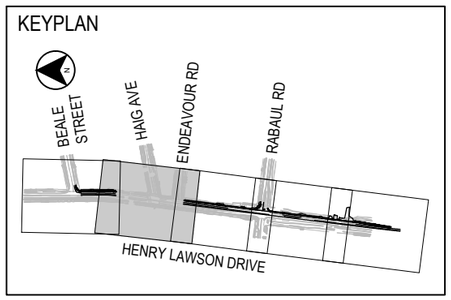
ISSUE: 1



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001002.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:16:25 PM	PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No. / APPROVAL	SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	DRAWINGS / DESIGN PREPARED BY	CHECK PRINT (PRELIM. / FINAL; INITIAL / DATE)
	0	10.08.2020	DRAFT ISSUE (DETAILED)	A. PEREZ			DISCIPLINE
	1	06.11.2020	PRE-AFC	A.PEREZ			DISCIPLINE
			REVISION IN PROGRESS				DISCIPLINE
							DISCIPLINE
					CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-	BACKDRAFTED/CORRECTED
							CONFIRMED

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3 | SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-001002	1

FROM LANSDOWNE

TO MILPERRA

RABAUL ROAD

HENRY LAWSON DRIVE

ADJOINS SHT-SM-001002

ADJOINS SHT-SM-001004

CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT

SHALLOW PIPE BETWEEN B01/03 AND B01/02. REFER TO 'PV SERIES' FOR EDGE DETAIL.

CONTRACTOR TO ADJUST POSITION OF PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND PIT B01\03.

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION

MCA01

ABANDON EXISTING PITS AND PIPE

ABANDON EXISTING PIT AND DRIVEWAY CULVERT

ABANDON EXISTING DRAINAGE PIPE

CONFIRM LOCATION AND INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW OUTLET PIPE. ADJUST EXISTING PIT LINTEL TO SUIT NEW KERB ALIGNMENT.

SHALLOW PIPE BETWEEN EX R7 AND D01/18. REFER TO 'PV SERIES' FOR EDGE DETAIL.

CONCRETE ENCASE NEW PIPE. REFER TO 'PV SERIES' FOR ENCASEMENT DETAIL.

EXISTING SEWER MAIN NEARBY

CONTRACTOR TO ADJUST POSITION OF 1.2 m PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND DRIVEWAY.

SHALLOW PIPES BETWEEN D01/18 AND D01/13. REFER TO 'PV SERIES' FOR EDGE DETAIL.

SHALLOW PIPE BETWEEN I01\09 AND I01\02A REFER TO 'PV' SERIES FOR DETAILS

ABANDON EXISTING DRIVEWAY CULVERT

ABANDON EXISTING PIT AND CONSTRUCT NEW INLET PIT.

REMOVE EXISTING 375 DIA PIPE BACK TO FIRST CLEAN AND SOUND JOINT. INSTALL NEW 375 DIA PIPE AND CONNECT INTO EXISTING 375 DIA PIPE.

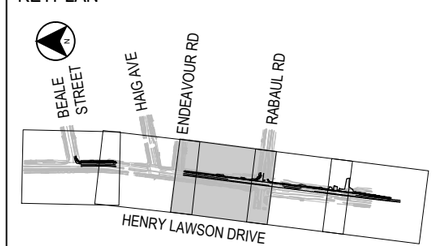
SHALLOW PIPE BETWEEN A01\02 AND I01\02A REFER TO 'PV' SERIES FOR DETAILS

CAUTION
NEW WATER MAIN NEARBY

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:18:11 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER MANAGEMENT PLAN

A3

SHEET 3 OF 5

TINSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-001003

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE TO BE BE CONFIRMED ON SITE DURING CONSTRUCTION

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

CAUTION
EXISTING SEWER MAIN NEARBY

PROTECT PROPOSED BATTER, LOW POINT AND 2 m FROM BACK OF KERB WITH ENKAMAT LINING. ENKAMAT LINING TO BE LAID AND PINNED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. REFER TO SM-SHT-000506 FOR DETAIL.

SHALLOW PIPES BETWEEN D01\18 AND D01\13. REFER TO 'PV SERIES' FOR EDGE DETAIL

ABANDON EXISTING DRAINAGE PIPE

CONTRACTOR TO CONFIRM DEPTH AND ALIGNMENT OF SEWER MAINS PRIOR TO CONSTRUCTION OF THE NEW DRAINAGE LINE TO ENSURE NO CLASH BETWEEN STORMWATER PIPE AND SEWER PIPE PROTECTION. STORMWATER PIPE WITHOUT SOCKET ACHIEVES APPROXIMATELY 25 mm CLEARANCE BELOW PROPOSED SEWER MAIN CONCRETE ENCASEMENT. THE STORMWATER PIPE SOCKETS/JOINTS SHOULD BE PLACED EITHER SIDE OF THE SEWER MAINS OR IN BETWEEN THE SEWER MAINS AND SHOULD NOT BE PLACED DIRECTLY UNDER EITHER SEWER MAIN.
CONTRACTOR TO CONFIRM NEW DRAINAGE PIPE HAS ADEQUATE CLEARANCE TO THE SEWER MAIN AND DESIGN PIPE GRADE CAN BE ACHIEVED

ADJOINS SHT-SM-001003

ADJOINS SHT-SM-001005

MCA01

EX.1.0

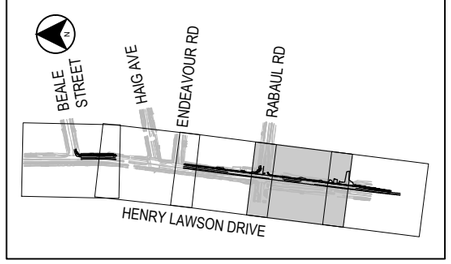
D01\02 D01\14 D01\13 D01\12 D01\11 D01\10 K01\02 D01\09 D01\08 D01\07

Ø600 Ø675 Ø750 Ø450 Ø375

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001004.DWG
EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION
0	10.08.2020	DRAFT ISSUE (DETAILED)
1	06.11.2020	PRE-AFC

REVISION IN PROGRESS

DESIGN LOT CODE: WVR No. | APPROVAL: A. PEREZ, A.PEREZ

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:16:54 PM | PLOT BY: MEGHWARB

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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3

SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-SM-001004 | ISSUE 1

FROM LANSDOWNE

TO MILPERRA

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

MCA01

480 500 520 540

556.214

ADJOINS SHT-SM-001004

LIMIT OF WORKS

Ø750 Ø750 Ø750 Ø375 Ø375 Ø750 Ø450 Ø750

D01102 D01106 D01105 D01104 D01103 D01102 D01103 D01101

EX1.1

CAUTION
EXISTING COMMS NEARBY

CAUTION
EXISTING SEWER MAIN NEARBY

CAUTION
TREE PROTECTION ZONE (TPZ) NEARBY. PIPE ALIGNMENT ENSURES LESS THAN 10% OF TPZ IS AFFECTED. REFER TO 'REF' FOR FURTHER DETAILS.

CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.

REPLACE EXISTING HEADWALL AND APRON WITH NEW LIKE-FOR-LIKE HEADWALL AND APRON. REFER TO ST SERIES DRAWINGS FOR DETAILS. INSTALL MOUNTING RING STYLE FLOOD GATE (HUME-KING FLOODGATE OR SIMILAR). RETAIN EXISTING SCOUR PROTECTION

ABANDON EXISTING PIPE DOWNSTREAM OF NEW PIT D01\02 AND CONSTRUCT NEW PIPE ON EXISTING PIPE ALIGNMENT.

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
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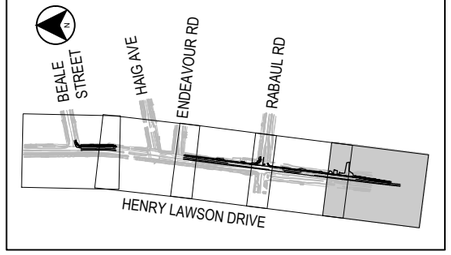
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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PLOT BY: MEGHWARB

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

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CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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BACKDRAFTED/CORRECTED		
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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

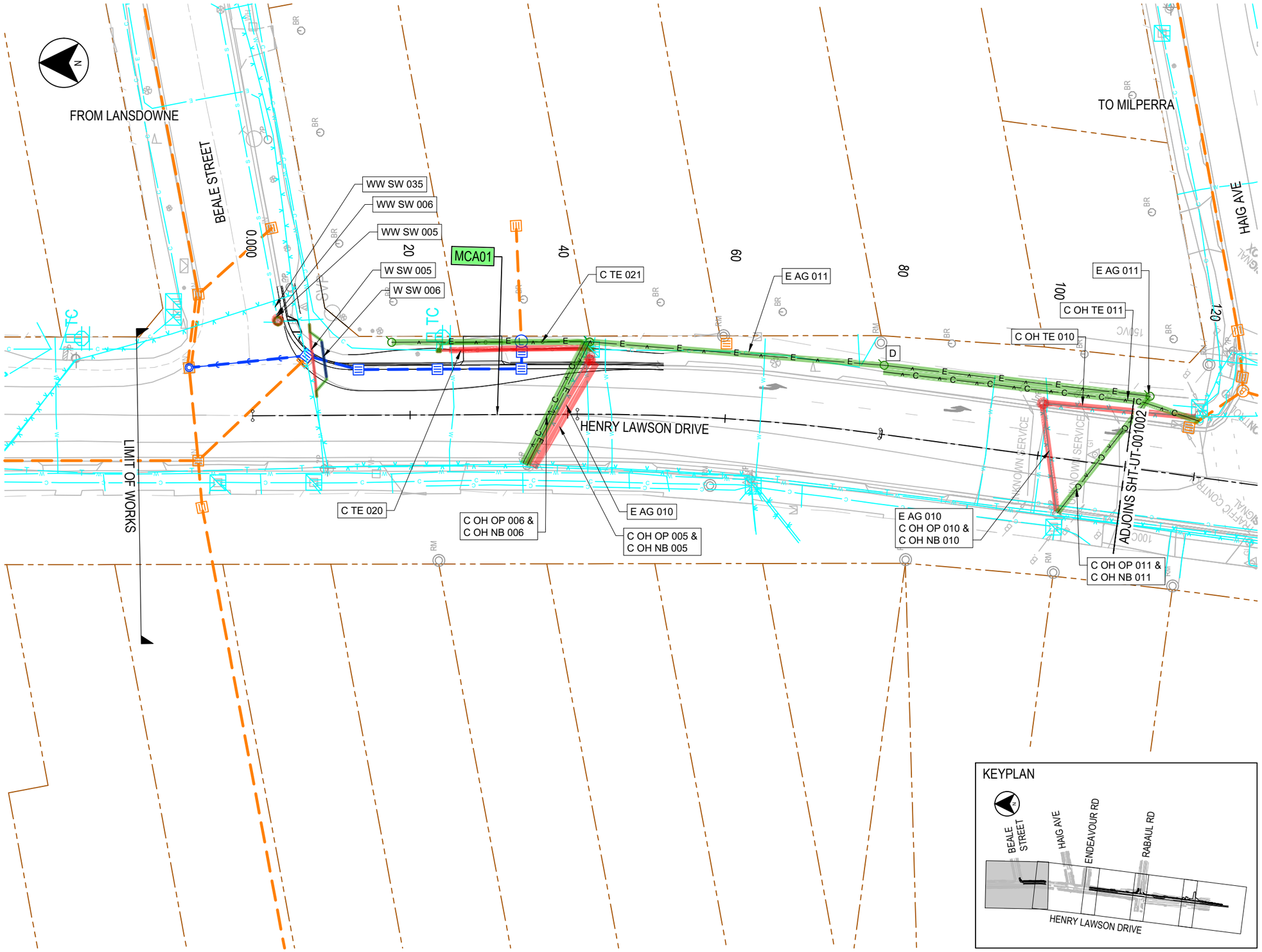
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3

SHEET 5 OF 5

TINSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN EDMS No.: - SHEET No.: SHT-SM-001005 ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

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THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

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CLIENT: NSW GOVERNMENT Transport for NSW	CANTERBURY BANKSTOWN COUNCIL MR508 HENRY LAWSON DRIVE UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL UTILITIES IMPACT ASSESSMENT PLAN	A3 SHEET 1 OF 5	

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
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CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

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DISCIPLINE		
DISCIPLINE		
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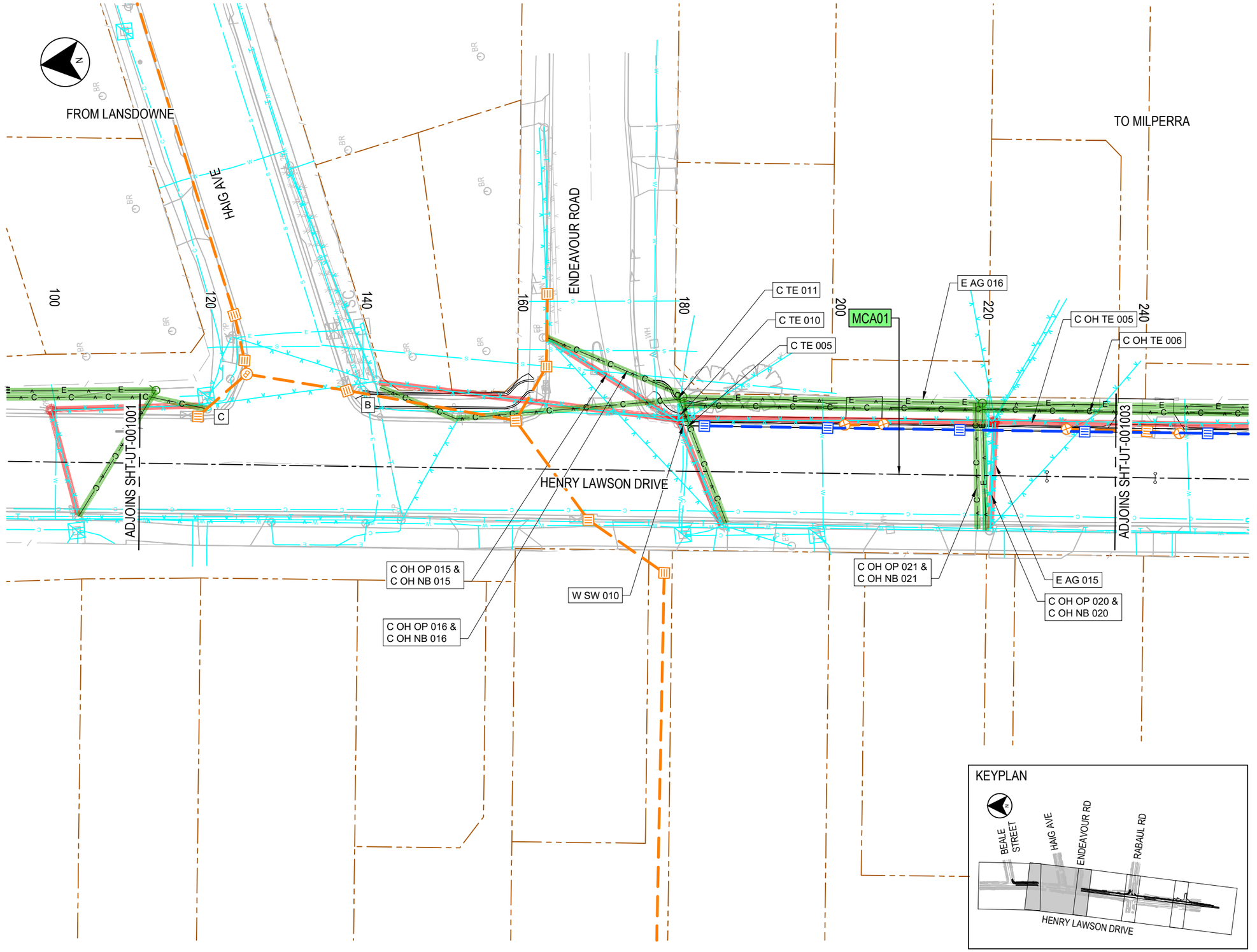
CONFIRMED		

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-UT-001001	1



LEGEND

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- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
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- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
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- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
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NOTES

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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

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CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:19:58 PM | PLOT BY: MEGHWARB

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CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

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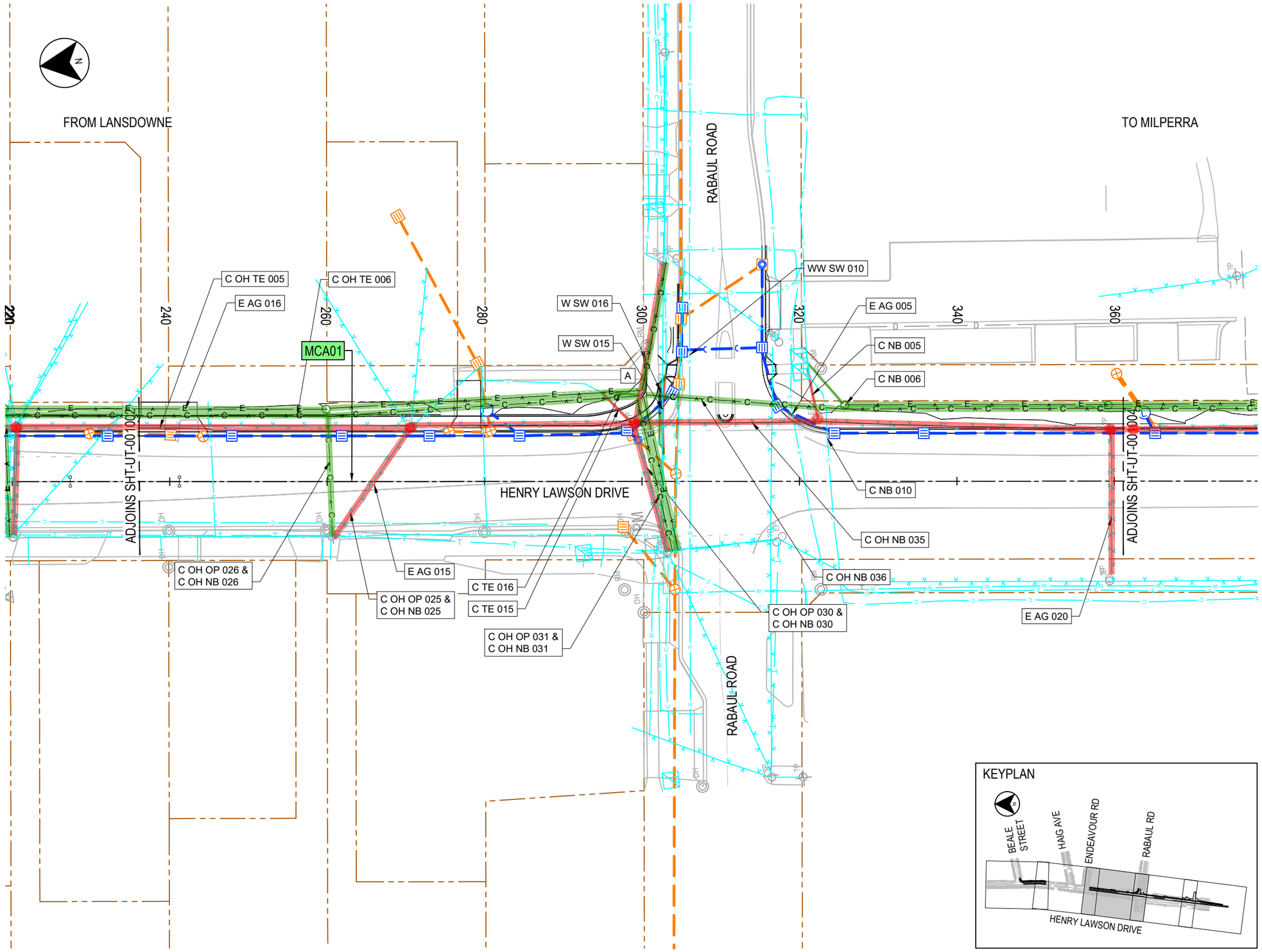
A3
SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-UT-001002 | ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
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- DESIGN ELECTRICAL POLE
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- ABANDON EXISTING PIPE / PIT
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NOTES

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KEYPLAN

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:18:51 PM
PLOT BY: MEGHWARB

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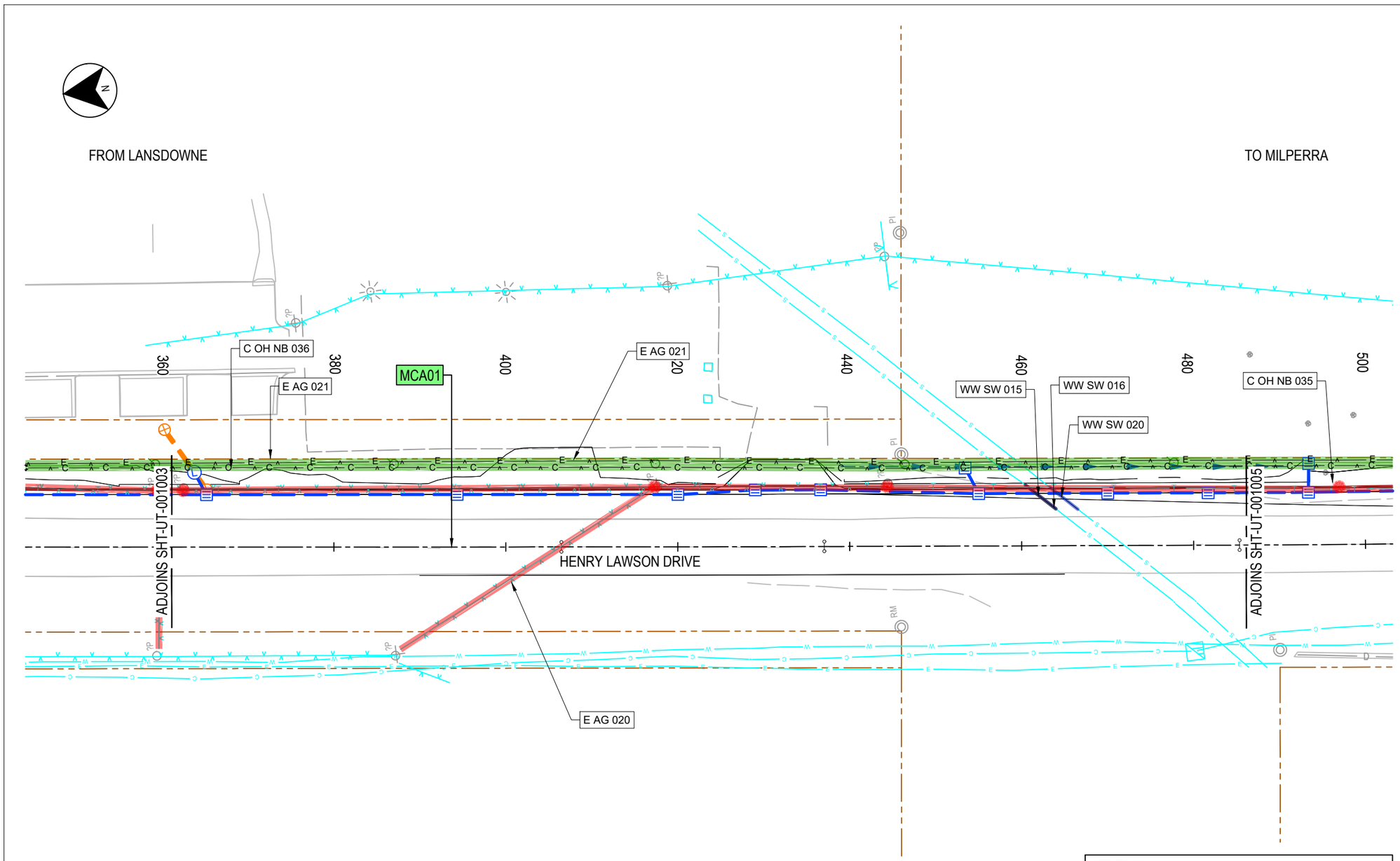
A3
SHEET 3 OF 5

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-UT-001003
ISSUE: 1



LEGEND

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- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
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- EXISTING COMMUNICATION
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- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX UTILITIES TAG
- MXXX ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

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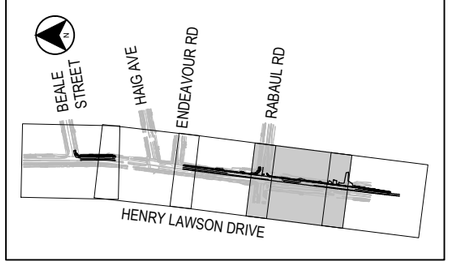

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PLOT DATE / TIME: 23-Nov-20 / 9:19:10 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

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CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL UTILITIES IMPACT ASSESSMENT PLAN

A3

SHEET 4 OF 5

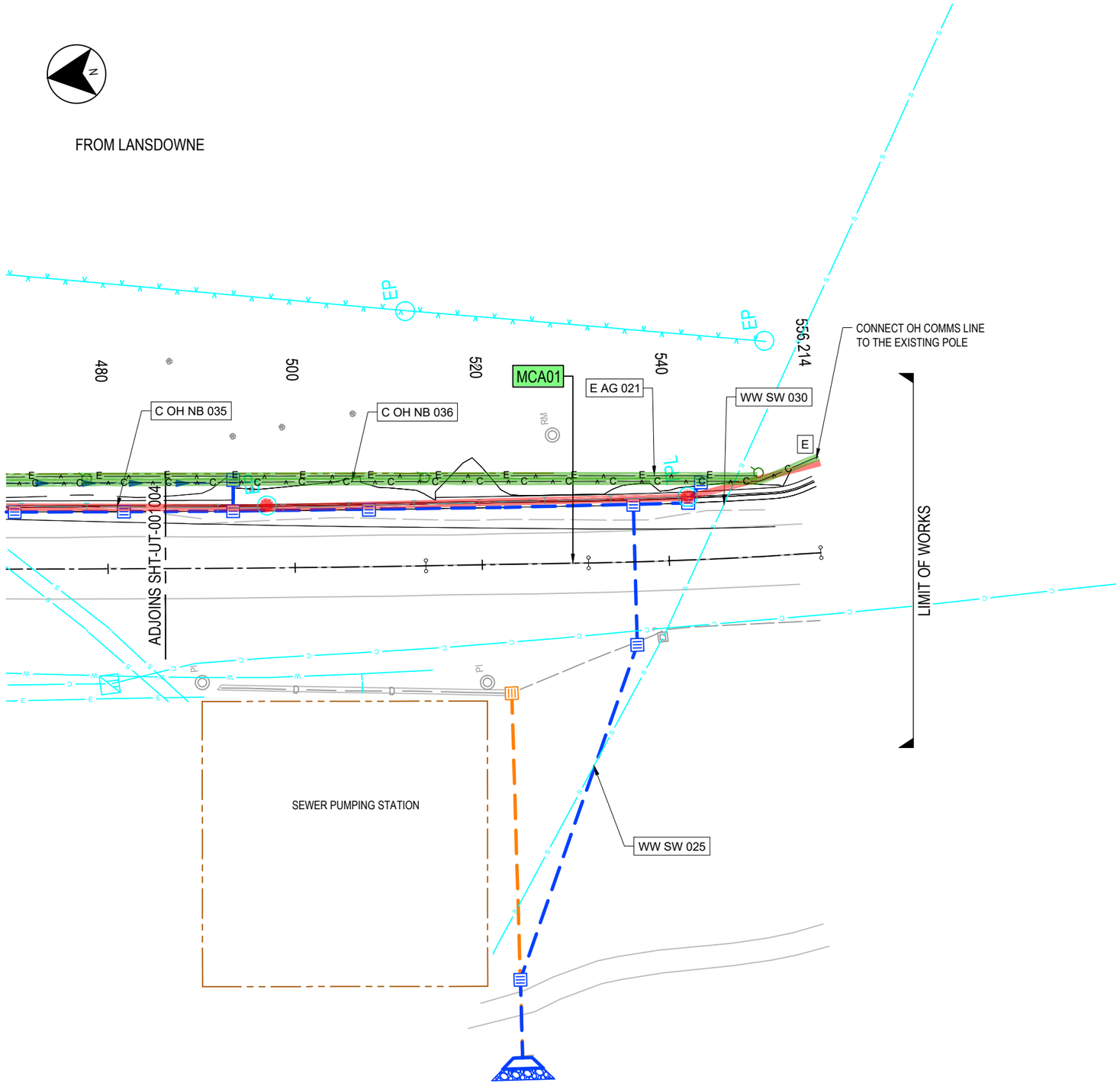
TfNSW REGISTRATION No.: DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-001004

ISSUE: 1



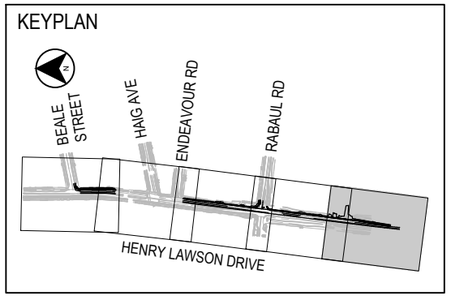
LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
2. REFER TO UTILITY TABLE ON SHT-UT-002001 AND SHT-UT-002002 FOR MORE INFORMATION AND SHT-GE-000021 TO SHT-GE-000023 FOR GENERAL NOTES.
3. UTILITIES DRAWINGS SUBJECT TO FURTHER COORDINATION WITH UTILITIES AUTHORITIES.
4. THE SHOWN PROPOSED UTILITY ROUTES AND STREET LIGHT COLUMNS ARE INDICATIVE ONLY. REFER RELEVANT UTILITIES DRAWING FOR DETAILS.
5. DOMESTIC AND OTHER INDIVIDUAL UTILITIES IMPACT ASSESSMENT IS NOT INCLUDED IN THE DRAWINGS.
6. TCS/ITS DESIGN NETWORK CONDUITS ARE NOT SHOWN IN THIS DRAWING.
7. DISCREPANCIES BETWEEN COMBINED UTILITY PLANS AND UTILITY AUTHORITY PLANS TO BE BROUGHT TO THE DESIGNERS ATTENTION.
8. DRAINAGE AND TCS ARE SHOWN ON PLANS FOR REFERENCE ONLY.
9. NOT AFFECTED = UTILITY IDENTIFIED WITH NO AUTHORITY REQUIREMENTS. PROTECTED = UTILITY OWNER HAS APPROVED PROTECTION (ie. ENCASE SLAB) THAT DOES NOT REQUIRE RELOCATION. ABANDON = WILL BE OUT OF SERVICE, ABANDON, DECOMMISSIONED AS PER AS5488 AFTER 'NEW' IS LIVE. NEW = NEW UTILITY ROUTE.
10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN



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UTILITIES IMPACT ASSESSMENT PLAN

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SHEET 5 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

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EDMS No.: -

SHEET No.: SHT-UT-001005

ISSUE: 1

Appendix G

Community Consultation Report

Intersection upgrades on Henry Lawson Drive, Georges Hall

Community consultation report

February 2021

Contents

1 Executive Summary

Transport for NSW will upgrade Georges Hall (see Figure 1 below):

- constructing an additional southbound lane on Henry Lawson Drive between Endeavour Road and Rabaul Road, a length of about 140 metres
- converting the existing Henry Lawson Drive left turn slip lane between Beale Street and Haig Avenue from left-turn only to a shared left and through lane
- constructing a merge lane along Henry Lawson Drive south from Rabaul Road for a length of about 140 metres
- prohibiting right turns from Henry Lawson Drive, northbound, onto Rabaul Road, eastbound and encouraging road users to use the signalised intersections at Tower Road, to the south, and Haig Avenue, immediately to the north.

The project's total construction extent is about 600 metres, north to south, with some work for short distances along Beale Street, Haig Avenue, Endeavour Road and Rabaul Road.

The work will involve relocation of gas, water, electrical and telecommunication utilities along the roadway, as well as upgrades to existing drainage infrastructure.

Investigations to develop the project began in 2017 and, pending further approvals, construction is scheduled to begin sometime in 2021.

We have listened to the community, conducted traffic modelling and reviewed statistics to find that the Georges Hall key intersection and main roads require upgrades to address traffic congestion and traffic flow.

In July to 3 August 2020 community consultation was carried out using mail and on-line platforms to gather feedback and comments about the proposed improvements for Georges Hall.

The campaign reached 31,500 people inclusive of local residents and community members. We received feedback from 92 members of the community and from this we learnt:

- they were concerned about the proposal's effectiveness in addressing congestion
- the effect on local residents of banning the right turn at Rabaul Road
- the operation of traffic signals at Haig Avenue and its effect on traffic flow
- the removal of trees to accommodate the road widening and drainage work
- safety issues caused by large vehicles turning left into Haig Avenue
- the absence of measures designed to address northbound congestion (beyond the prohibited right turn at Rabaul Road).

1.1.1 Decision

Transport for NSW reviewed community and stakeholder comments during the consultation period. We will continue with the development of proposed improvements in Georges Hall with an additional element to the project scope as outlined below:

Construction of a new footpath along Henry Lawson Drive: As a result of discussions with Canterbury Bankstown City Council, Transport for NSW has agreed to construct a pedestrian footpath along the eastern side of Henry Lawson Drive, between Haig Avenue and Rabaul Road.

While this issue was not in the original proposal, Council impressed on TfNSW its safety concerns for pedestrians along the side of the road, especially those with mobility issues.

2 Introduction

2.1.1 Background

In July 2020, Transport for NSW called for public comment on a proposed upgrade along Henry Lawson Drive, Georges Hall.

The 'Georges Hall upgrade' proposes a number of elements aimed at reducing north and southbound congestion and improving travel times in both directions.

More than 6,100 vehicles travel along this section of Henry Lawson Drive in the morning and evening peak periods and experiences heavy congestion. The road carries a large volume of heavy vehicles and serves as an important north/south

freight route, as well as servicing nearby Bankstown Airport. The Henry Lawson Drive and Haig Avenue intersection in Georges Hall is also the only signalised intersection along the 5.4 kilometre section on Henry Lawson Drive between Hume Highway, Lansvale, and the Milperra/Newbridge roads' intersection, at Milperra.

This project complements the NSW Government's separate $100 million commitment to upgrade the length of Henry Lawson Drive, between Hume Highway and the M5 South Western Motorway, Milperra; a distance of about 7.5 kilometres (see chapter 3). An early concept design for the first stage of this project (Stage 1A) was released for public consultation in February 2020. About 80 submissions on the proposal were received and in July 2020, Transport for NSW published its consultation report. This report can be viewed or downloaded from the project webpage – nswroads.work/henrylawsondrive. (A brief outline of the project is below.)

2.1.2 Methodology

Transport for NSW sought comment from users on the proposed changes. We worked within the COVID-19 pandemic restrictions to safeguard the community and our staff whilst doing our best to connect with the community.

The results were collated to understand the demographics and views of participants.

3 Engagement

3.1.1 Consultation objectives

In July 2020, Transport for NSW distributed a 'Have Your Say' notification to about 5,500 residents and businesses in Georges Hall and Milperra, as well as parts of Lansvale, Lansdowne and Condell Park (see Appendix A). Geo-targeted social media posts were timed to coincide with the release of the consultation document and as a reminder to local residents. These invited people to comment on the proposed upgrade via the project webpage.

A2-sized posters were put up at key points along the affected stretch of Henry Lawson Drive, as well as near schools, childcare centres and in the Georges Hall town centre, about 640m to the east.

These engagements gave TfNSW the opportunity to:

- seek comment, feedback, ideas and suggestions for consideration on the proposed upgrade
- identify and contact directly affected residents and stakeholders
- build a database of interested and concerned community members for future engagement opportunities.

The comment period closed on 3 August 2020.

3.1.2 Engagement response

During the two week consultation period, TfNSW received **22 submissions** through the project webpage and email account (HenryLawsonDrive@rms.nsw.gov.au). Of these, 16 contained some reference directly relevant to the proposed scope of the Georges Hall upgrade (some raised matters both within and outside the consultation scope).

There were **70 unique comments** over two Facebook advertisements. Of these comments, eight referred to matters within the project scope. These advertisements were shared 32 times. (A breakdown of social media responses is at Chapter 2.2.3.)

Comments within the project scope

The key matters raised by respondents within the scope of the proposed Georges Hall upgrade included:

- concerns about the proposal's effectiveness in addressing congestion
- the effect on local residents of banning the right turn at Rabaul Road
- the operation of traffic signals at Haig Avenue and its effect on traffic flow
- the removal of trees to accommodate the road widening and drainage work
- safety issues caused by large vehicles turning left into Haig Avenue

- the absence of measures designed to address northbound congestion (beyond the prohibited right turn at Rabaul Road).

(These comments and TfNSW responses are summarised in the table below.)

Comments outside the project scope

A number of submissions addressed matters outside the scope of the proposed Georges Hall upgrade. A summary of these submissions is at Chapter 6.

Seven submissions expressed a strong desire to see the duplication of Henry Lawson Drive from two lanes to four along its entire length between Hume Highway and the M5 South Western Motorway.

While these matters were out of scope, TfNSW directed respondents to the Henry Lawson Drive corridor upgrade consultation report (July 2020) for more information on the NSW Government's plans in this regard.

Respondents were advised when matters were out of scope but still relevant to TfNSW operations, and these issues have been forwarded for consideration and, if appropriate, for response.

Respondents were advised matters pertaining to the Canterbury Bankstown City Council operations have been forwarded to the council for consideration and appropriate response.

Social media responses

TfNSW posted two advertisements to the NSW Roads Facebook page during the consultation period: the first as the process opened and the second to remind people to make submissions. In all, the posts attracted 250 comments, of which 70 were unique. The remainder was composed of replies by other Facebook users as well as TfNSW responses. The ads were also shared 40 times. (See samples at figures 2 and 3.)

Of the unique comments, 56 fell outside the consultation scope. The most prominent theme (28 comments) was the call for a whole-of-corridor upgrade. One other noticeable theme was the number of speed humps on Haig Avenue (a local road).

The 14 comments within the project consultation scope referred to the TfNSWs projected benefits of the upgrade, the need for a right-turn bay at Rabaul Road and the Haig Avenue intersection lights (see figure 3 for sample).

TfNSW (through its NSW Roads Facebook account) responded to unique comments, advising respondents of the February 2020 engagement for Stage 1A of the Henry Lawson Drive corridor upgrade and that TfNSW would be consider the comments as part of the consultation process.

The advertisements had an audience reach of 26,000 and attracted 189 ‘likes’.

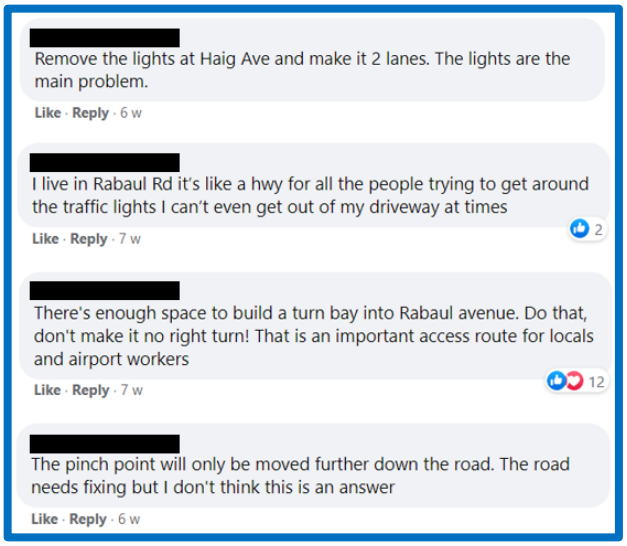


Figure 2: Sample of Facebook comments within project scope

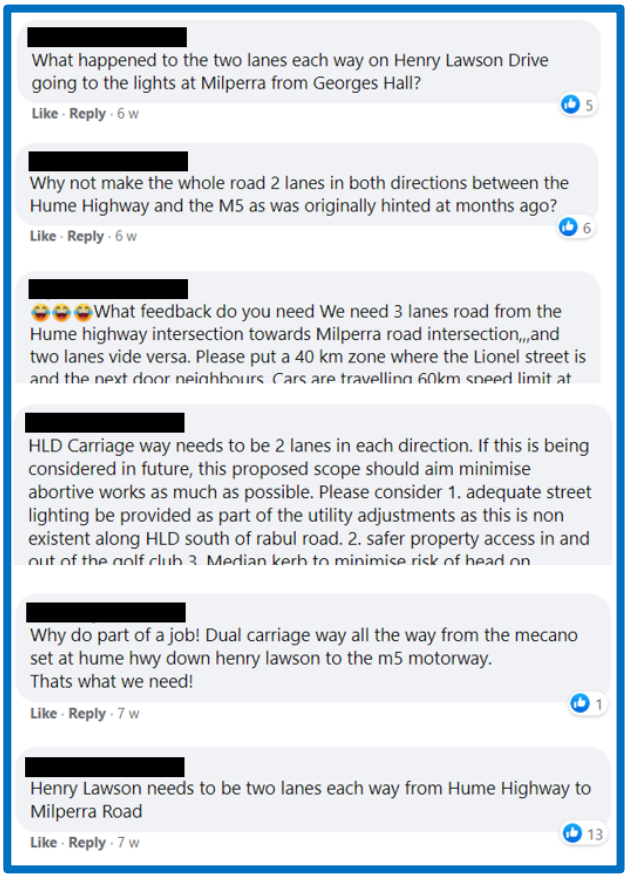


Figure 3: Sample of Facebook comments outside project scope

4 Analysis of the submissions

Consideration of both official submissions and social media comments indicate mixed views about the Georges Hall upgrade however there is a shared concern for traffic congestion and flow. The public feedback generally demonstrates community support for a whole-of-corridor solution that goes beyond the proposed upgrade's localised scope.

Of the official submissions, six expressed views of the project that could be considered neutral, in that they contained sentiments both positive and neutral, while six expressed negative views and four expressed positive views.

Negative views varied from doubts about the projected benefit of banning the Rabaul Road right-turn, to concerns it would delay delivery of the corridor upgrade.

> *"My other concern if these proposals go ahead as planned is that they will become an excuse to further delay any real improvements."*

On the other hand, support for the corridor upgrade often was more emphatic.

> *"Just like Governor Macquarie Drive, Henry Lawson Drive needs to be two lanes each way from start to finish; that is from the Hume Highway to Newbridge Road.*
>
> *"Anything less is not good enough."*

Views expressed on social media were more likely to favour of a whole-of-corridor approach.

Of the 50 unique comments over two staged Facebook ads, 20 expressed support for a whole-of-corridor solution. Comments referring to matters within the project scope were mostly neutral on the question of whether the project should proceed as proposed.

5 Relationship to the proposed $100 million Henry Lawson Drive corridor upgrade

Many of the submissions during the public comment period raised the issue of a larger upgrade of Henry Lawson Drive; in particular, a widening that would deliver a four lane road along a 7.5 kilometre corridor between Hume Highway to the M5 South West Motorway. This issue falls outside the scope of the proposed Georges Hall upgrade. However, a consultation process to deliver a large scale upgrade Henry Lawson Drive is underway.

In February 2020, TfNSW called for public comment on the first stage of this corridor upgrade. Specifically, Stage 1A of a proposed three-stage program would see Henry Lawson Drive widened between Keys Parade, Milperra, and its intersection with Tower Road, adjacent Bankstown Airport.

The proposed corridor upgrade is at an early concept design stage and construction is expected to begin in 2024.

Funding for the corridor upgrade and the Georges Hall upgrade is separate. The corridor upgrade is funded under a $100 million NSW Government commitment; the Georges Hall upgrade is funded by the $450 million Urban Road Upgrade and Congestion Program.

The corridor upgrade consultation report can be viewed or downloaded on the Henry Lawson Drive upgrade project webpage – **nswroads.work/henrylawsondrive**.

6 The Outcome

We have reviewed and considered all the feedback received during the consultation period, as well as traffic and safety statistics to help us make decisions about the delivery of this project.

There is generally community support for the traffic and safety improvements for Georges Hall.

However, many in the community expressed the belief that the improvements in the Georges Hall upgrade alone cannot meet the increasing future traffic demand, with specific need cited for a whole-of-corridor solution that goes beyond the proposed upgrade's localised scope.

The whole-of-corridor solution is a the corridor upgrade consultation report can be viewed or downloaded on the Henry Lawson Drive upgrade project webpage – **nswroads.work/henrylawsondrive**.

Respondents who raised matters relevant to the corridor upgrade proposal have been directed to this report for more determination on the NSW Government's plans.

7 Summary: public comment and Transport for NSW response

Transport for NSW has summarised the feedback received and provided responses in the table below.

Table: Comments within project scope

Category	Feedback	Transport for NSW response
Effectiveness of the proposal	My concern is that these proposed Band-Aid suggestions will (a) cost a lot of money, (b) result in negligible, if any, improvements and (c) further delay any real prospects for improvement. A long (and costly) project will not solve the problems that motorists face every day and will delay any real prospects of improvements.	The NSW Government in February announced the first stage of a major three-stage program to upgrade Henry Lawson Drive, via a $100 million commitment to widen the road from Keys Parade, Milperra, to Tower Road, Georges Hall. Two subsequent stages of the program will see Henry Lawson Drive upgraded along a 7.5 kilometre stretch between Hume Highway and the M5 South Western Motorway. It's not the case that TfNSW is choosing one approach over the other. The Georges Hall upgrade gives us the opportunity to take fast action to relieve congestion on one of the road's trouble spots by providing an additional southbound lane along Henry Lawson Drive. On the other hand, the corridor-length upgrade is significantly larger in scale and won't be delivered for a number of years. The design for the Georges Hall upgrade is all but complete, is fully-funded and construction is scheduled to begin in 2021. Funding for the two projects is also separate. The Georges Hall upgrade is funded under the $450 million Urban Road Upgrade and Congestion Program.
	Thinking long term; it would be more effective in terms of money and time, if the present work plan integrates the future design for the four-lane road.	

Prohibition of right turns at Rabaul Road	The proposed No Right Turn at Rabaul Road will increase queues at the Haig Avenue intersection. There will be flow on effects further into Haig Avenue with motorists trying to access Rabaul Road, Georges Hall Grammar School and Bankstown Airport.	In designing the upgrade, Transport for NSW has looked closely at how traffic affects the intersections within the proposed upgrade area. The number of vehicles turning right at Rabaul Road is relatively small, but can have a disproportionate effect on northbound traffic, particularly in peak periods. Rabaul Road is unsignalised, so right-turning vehicles have to wait for breaks in the traffic. This can cause queuing, especially when heavy vehicles cannot pass turning vehicles on the left. The proposed addition of a southbound lane will also make right turns at this intersection less safe. Right-turning traffic at the unsignalised intersection at Rabaul Road presently has to filter across one lane of oncoming traffic. The proposed upgrade will increase this to two lanes, adding a level of risk to this right turn, particularly when vehicles in the outside lane are obscured by vehicles on the inside. It is TfNSW's view this is a safety risk that can be avoided by vehicles using the safer, signalised turn at Haig Avenue. On the other hand, the right turn bay at Haig Avenue can hold about eight standard-sized vehicles and does not often reach capacity. TfNSW expects any increase in vehicles turning right at Haig Avenue can be accommodated within the right turn bay without affecting the progress of through traffic. TfNSW also does not expect the amount of traffic turning onto Haig Avenue will cause any flow on effects further away from the intersection. This includes residential, school and commercial traffic. TfNSW has discussed with Canterbury Bankstown City Council traffic matters related to the proposed upgrade. The Council has not

Category	Feedback	Transport for NSW response
		raised any issues with regard to the right-turn prohibition at Rabaul Road.
	Henry Lawson Drive northbound Is also delayed by queued traffic waiting to get into the right hand turn lane for Haig Ave. I believe a similar widening of this part of Henry Lawson Drive (lengthening the right-turn lane) is required for northbound as well as the proposed southbound lanes.	There will be some instances where the number of vehicles turning right at Haig Avenue exceeds the capacity of the right turn lane. This happens with the present road configuration and will occur even after the upgrade is complete. However, the vast majority of northbound road users travel directly through the Haig Avenue intersection. TfNSW traffic modelling indicates removing impediments to northbound through-traffic past Rabaul Road will deliver a clear benefit, particularly during peak periods.

Category	Feedback	Transport for NSW response
	I have never noticed a problem with traffic banked up at Rabaul Road. There is ample space to undertake on the left side of turning vehicles. Placing a No Right Hand sign at Rabaul Road will significantly increase local traffic turning right at Haig Street - and this is where the real problem lies: traffic right along HLD - both ways - has been heavily delayed ever since the traffic lights were installed at Haig Street. Forcing more local traffic to turn right into Haig Street will exacerbate - not solve - that problem. For a start, the right hand turn lane would need to be extended all the way back to Rabaul Road - and then a longer right turn green signal would be necessary to allow all the extra traffic to turn into Haig Avenue. This in turn will cause even longer queues and delays in traffic travelling in the opposite direction. Surely a more sensible solution would be to add a right hand turn lane into Rabaul Road. There is ample space on the left hand lane to allow this to happen - and I would suggest at far less a cost.	TfNSW notes at the intersection of Henry Lawson Drive and Rabaul Road, it is common for through traffic to use the road shoulder to bypass vehicles waiting to turn right. This can be an unsafe manoeuvre, as it can bring fast-moving vehicles close to the utilities poles only a short distance from the shoulder. Moving the existing power poles to allow for a new lane would trigger the relocation of additional utilities, which would not be cost-effective for the project. The Haig Avenue intersection has a right-turn bay with capacity for about eight standard vehicles. The relatively low number of vehicles affected by the ban on the right turn at Rabaul Road are expected to be accommodated within this right turn bay without affecting the progress of through traffic at the intersection. In addition, right-turning traffic at the unsignalised intersection at Rabaul Road presently has to filter across one lane of oncoming traffic. The proposed upgrade will increase this to two lanes, adding a level of risk to this right turn, particularly when vehicles in the outside lane are obscured by vehicles on the inside. It is TfNSW's view this risk can be avoided by vehicles using the safer, signalised turn at Haig Avenue. A number of respondents have identified an issue with speed bumps along Haig Avenue. This matter falls within the operational responsibility of Canterbury Bankstown City Council. TfNSW will forward these concerns to the Council for its consideration.
	I strongly oppose the NO LEFT HAND TURN being implemented at Rabaul Road, and would hope this could be reconsidered. This is merely going to direct more traffic to turn at Haig Avenue.	

Category	Feedback	Transport for NSW response
	To remove any incidence of queueing all that needs to be done is to make a proper right turn lane sufficient for say, three or four vehicles. And a through slip lane on the inside for the through traffic on Henry Lawson. So easy and safe, and there exists a wide shoulder here next to the Kentucky Reserve car park for this purpose. And while on this subject the right turn bay into Rabaul Road needs extending to accommodate the often heavy traffic flows. The [Rabaul Road] turn is used daily by local residents and Rabaul Road also feeds to the airport Link Road for direct Bankstown Airport industry access. There is currently insufficient time for the Henry Lawson right turn signal at the Haig Avenue traffic lights for local Georges Hall traffic.	
	My comment is that if your plan should include a right hand turn lane by utilising the ample shoulder, (as is the normal case anyway,) the right hand turn could be maintained.	

Category	Feedback	Transport for NSW response
	The proposed no right turn into Rabaul Road is undesirable as it restricts the flow of traffic entering the Georges Hall residential areas and airport routes. Further, it creates a diversion to Haig Avenue. This in turn creates slower access due to an excessive number of speed humps along Haig Avenue, and redirects traffic via many suburban streets to obtain access to the airport facing road network.	
Merging of proposed second lane into one lane	A problem with the current proposal is converting the left turn only lane from Henry Lawson Drive onto Haig Avenue into a shared lane. Even extending the dual lane on the other side will not stop delays with traffic merging. Any minor reduction in queuing will be negated by the delays caused by the merging traffic. The end effect will be moving the delays 50 or so metres; it will have negligible impact on reducing delays.	The intersection of Henry Lawson Drive and Haig Avenue is the only signalised intersection between Hume Highway and Milperra/Newbridge roads (a distance of 5.4 kilometres). Southbound traffic at this intersection can queue back for considerable distances and can be additionally affected by the slower departure speeds of heavy vehicles when the lights turn green. By converting the left-turn only lane at Haig Avenue to a shared left/through lane, and creating an additional continuous lane from Haig Avenue to Rabaul Road, more vehicles will be able to clear the intersection with each green light phase. This additional lane reduces the impact on standard vehicles when heavier vehicles accelerate slowly from the green lights. TfNSW traffic modelling indicates there is enough capacity south of the signalised
	The merging of two lanes into one lane never works well, as getting into the right-hand lane from the left-hand lane causes more congestion than it solves.	

Category	Feedback	Transport for NSW response
	[Construct a four-lane road] rather than adding a lane for less than a kilometre in length, which will just allow more traffic onto the road only to pinch point it again when the lane runs out in both directions.	intersection to allow for smooth merging of the two lanes south of Rabaul Road. While this is not a solution to whole-of-corridor congestion issues, it will provide localised congestion relief and reduce the queue lengths on the approach to the intersection.
Misuse of existing left-turn lane	Currently many cars use the left turn only lane at Haig Avenue to go straight ahead southbound, before pushing in further downstream. This causes significant road safety risks.	With regard to driver behaviour, the widening of Henry Lawson Drive to two lanes through this section of road will eliminate the need and opportunity for road users to make dangerous and unlawful traffic movements.
Efficiency and safety of heavy vehicle movements at Haig Avenue intersection	There are often long wait times for up to three light change sequences for traffic turning out of Haig Avenue [because] large trucks turning left [onto Haig Avenue] occupy half of the right hand turn lane to negotiate the corner. This stops smaller vehicles utilising the left hand turn green signal	TfNSW has investigated this issue, and while we won't be taking further action in this regard, we have referred the comments to Canterbury Bankstown City Council, which has operational responsibility for Haig Avenue.
	Long trucks turning left into Haig Avenue from Henry Lawson Drive can take up both lanes. They often come close to cars waiting to turn from Haig Avenue, as well as the existing power pole. This should be stopped as it is unsafe. A concrete median would fix this problem.	

Category	Feedback	Transport for NSW response
	An issue here that is not identified is the difficulty for large truck turning into Haig Ave [from Henry Lawson Drive]. This is both because of the corner angle is less than 90 degrees and there is only a single lane heading east. Large trucks occasionally have to wait for the traffic queued in Haig Ave to clear before they can complete their turn.	
Phasing of traffic lights and effect on congestion	Transport for NSW should look at issues with the phasing of the traffic lights at the Henry Lawson Drive and Haig Avenue intersection. North and southbound vehicles have to wait long at the lights in peak periods to allow only two or three cars to enter Henry Lawson Drive from Haig Avenue. The green light periods for Haig Avenue traffic should be shorter and less frequent. This would greatly assist the traffic flow along Henry Lawson Drive.	TfNSW routinely assesses traffic light phasing to maximise the efficiency of vehicle movements. TfNSW has investigated this issue, and while we won't be taking further action in this regard, we have referred the comments to Canterbury Bankstown City Council, which has operational responsibility for Haig Avenue.

Category	Feedback	Transport for NSW response
	I object to the planned removal of native trees lining the eastern side of Henry Lawson Drive between Tower Road and Rabaul Road. These are mainly Blue Box (*Eucalyptus baueriana*) and Forest Red Gum (*Eucalyptus tereticornis*). The Blue Box trees in particular are very fine specimens uncommon in the area. Every effort should be made to configure the new alignment to preserve as many trees as possible.	TfNSW has made every effort to limit the number of trees it needs to remove to accommodate the road widening. Reasons for removal include where the trees are in the path of road widening, underground utilities or overheard power lines, or where they might pose a safety risk to road users. A professional arborist was engaged to advise on the trees needing to be removed and to identify where others could be preserved. TfNSW will work with Canterbury Bankstown City Council to develop and implement a strategy for local planting to mitigate the loss of trees.
Stormwater and flooding matters	Work also needs to be done to make sure heavy rains and flooding don't make it impossible to drive on.	The project involves upgrading localised stormwater and flood mitigation infrastructure above its present capacity. This includes new kerbs and gutters with pits and pipes along the project's extent on the eastern side of Henry Lawson Drive. This will help reduce the future impacts of flooding in the direct vicinity of the upgrade area.
	It would be great to fix drainage on HLD.	

Category	Feedback	Transport for NSW response
Footpath on Henry Lawson Drive	We've been there for seven years. And very lucky to have a park near us, but actually we can't ride our bikes to the park with our girls Alexandra 8 and Andrea 6, as we don't have a footpath to reach the light on Haig Avenue. I would like to ask if you can provide a footpath on that side of the road as you're putting our life in danger.	Unfortunately, there is no scope to include a footpath between Beale Street and Haig Avenue, as the project does not involve construction work in this location. As part of the upgrade, TfNSW will be constructing a new footpath between Haig Avenue and Rabaul Road, as the upgrade involves using the existing shoulder to construct a new lane. We appreciate this is a concern for you and your family. There will be future opportunities for TfNSW to consider more pedestrian and shared path options as part of the Henry Lawson Drive whole-of-corridor upgrade. At present, TfNSW is working on the concept design for Stage 1A of whole-of-corridor upgrade. Beale Street is in the area to be covered by Stage 2. People can find out more or sign up to receive projects updates at nswroads.work/henrylawsondrive.
General support for the project	I support the proposed changes to Henry Lawson Drive between Beale Street and Rabaul Road. I have no issues with the proposed changes and strongly recommend that these works are carried out as soon as possible.	The next steps for the project are to finalise the review of environmental factors and finalise the design. Construction is scheduled to begin in 2021.
	The upgrades to Henry Lawson Drive are fine with us. All we want is the completion to the Hume Highway ASAP.	

Category	Feedback	Transport for NSW response
Scale of congestion underreported in consultation document	I think that the document seriously understates the problems along HLD from the Hume Highway right through to Newbridge Road. It almost seems to me that the author hasn't personally experienced the problems motorists encounter every day during the extended (and becoming more extensive) peak periods. Take for instance the statement in the Background section: "Southbound congestion during peak periods can extend from the Milperra Road intersection all the way back to Flinders Road." What nonsense! That is such a serious understatement that it suggests that your team does not appreciate the seriousness of the true problem.	The traffic conditions observed by TfNSW in designing the upgrade were made over a limited time only. We appreciate these conditions can vary, as can the experiences of motorists. Our investigations demonstrated a congestion issue serious enough to warrant a major investment in designing and delivering the proposed upgrade.

Category	Feedback	Transport for NSW response
	You mention that southbound congestion can extend back to Flinders Road in peak periods. My observation is that pre COVID times, and even recently, southbound congestion can often extend back to the 70/60km/h boundary for no apparent reason other than the traffic signals at Haig Avenue and Milperra Rd. On some occasions, southbound congestion reaches as far back as the Hume Hwy but I think that this is as a result of an earlier collision. Your proposal does not mention northbound congestion which occurs daily in peak hours except for an inference of right hand turn traffic at Rabaul Road. My experience is that northbound traffic backs up to Tower Road every weekday afternoon peak and around half that distance in the morning peak.	

Category	Feedback	Transport for NSW response
	I just wished to add to the list of possible improvements at the Milperra Bridge. With the addition of Flower Power on Henry Lawson Drive and the possible additional housing estate next to the River I believe a major improvement is also required to the right hand turn lane (heading North) from Henry Lawson Drive into Milperra Rd. In many instances throughout the day the traffic currently wishing to make that turn are already blocked and have to wait to access the present rather short lane.	
	Southbound traffic often extends back to the Meccano Set on Hume Highway and not just Flinders Street. I often sit in traffic waiting on the Woodville Road side of Henry Lawson Drive - it's a crawl all the way Milperra Road.	

Table: comments outside of project scope

Category	Feedback	Transport for NSW response
General traffic issues	The proposal does not go far enough to address the right turning difficulty from Georges River Golf Course and Gasparo restaurant car park, into Henry Lawson Drive. In periods of medium to heavy traffic, there is limited opportunity to make a safe right hand turn.	The submission falls outside the scope of the project. Motorists are encouraged to exercise caution when leaving private premises and to consider other routes if concerned about safety.
Flinders Road and Henry Lawson Drive	We desperately need something at this intersection for cars to be able to cross safely from Flinders road on to Henry Lawson Road. Round about or traffic lights is much needed	These comments have been forwarded to the appropriate team within TfNSW for consideration and response, if required.
	Would it be feasible to include in this upgrade, work to the intersection of Flinders Road (no traffic lights please). This is generally the starting area (finish) of the traffic congestion to Milperra Road.	
Tower Road intersection	The traffic lights at Tower Road need to have a red arrow in peak traffic times. The traffic coming though from Georges Hall can begin to use two lanes about 100 yards or so away from these lights but the traffic in the inside lane acts like a barrier which obstructs the view of this second lane. I have seen a few accidents at this intersection and viewed many more near misses.	

Category	Feedback	Transport for NSW response
Congestion improvements on non-State roads	To enhance traffic flow along Haig Avenue, place limitations on the movement of heavy vehicles along Marion Street and Birdwood Road originating from the Condell Park industrial area. Redirect heavy vehicles from the Condell Park industrial area to Milperra Road by linking Birch Street and Allingham Street to Nancy Ellis Leebold Drive.	The roads mentioned in the submission are managed by Canterbury Bankstown City Council. The submission has been forwarded to the Council for consideration.
Widening of whole of Henry Lawson Drive corridor	Can you please make the road from the Meccano Set to the M5 three lanes each way? Two lanes is better than one, but seems there's so much pressure on this road now that two lanes will soon become obsolete.	The issues raised in the submission are addressed in a separate program being developed by Transport for NSW. In February 2020, TfNSW called for public comment on the first stage of a proposed three stage program to upgrade Henry Lawson Drive between Hume Highway at Lansdowne and the M5 South Western Motorway at Milperra (the 'corridor upgrade'). The 7.5 kilometre corridor upgrade proposal includes investigating widening Henry Lawson Drive from two to four lanes. The first stage of the corridor upgrade is funded by a $100 million commitment from the NSW Government. The proposed corridor upgrade is at a concept design stage. Further consultation is expected with local residents and businesses in late-2020. Work on subsequent stages has begun and will also be subject to public consultation. The Georges Hall upgrade is funded under the $450 million Urban Road Upgrade and Congestion Program, which is separate to
	Just like Governor Macquarie Drive, Henry Lawson Drive needs to be two lanes each way from start to finish; that is from Hume Highway to Newbridge Road. Anything less is not good enough.	
	Please, just get it done and I hope that the dual lanes will extend from Beale street all the way to Milperra Road heading south. Second, Henry Lawson Drive should be made two lanes heading both south and north.	

Category	Feedback	Transport for NSW response
	Whilst the current proposal is a good one it just doesn't go far enough. The entire road from the Meccano set on the Hume Highway all the way down to the traffic lights on Newbridge Road should be two lanes each way. I understand it's a bit tight where there are houses in and around the Beale Street to Rabaul Road area but I am sure this could be overcome with careful planning. The rest of the road has plenty of space for the road to be widened to two lanes as most of it is parkland or unused land at the golf course.	the corridor upgrade funding. Delivery of the Georges Hall project will not affect delivery of the corridor upgrade. The corridor upgrade consultation report can be viewed or downloaded on the Henry Lawson Drive upgrade project webpage – **nswroads.work/henrylawsondrive**. Respondents who raised matters relevant to the corridor upgrade proposal have been directed to this report for more ambition on the NSW Government's plans.

Category	Feedback	Transport for NSW response
	I feel so much time has already been wasted. This road is a host track along its entire length. It should have been a dual lane or triple lane road prior to the M5 opening onto it. People who have lived here in Milperra and George's Hall for more than 30, 40 or even 50 years have been waiting for the golden promise of HLD being upgraded. So let's get real now!! This proposal will feed more traffic into single lane traffic that stretches from Tower Road to Lansvale/Lansdowne. Surely it is necessary to make the road past Tower Road ready for extra traffic before pushing an uncontrollable amount into the small area either side of Milperra Rd before upgrading that small section. Show some guts and be honest. The people of the area and those that use this area can foresee so many extra problems will be created if you work on the wrong areas first. The area from the M5 needs to be done first also.	

Appendix B: ‘Have your say’ on intersection improvements at George Hall

Transport for NSW

Have your say - Proposed intersection improvements on Henry Lawson Drive, Georges Hall

Community consultation | July 2020

Proposed intersection improvements will help reduce northbound and southbound congestion on Henry Lawson Drive, Georges Hall

Between now and Monday 3 August 2020, you can have your say on plans to upgrade Henry Lawson Drive, Georges Hall, from Beale Street to Rabaul Road.

In February 2020, Transport for NSW sought feedback on stage one of a proposed three-stage Henry Lawson Drive upgrade. The findings of that consultation, along with community feedback, have been published on the Transport for NSW website.

As part of a commitment to improve travel on the entire corridor, Transport for NSW is also fast-tracking a proposal to upgrade a key pinch point on Henry Lawson Drive – from Beale Street to Rabaul Road, Georges Hall. Designs for the upgrade are well advanced and work could be underway as soon as early-2021.

The upgrade will deliver early relief for local residents and road users, who experience significant congestion along this busy corridor. This work will not slow down delivery of the Henry Lawson Drive upgrade program, which was announced by the NSW Government in 2018.

The proposed upgrade will be funded under the NSW Government’s $366m Urban Road Upgrade and Congestion Program. This funding is in addition to the NSW Government’s $100 million commitment to the three-stage Henry Lawson Drive upgrade.

Transport for NSW welcomes feedback on the project by **Monday 3 August 2020**.

July 2020

Background

About 6,100 vehicles travel along Henry Lawson Drive, Georges Hall, during the AM and PM peak periods alone.

Southbound congestion during peak periods can extend from the Milperra Road intersection all the way back to Flinders Road, Georges Hall. At the same time, northbound traffic is slowed or stopped by vehicles waiting to turn right at the non signalised intersection of Henry Lawson Drive and Rabaul Road.

Crash data for the area are typical of roads where congestion leads to driver frustration. Between 2014 and 2019, 36 percent of recorded crashes were rear-end collisions.

Without changes to this stretch of road, congestion and wait times will grow longer over the next ten years. Southbound vehicles at the intersection in 2029 could expect average delays of more than a minute in AM peak periods, compared to the 20 seconds experienced in 2019. This figure almost doubles in the PM peak, from a 36 second average wait time (2019) to 65 seconds (2029).

Our proposal

To address these issues and to better accommodate expected traffic growth in the area, Transport for NSW is proposing to widen Henry Lawson Drive, from Beale Street in the north to Rabaul Road in the south. The wider road will provide two continuous southbound lanes, helping alleviate congestion and improve travel times.

We are also proposing to prohibit the right turn from Henry Lawson Drive, northbound, onto Rabaul Road, eastbound. There are no signals at this intersection, so vehicles waiting to turn create downstream congestion extending towards Milperra Road.

Key changes

- **Henry Lawson Drive (southbound) onto Haig Avenue –** changing the left turn-only lane to a shared left and through lane; extending the auxiliary lane approach to the intersection by about 45 metres
- **Henry Lawson Drive (southbound) between Endeavour Road and Rabaul Road** – utilising the existing shoulder to construct an additional southbound lane
- **Henry Lawson Drive (northbound) onto Rabaul Road -** Banning right turn movement

What you need to know

Proposed no right turn – Rabaul Road

At present, only around 40 vehicles an hour make a right turn at this intersection during the morning peak period. However, queuing vehicles can have flow on effects, often bringing through traffic to a halt.

The proposed No Right Turn at Rabaul Road means road users will need to turn right at signalised intersections with Haig Street (between Beale Street and Rabaul Road) and Tower Road (1.3 kilometres south).

We appreciate this change might affect journeys for local residents, but will contribute to an easing of congestion.

Changes to driveways

To allow for the widening of Henry Lawson Drive, we will need to reconstruct a number of driveway entrances along the eastern side of Henry Lawson Drive. This requires no further action from residents and landowners and we'll directly contact affected properties to discuss the changes.

Removal of trees

Our work requires the removal of a number of trees from along Henry Lawson Drive. We are working to limit the number of trees as much as possible. However, it is inevitable a number of them will need to be removed, either because they are in the path of the road work or because they pose a threat to the safety of workers during construction.

Parking on Henry Lawson Drive

Our work involves widening Henry Lawson Drive along its eastern side. Areas that might be commonly used for parking will not be available after construction begins and will not be reinstated when the widened section of road opens to traffic.

We appreciate parking is a concern for residents and businesses and Transport for NSW welcomes comment on this issue.

About 6,100 vehicles pass through Georges Hall each day during the AM and PM peak periods alone

Queuing northbound traffic increases the potential for crashes

Proposed intersection improvements on Henry Lawson Drive, Georges Hall

What's next and when will work begin?

We will assess and respond to all public submissions to this process. We'll publish a consultation report addressing the issues that were raised and advising the public of the outcome, including any changes we make to the upgrade design.

Pending the outcome of consultation and finalisation of the design and assessment processes, construction is expected to begin in the first half of 2021. We'll provide advance notification of our intended start date. We'll also provide regular three-monthly project updates, which renew or outline changes to our work schedule and address any issues that might have arisen with the project.

How do I have my say?

You can make a submission using the details below. The public comment period closes on **Monday 3 August 2020**.

Noise and disruption

There will be periods where our work generates more noise and disruption than at other times. We are required to take all appropriate steps to minimise construction noise, wherever feasible. One condition is we require our work crews to complete the noisiest tasks, including jackhammering and concrete cutting, before midnight.

We're also required to notify the public in advance when our work requires changes to traffic conditions, such as road closures and detours.

We welcome comments on how we can mitigate the effects of our work on local residents and businesses.

Our work schedule

When construction begins, our standard working hours are **7am** to **5pm**, **Monday** to **Friday** and **8am** to **1pm**, **Saturday**. We can work up to five days a week.

Our out-of-hours (night) work may take place between **8pm** and **5am**, from **Sunday** to **Thursday** nights. We can work up to **five nights a week**.

We don't work public holidays. This schedule will be confirmed closer to the construction period and we are required to advise the public in advance if we need to work outside published times.

We welcome comment on this schedule, including any factors we need to consider when scheduling our work.

Consultation outcomes – proposed Henry Lawson Drive upgrade, from Tower Road to Keys Avenue

The public comment period on the first stage of a three stage proposal to upgrade Henry Lawson Drive from Tower Road, Georges Hall, to Keys Avenue, Milperra, closed in March 2020. Under the proposal, the intersection of Henry Lawson Drive, Milperra Road and Newbridge Road would be upgraded and additional lanes would be provided between Tower Road and Keys Avenue.

The 78 responses addressed themes including: the extent of stage one work; the proposed widening; the possibility of a flyover/underpass/overpass; and design suggestions for consideration.

A summary of the submissions and Transport for NSW responses can be viewed or downloaded on the project webpage – **nswroads.work/henrylawsondrive**.

Work to upgrade Henry Lawson Drive, Georges Hall, could begin as soon as early-2021

For more information:

For more information about the proposed Georges Hall intersection upgrade or the proposed Henry Lawson Drive upgrade, please contact the project team:

1800 951 218

HenryLawsonDrive@rms.nsw.gov.au

nswroads.work/henrylawsondrive

Henry Lawson Drive upgrade
Transport for NSW
27 Argyle Street, Parramatta NSW 2150

131 450

If you need help understanding this information, please contact the Translating and Interpreting Service on 131 450 and ask them to call us on 1800 951 218.

July 2020
20.227

8 Appendix C – Public consultation notification February 2020, Stage 1A

Transport for NSW

Henry Lawson Drive Upgrade

Have your say – early concept design features

February 2020

Intersection of Henry Lawson Drive, Milperra Road and Newbridge Road

The NSW Government is proposing to upgrade Henry Lawson Drive to reduce congestion and improve safety and connectivity.

Transport for NSW are investigating a 7.5 kilometre upgrade of Henry Lawson Drive between the M5 Motorway, Milperra and Hume Highway, Lansdowne. The upgrade would be staged with stage one spanning from Keys Parade to just north of Tower Road.

The proposal for stage one would provide more capacity for vehicles travelling through the intersection of Henry Lawson Drive, Milperra Road and Newbridge Road. It would improve efficiency along the corridor and safety for motorists and pedestrians.

How to provide feedback

We invite you to provide feedback on the proposed early concept design features until Friday 6 March.

All comments will be reviewed and responded to in a consultation report which will be made available on the project webpage.

Where are we now and next steps?

We are currently refining the concept design for the project. Your comments will help us to ensure we have considered public feedback in any further development of the concept design. Later this year we will display the concept design for public comment. Once the concept design has been finalised we will carry out the required environmental assessments and publicly display them prior to construction.

Building two lanes

Improving traffic flow

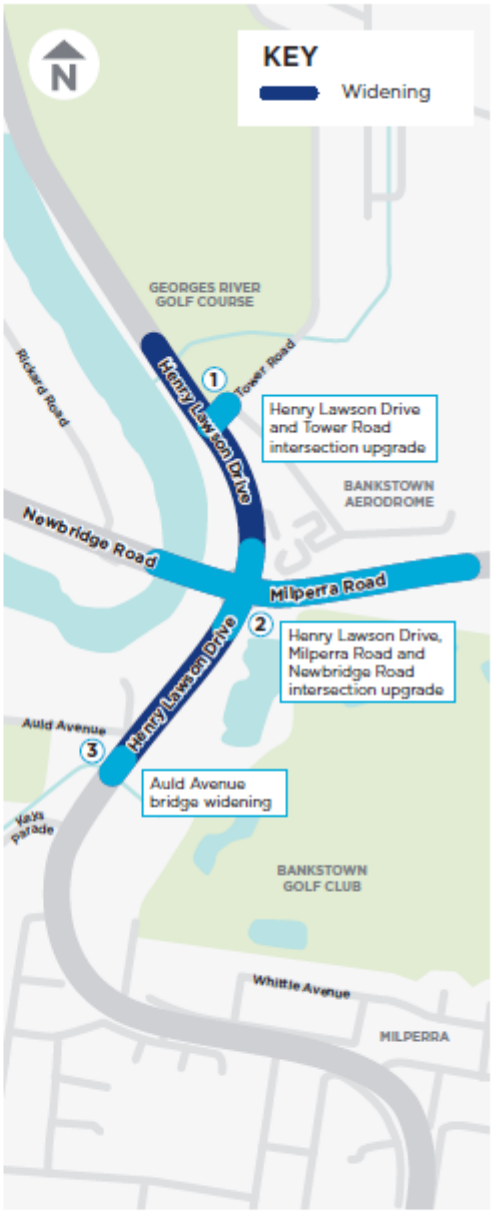
February 2020

What would the proposal involve?

The proposal would involve:

- Providing two lanes in each direction on Henry Lawson Drive between Keys Parade to just north of Tower Road
- Upgrading the intersection of Henry Lawson Drive, Milperra Road and Newbridge Road to provide:
  - An additional southbound lane
  - Extending the length and providing a dual right turn for motorists turning right from Milperra Road into Henry Lawson Drive
  - An upgraded left turn for motorists turning left from Newbridge Road into Henry Lawson Drive
  - Extending the length of the dual right turn lanes for motorists turning right from Henry Lawson Drive into Newbridge Road
- Upgrading the intersection of Henry Lawson Drive and Tower Road including providing a dual right turn from Henry Lawson Drive into Tower Road
- Widening the Auld Avenue Bridge to create two lanes in each direction.

The concept design for the project is still being developed. Detail regarding the design such as how the widening would impact the surrounding properties and land are still being developed and would be provided during the concept design have your say period.



Further information

1800 951 218

HenryLawsonDrive@rms.nsw.gov.au

GSPO – Henry Lawson Drive Upgrade
27 Argyle Street, Parramatta NSW 2150

For more information about the project, visit nswroads.work/henrylawsondrive

131 450

If you need help understanding this information, please contact the Translating and Interpreting Service on 131 450 and ask them to call us on 1800 951 218.

February 2020
20.077

9 Appendix D – Facebook advertisement July 2020

Appendix H

ISEPP Consultation and Council Correspondence

18 June 2020

Reference number: P.0043031

General Manager
City of Canterbury/Bankstown Council
PO Box 8
Bankstown NSW 1885

Dear Sir/Madam

Consultation regarding proposed Henry Lawson Drive and Rabaul Road, Georges Hall upgrade

Transport for NSW is proposing to undertake works for the Henry Lawson Drive and Rabaul Road, Georges Hall upgrade.

Under the State Environmental Planning Policy (Infrastructure) 2007, Transport for NSW is required to consult with the City of Canterbury Bankstown Council under clause 13 due to the permanent impacts to the existing pedestrian path/access on Henry Lawson Drive between Beale Street and Rabaul Road, Georges Hall.

An outline of the proposal is attached to this letter, including design drawings for the adjustments to the pedestrian path and road alignment.

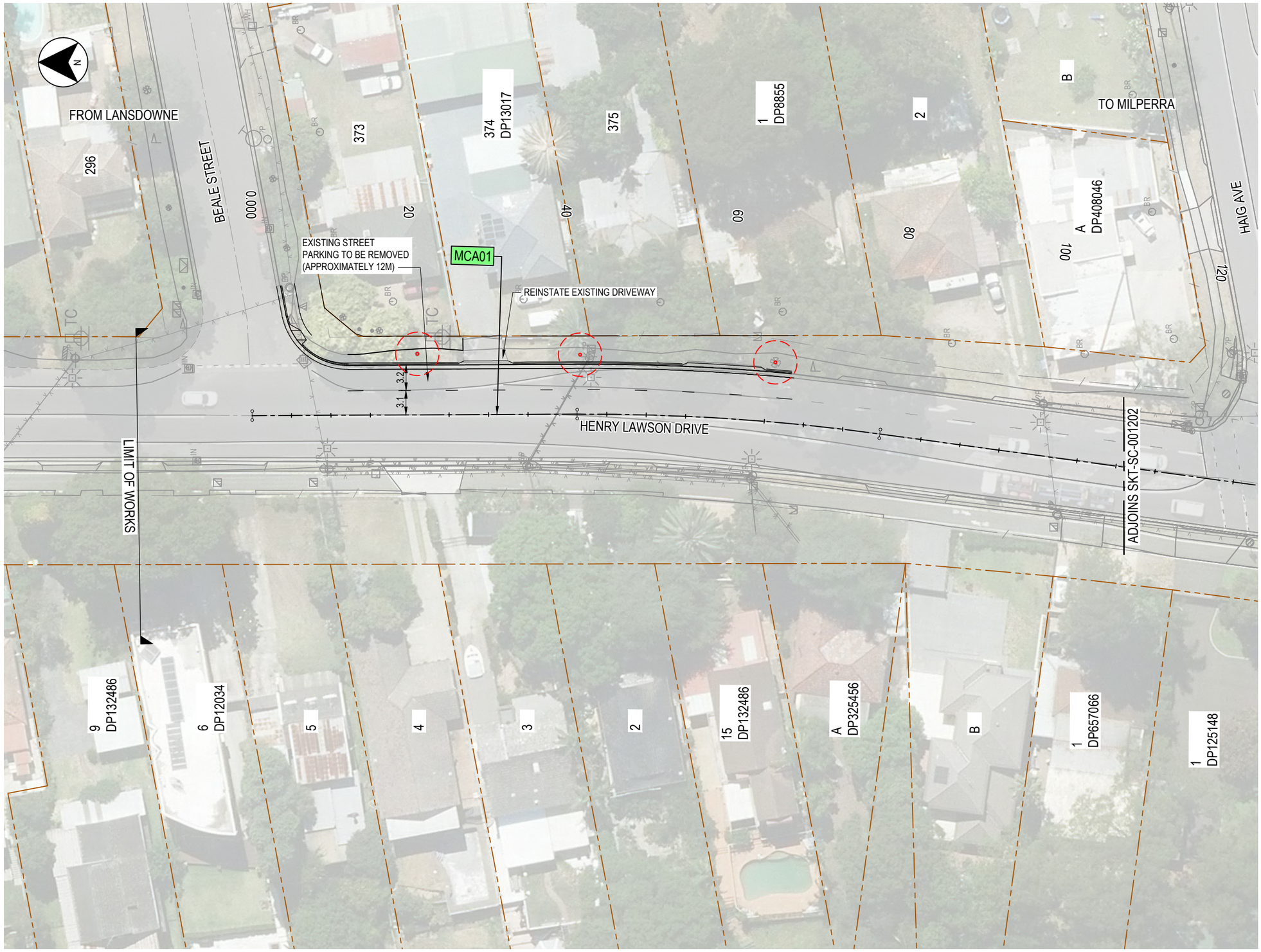
It would be appreciated if you could provide any comments about this proposal by Thursday 10 July 2020.

Transport for NSW would be pleased to provide further information if required. In this regard Ana Perez may be contacted on 0499 989 505 or by email Ana.Perez@transport.nsw.gov.au .

Yours faithfully

Ana Perez
Project Manager
Transport for NSW

Attachment A – Design Drawings



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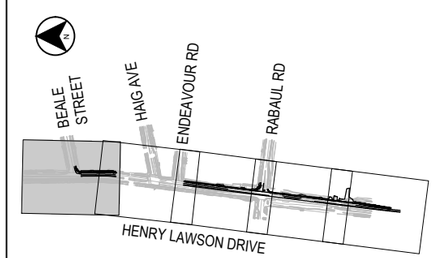
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. PROPERTY ADJUSTMENTS YET TO BE AGREED UPON BY PROPERTY OWNERS.
3. APPROXIMATELY 38m KERB SIDE PARKING TO BE REMOVED ON THE SOUTHBOUND OF HENRY LAWSON DRIVE DUE TO PROPOSED CARRIAGEWAY WIDENING.

KEYPLAN



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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: GREATER SYDNEY DIVISION
EASING SYDNEY'S CONGESTION
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 1 OF 5

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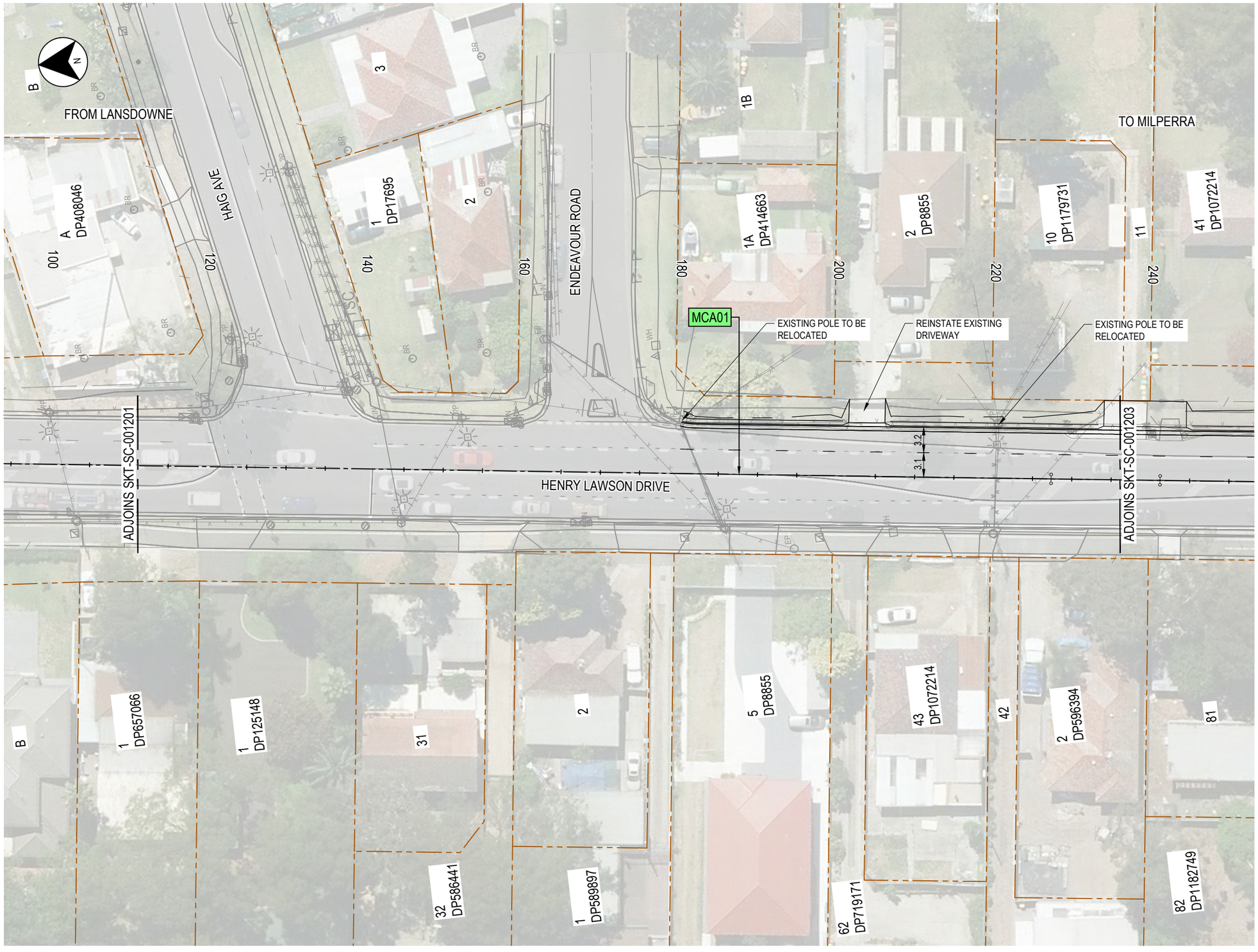

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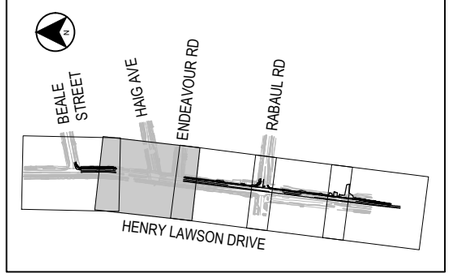
KEYPLAN



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CLIENT

NSW GOVERNMENT Transport for NSW

PREPARED FOR
GREATER SYDNEY DIVISION
EASING SYDNEY'S CONGESTION
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

A3

SHEET 2 OF 5

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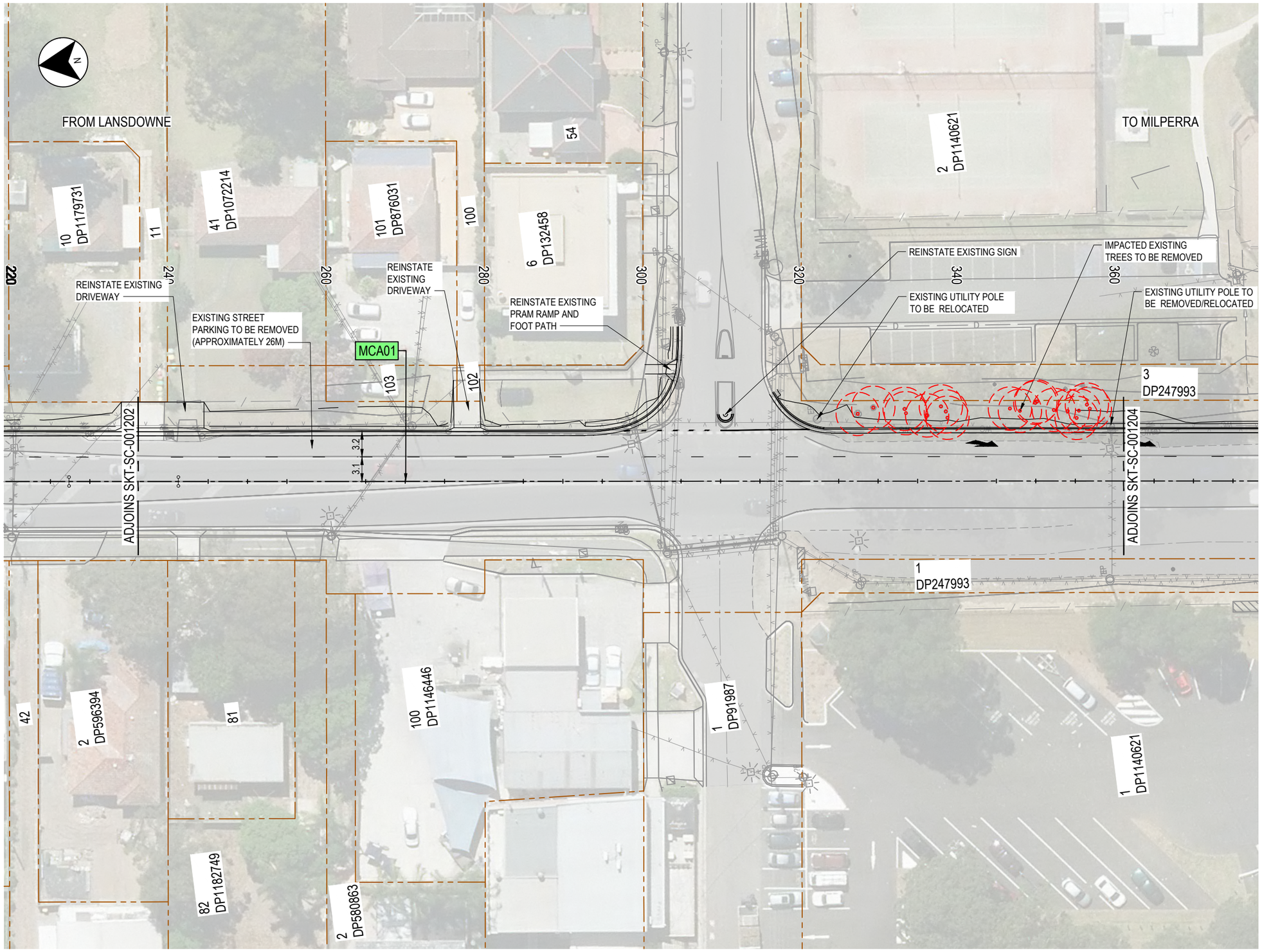

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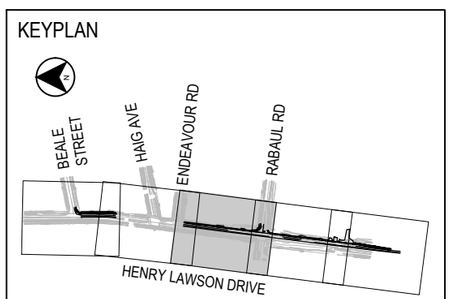

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PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

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SHEET 3 OF 5

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FROM LANSDOWNE

TO MILPERRA

2 DP1140621

3 DP585387

360 380 400 420 440 460 480 500

EXISTING TREES IMPACTED BY CARRIAGEWAY WIDENING TO BE REMOVED

MCA01

EXISTING POLE TO BE RELOCATED

REINSTATE EXISTING DRIVEWAY

RELOCATE EXISTING UTILITY POLE AND THE FLOOD GAUGE SIGN

EXISTING TREES IMPACTED BY CARRIAGEWAY WIDENING TO BE REMOVED

3 DP247993

ADJOINS SKT-SC-001203

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HENRY LAWSON DRIVE

ADJOINS SKT-SC-001205

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1 DP1140621

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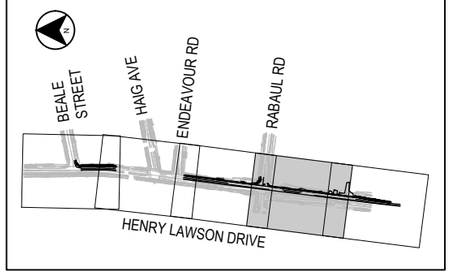
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. PROPERTY ADJUSTMENTS YET TO BE AGREED UPON BY PROPERTY OWNERS.
3. APPROXIMATELY 38m KERB SIDE PARKING TO BE REMOVED ON THE SOUTHBOUND OF HENRY LAWSON DRIVE DUE TO PROPOSED CARRIAGEWAY WIDENING.

KEYPLAN



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MR508 HENRY LAWSON DRIVE

HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

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SHEET 4 OF 5

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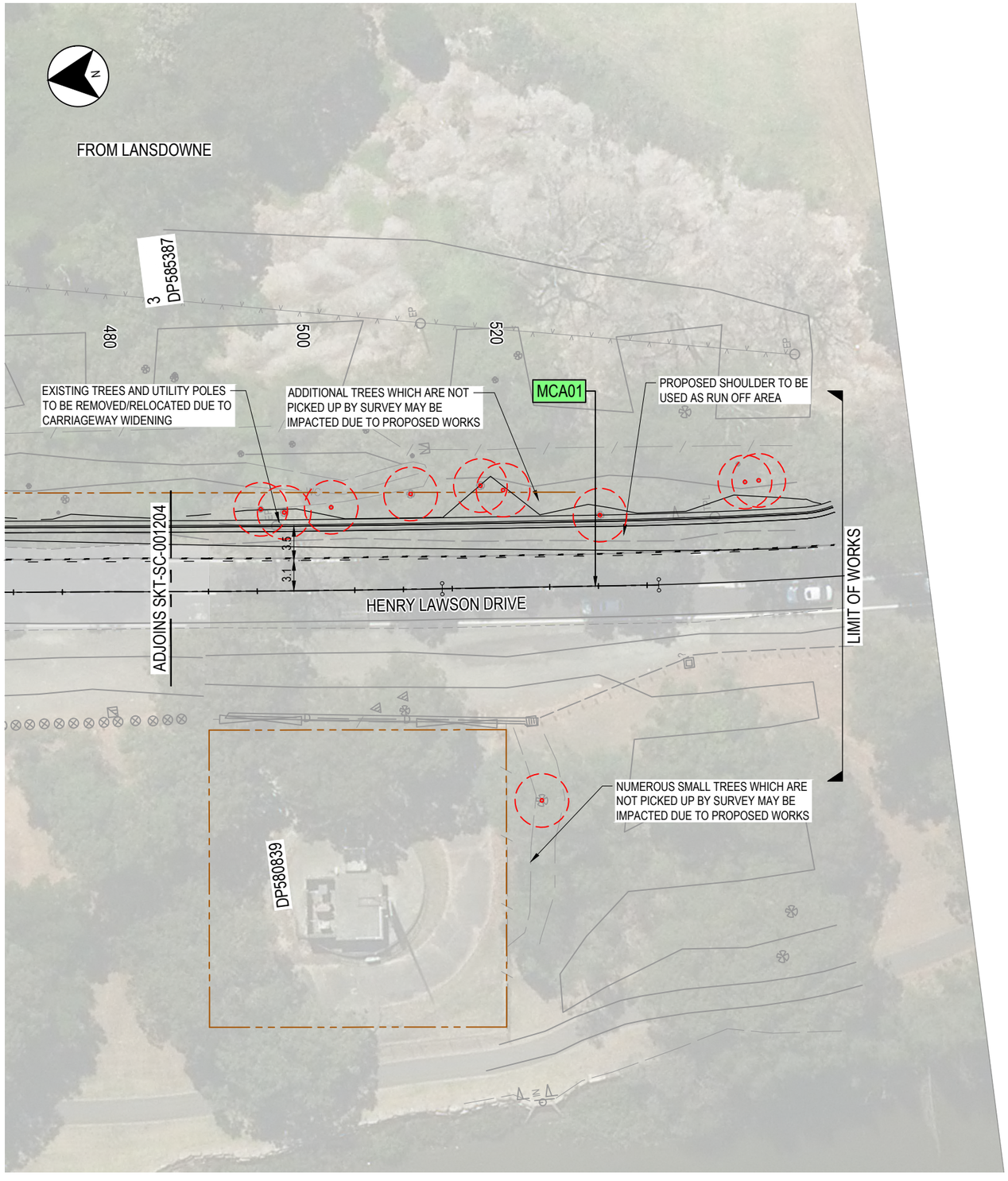

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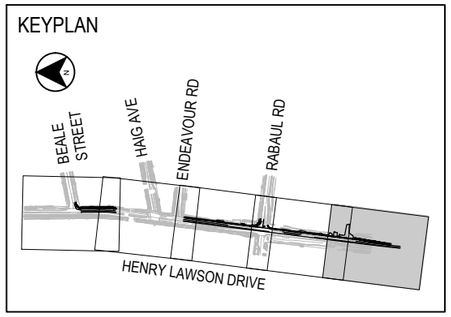

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HENRY LAWSON DRIVE / RABAUL ROAD, HAIG AVENUE RIGHT TURN BAYS GENERAL ARRANAGEMENT PLAN

SHEET 5 OF 5

RMS REGISTRATION No.: DSxxxx/xxxxxx
PART: 1
ISSUE STATUS: CONCEPT DESIGN
EDMS No.: -
SHEET No.: SHT-RD-001205
ISSUE: 0

28 July 2020 Ref: PLAN-142-113

Ana Perez
Transport for NSW
GSPO- Henry Lawson Drive Upgrade
27 Argyle Street
Parramatta NSW 2150

Dear Ms Perez

Canterbury-Bankstown Council (Council) welcomes the opportunity to comment on the Urban Roads Pinch Point Program proposal for Henry Lawson Drive.

Councils Community Strategic Plan, CBCity 2028, identifies seven high level aspirations for our ten-year vision for the City, one of which is to be Moving and Integrated - an accessible City with great local destinations and many options to get there. Likewise, one of the objectives of the Bankstown CBD and Bankstown Airport Collaboration Area is to be well connected to the rest of Greater Sydney. Henry Lawson Drive represents a significant movement corridor within the local government area, and reducing congestion and improving safety and connectivity along this corridor would provide benefit to the local community and also improve the functionality of the surrounding employment and industrial precinct.

The following comments are offered by Council for consideration as part of the early concept design consultation phase:

- The current flood modelling along the corridor should be considered. To assist in your assessment and design work a ZIP file has been attached to this email which includes;
    - Henry Lawson Drive south of Rabaul Road to north of Beale St 100 Year ARI Stormwater Flooding;
    - Intersection of Henry Lawson Drive and Beale Street Stormwater Drainage Pipe and Pit System;
    - Intersection of Henry Lawson Drive and Rabaul Road Stormwater Drainage Pipe and Pit System; and
    - Intersection of Henry Lawson Drive with Haig Avenue and Endeavour Road Stormwater Drainage Pipe and Pit System.

These maps give a broad idea of the stormwater flooding and deficiencies in the stormwater drainage system in the project area. Council notes that most of the stormwater drainage pipe systems are under capacity, currently at 1 year ARI, as such it is beneficial to road users if the pipe systems across and pits in Henry Lawson Road are upgraded. Further to this, in general, the interface between Henry Lawson Drive and side streets, in terms of kerb and gutter and road cross falls, is poor or non existent, causing stormwater ponding. The proposed works should improve these outcomes for the community.

- The inclusion of water sensitive urban design initiatives within Kentucky Reserve should be considered for inclusion as part of the project to improve environmental and water quality outcomes.

- The Georges River cycleway runs adjacent to Henry Lawson Drive along this section of the road. The cycleway provides a north-south link within our LGA, connects to Liverpool and Fairfield local government areas and is a popular recreational cycling route. The proposed work should ensure the north-south cycling connection is maintained as the TfNSW Co-Designed Bicycle Network Blueprint identifies this as a Tier One cycling route.

- There is also the opportunity to improve pedestrian access along the Eastern side of the corridor. There is currently no footpath provided between Rabaul Road and Haig Avenue, where the signalised pedestrian crossing is located. Including a footpath within the scope of the work would connect the tennis court facility with the Georges River cycleway and improve active transport options for both residents and workers within Georges Hall.

- The Georges River Parklands is a priority green grid corridor for the South District. It is important this corridor retains access to the river for the community and acts as an extended linear river parkland. Planting should be enhanced along the corridor to improve ecological outcomes and reflect the visual character of the river foreshore. The work should minimise the impact to tree loss, particularly when the cumulative impact of the proposed Henry Lawson Drive and Milperra Road intersection upgrade, the Tower Road intersection upgrade and future work along the whole corridor is considered. Preserving mature and established trees where possible should be encouraged.

- Traffic, particularly heavy vehicles, should be encouraged to utilise the Tower Road intersection rather than use local streets such as Haig Avenue when the right turn option into Rabaul Road is removed.

Council supports the investment by TfNSW in improving transport infrastructure within the City of Canterbury Bankstown. Council notes that while this project is expected to improve movement through the Henry Lawson Drive and Haig Street intersection, in peak times, the remainder of the corridor between the M5 Motorway and Hume Highway, Lansdowne, also suffers from congestion, and improvements along the whole corridor, such as the duplication of Henry Lawson Drive, should be investigated and prioritised to ensure growth is supported.

We look forward to further consultation with Transport for NSW. Should you require any further information, I can be contacted via margaret.southwell@cbcity.nsw.gov.au or 9707 5704.

Yours sincerely,

Margaret Southwell
Strategic Projects Officer

Appendix I

Traffic Route Diversion Assessment

Right Turn Ban Assessment

Henry Lawson Drive northbound traffic at Rabaul Road

04-003-P0043031-MEM-CV-000

JAN 2020 | Version: 1

Contents

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Author:	Bless Varghese – Design Engineer
Date:	July 2020
Version:	1
Reference:	P.0043031
Division:	Greater Sydney
Review date:	June 2020

1 Introduction

Henry Lawson Drive is a key link between Hume Highway, Milperra Road and the M5. It is currently one lane in each direction. There are significant queuing and delays observed on the Henry Lawson Drive southbound traffic which extents towards and beyond Flinders Road during peak periods.

As part of the Henry Lawson Drive/ Haig Avenue - Rabaul Road detail design project, Easing Sydney's Congestion Portfolio team has conducted a traffic assessment to analyse different options to reduce congestion at the study area. The proposed option (refer to Appendix A for Option 2 extracted from Urban Road Congestion Program – Intersection Option Assessment Traffic Report) suggests a right turn ban for Henry Lawson Drive northbound traffic at Rabaul Road.

Figure 1 below shows Henry Lawson Drive/ Haig Avenue where the northbound right turn is proposed to be banned:

Figure 1: Intersection of Henry Lawson Drive and Rabaul Road (image: six maps)

This memo documents a brief desktop review of the proposed right turn ban and its potential impacts to residential and other land use in the area.

2 Reasons for right turn ban

According to the “Intersection Option Assessment Traffic Report”, it is suggested that the right turn ban at northbound Henry Lawson Drive into Rabaul Road is proposed due to the following reasons:

Intersection Performance

Right turning traffic into Rabaul Road at times impeding / causing delays to the northbound through movement, contributing to the wider performance issues along this section of the corridor.

Safety

Currently, northbound right turn movement is operating under uncontrolled filter condition. By banning the northbound right turn from Henry Lawson Drive (S) into Rabaul Road is removing the risk of the right turn conflicting with the heavy southbound movements.

Henry Lawson Drive through traffic is also observed to be making use of the narrow verge / hard shoulder to bypass the right turning traffic. The electricity pole located at the corner poses physical constraints for bypassing through traffic causing safety concerns with such manoeuvrer.

3 Alternative route assessment

This section discusses the potential alternative routes as a result of banning right turn from northbound Henry Lawson Drive into Rabaul Road. Two key destinations are to be impacted, namely residentials along Rabaul Road, and the Bankstown Aerodrome at Tower Road. The key assumptions made for the analysis is as following:

- The travel time calculations are based on the publicly available Google Maps estimated travel time, with shortest route measured from the map to be adopted
- The primary impact of the right turn ban at Rabaul Road will be on the residents along Rabaul Road
- Access to Bankstown Aerodrome is primarily from the signalised intersection of Henry Lawson Drive and Tower Road; however, there might be vehicles that use Rabaul Road to access the Aerodrome and will be impacted by the right turn ban.

The impacts to the residentials and the Aerodrome are discussed as following:

Residentials along Rabaul Road

In the existing condition, the time taken to travel from 256 Henry Lawson Drive to 54 Rabaul Road is approximately 1 min for 100 m.

Figure 2: Existing condition - right turn at Rabaul Road (image: six maps)

Two potential alternative routes are explored by implementing the proposed right turn ban at Rabaul road:

Alternative route option 1: via Haig Avenue- Ashcroft Street

By proposing right turn ban at Rabaul Road, vehicles are required to travel further north and take right at Haig Avenue (signalised intersection with dedicated right turn) and use

Ashcroft Street (local road) to access Rabaul Road. It would take approximately 2 min for 1.1 km travel (additional travel distance of 1 km).

Figure 3: Right turn ban at Rabaul Road, vehicles taking right at Haig Avenue and Ashcroft Street to access Rabaul Road (image: six maps)

Alternative route option 2: Beale Street- Ashcroft Street

If vehicles are not turning at Haig Avenue, other alternative route can be right turn into Beale Street, which is the downstream intersection of Haig Avenue, as shown in the map below. This route will take approximately 3 minute, and 1.5 km to reach the residentials along Rabaul Road.

Note that there is no right turn allowed at Endeavour Road in the existing scenario.

Figure 4: Right turn ban at Rabaul Road, vehicles taking right at Beale Street and Ashcroft Street to access Rabaul Road (image: six maps)

In comparing the Alternative route option 1 and Alternative route option 2, option 2 will take approximately an additional minute travelling from 256 Henry Lawson Drive to 54 Rabaul Road when compared option 1.

In assuming all rerouted vehicles will turn right at Haig Avenue as it is the shortest route, the proposed right turn ban will add additional traffic volume of 44% in AM peak and 17% in PM peak at Haig Avenue, as seen in **Table 1** below:

Table 1: Existing and additional traffic at Haig Avenue due to right turn ban at Rabaul Rd

Right turn at Haig Avenue	Existing AM peak	Existing PM peak
Existing volume	94	53
Additional traffic due to right turn ban at Rabaul Road**	41	9
Increase in traffic by %	44%	17%

**** assuming all vehicles turning right at Rabaul Road will now take right at Haig Avenue**

Swept path of heavy vehicles were checked to confirm on the turning radius at Haig Avenue. The design vehicle of Rabaul Road is 8.8 m service vehicle and check vehicle is 12.5 m SU truck. The swept path analysis shows that Haig Avenue intersection can cater for the above-mentioned design and check vehicle within the existing carriageway footprint without any need of intersection modification.

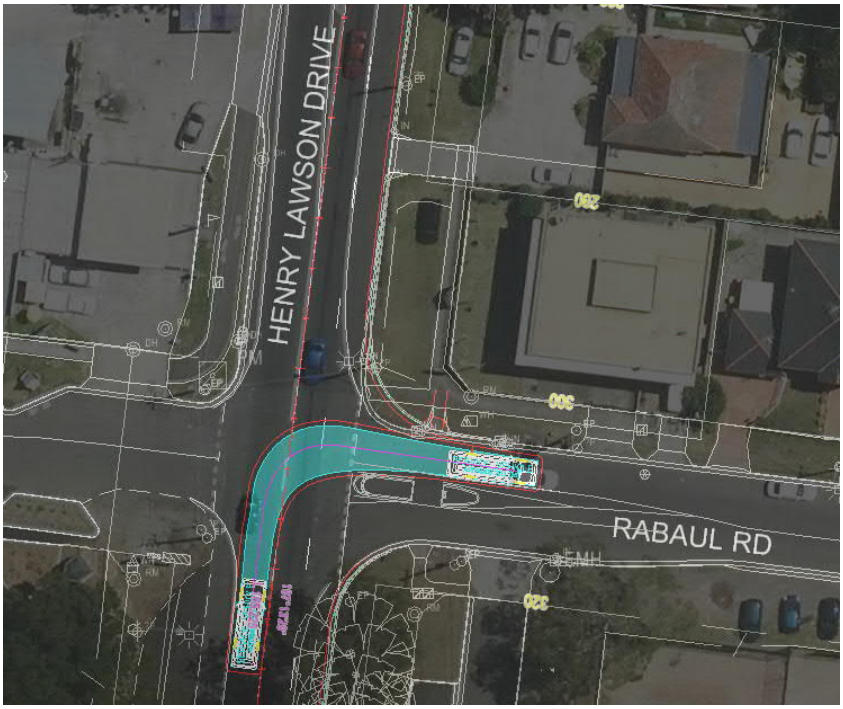

Figure 5: Swept path of design vehicle (8.8m service vehicle) at Rabaul Road

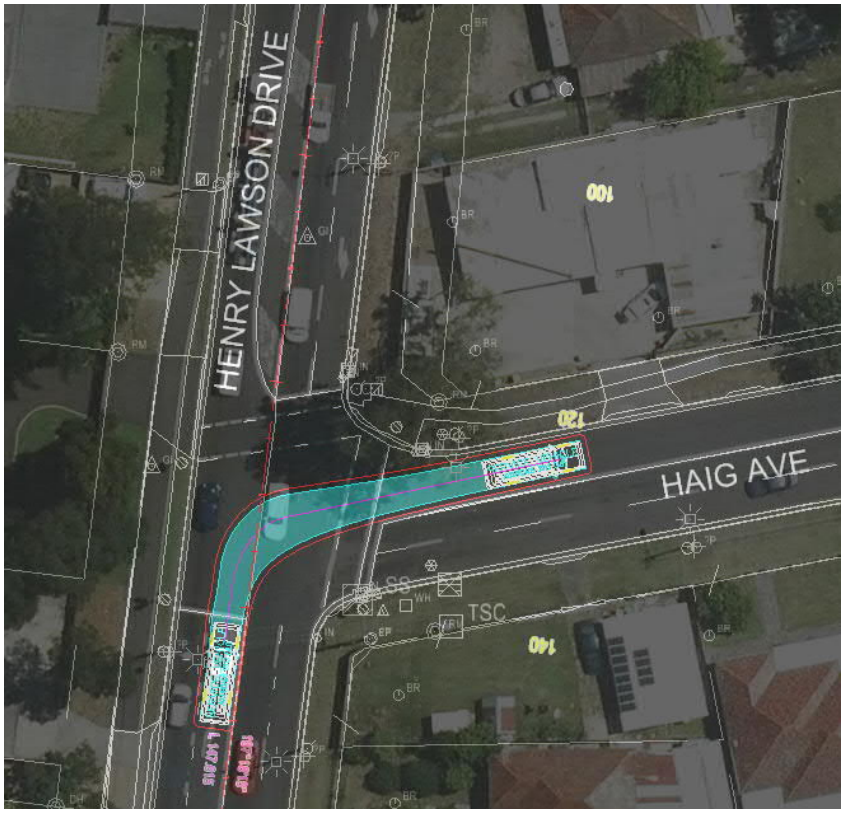

Figure 6: Swept path of design vehicle (8.8m service vehicle) at Haig Avenue

Figure 7: Swept path of check vehicle (12.5m SU truck) at Rabaul Road

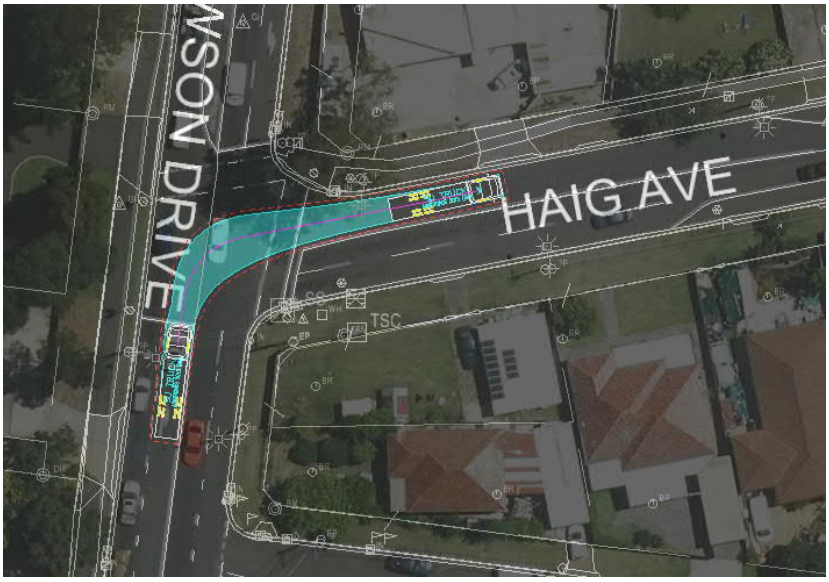

Figure 8: Swept path of check vehicle (12.5m SU truck) at Haig Avenue

The Bankstown Aerodrome

Based on traffic survey, 3% of right turn vehicles at Rabaul Road are heavy vehicles (assuming 8.8 m service vehicle as heavy vehicle). It is assumed that Rabaul Road connecting to Link Road/ Tower Road intersection is considered as one of the minor access points to Bankstown airport according to “2019 Bankstown masterplan”, as seen in **Figure 9** below.

Figure 9: Rabaul Road serves as secondary access to airport (image extracted from 2019 Masterplan of Bankstown Airport)

The right turn ban at Rabaul Road which will impact the access to the Bankstown Airport would require consultation from relevant stakeholders including the Council and aviation sector.

Tower Road intersection is currently signalised and has a dedicated right turn, and hence it would be a more convenient route for airport vehicles taking right at Tower Road than Rabaul Road.

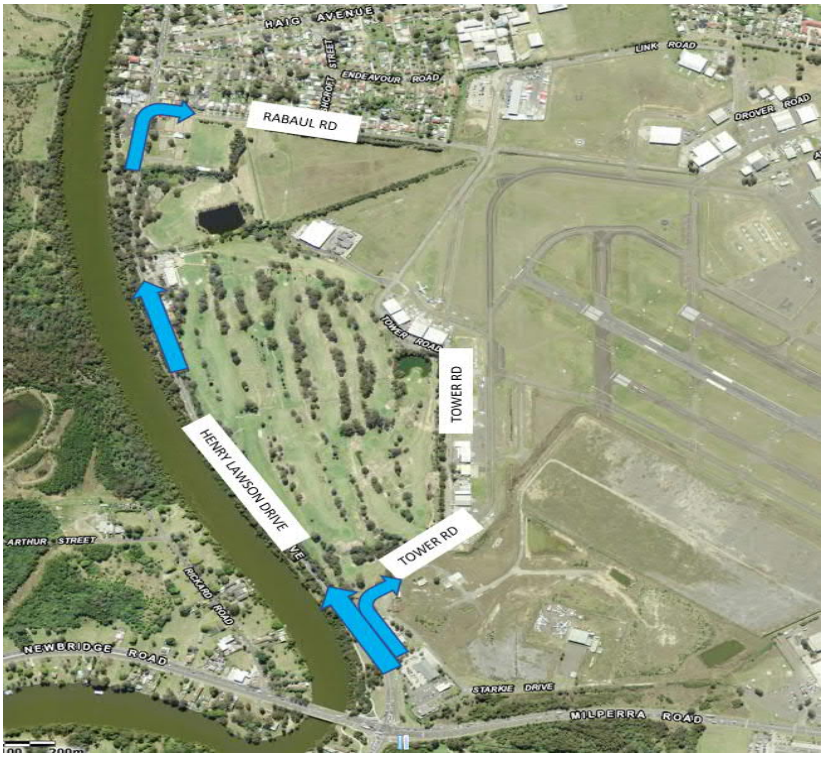

Figure 10: Existing condition - access to the Aerodrome via Henry Lawson Drive/ Tower Road and Henry Lawson Drive/ Rabaul Road (image: six maps)

4 Conclusion

As per the desktop review, it is concluded that vehicles can access residential properties on Rabaul Road via Haig Avenue intersection and Ashcroft Street, with an additional distance of 1km comparing to existing right turning distance at Rabaul Road.

From safety perspective, Henry Lawson Drive and Rabaul Road is an unsignalized intersection with the vehicles turning right from northbound Henry Lawson Drive into Rabaul Road are to wait for safe gaps from the southbound through traffic. Right turning traffic cause queuing at the intersection and there are vehicles passing the right turning vehicles via southbound shoulder, hence creates risk of multiple type of crashes. Proposed design has mitigated these risks by providing a safer right turning movement at Haig Avenue.

As for the access to the Bankstown Airport, Rabaul Road currently serves as a minor access point. Vehicles primarily access airport via Henry Lawson Drive/ Tower Road intersection. Henry Lawson Road/ Tower Road intersection south approach currently provides a dedicated right turn lane and is seen to be the easiest access to the airport.

In terms of the impact to Haig Avenue, approximately 41 vehicles per hour in the AM peak and only 11 vehicles in the PM peak will be added to the right turning traffic at Haig Avenue,

Based on above low volumes of diverted traffic and multiple alternative routes identified at two separate signals on Haig Avenue and Tower Road, both with dedicated right turn facilities, are adequate for accommodating the changes with no significant impacts anticipated.

5 Appendix A – Preferred option (Option 2) as per traffic assessment

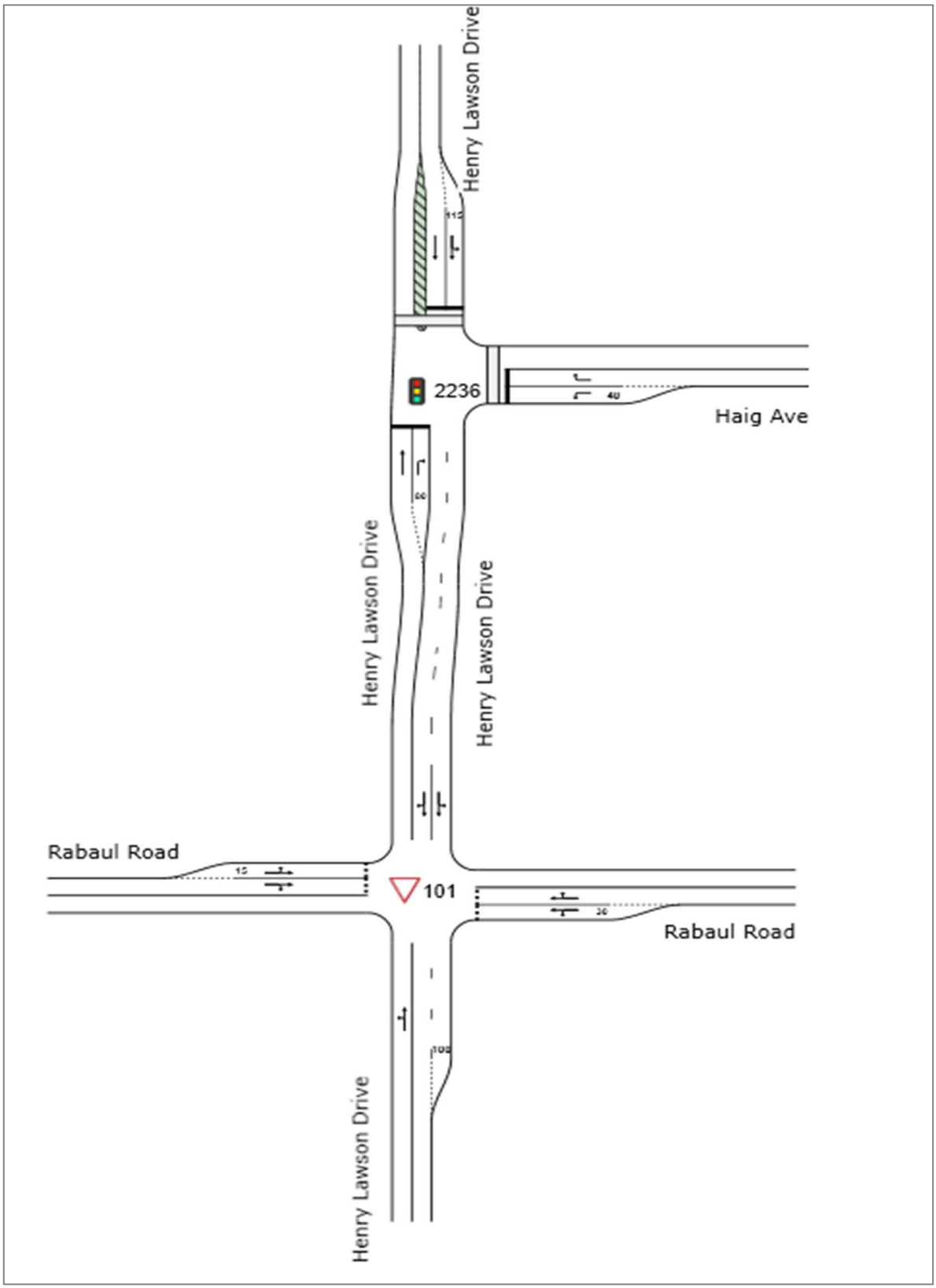

Figure above shows Option 2 (preferred option) layout from Urban Road Congestion Program – Intersection Option Assessment Traffic Report.

Appendix J

Noise and Vibration Assessment

RENZO TONIN & ASSOCIATES
inspired to achieve

Acoustics
Vibration
Structural Dynamics

HENRY LAWSON DRIVE WIDENING, GEORGES HALL

Construction and Operational Noise and Vibration Assessment

27 November 2020

Transport for NSW

TL559-01F02 N&V Report (r2)

35 1982-2017 ACOUSTIC ENGINEERING EXCELLENCE

Sydney Melbourne Brisbane Gold Coast Kuwait Singapore
Renzo Tonin & Associates ABN 29 117 462 861
Level 1/418A Elizabeth St SURRY HILLS NSW 2010 | PO Box 877 STRAWBERRY HILLS NSW 2012
P (02) 8218 0500 F (02) 8218 0501 sydney@renzotonin.com.au www.renzotonin.com.au

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Prepared for:	Transport for NSW
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Attention:	MS LYNDALL THORNHILL

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11.09.2020	Prepare draft report	0	1	D. Kim	M. Chung	M. Chung
27.11.2020	Finalise report	-	2	D. Kim	M. Chung	M. Chung

Contents

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List of Figures

1 Introduction

Renzo Tonin & Associates was engaged by Transport for NSW (TfNSW) to undertake an environmental noise and vibration assessment for the construction and operation of the proposed widening of Henry Lawson Drive between Beale Street and just south of Rabaul Road in Georges Hall. The proposed works include the addition of a second southbound lane on Henry Lawson Drive between Beale Street and Rabaul Road for a length of approximately 300m and the removal of the existing right-turn from Henry Lawson Drive onto Rabaul Road eastbound.

This study addresses the following issues:

- Construction noise and vibration emission from the use of mobile plant and equipment
- Operational noise emission resulting from traffic lanes moving closer to sensitive receivers located on Henry Lawson Drive due to the widening.

This study identifies the nearby sensitive receiver locations that are most potentially affected. The potential noise and vibration impacts are assessed against noise and vibration criteria presented in the following policies and guidelines:

- NSW Environmental Protection Authority's (EPA) '*Interim Construction Noise Guideline*' (ICNG),
- Transport of NSW (TfNSW, formerly Roads and Maritime Services) '*Construction Noise and Vibration Guideline*' (CNVG),
- EPA '*Road Noise Policy*' (RNP),
- TfNSW '*Noise Criteria Guideline*' (NCG), and
- TfNSW '*Noise Mitigation Guideline*' (NMG).

The existing ambient noise environment was determined through unattended long term noise monitoring at nearby receiver locations.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Project Description

Transport for NSW (TfNSW) proposes to widen Henry Lawson Drive between Beale Street and Rabaul Road in Georges Hall, in order to ease congestion and improve travel reliability along the road corridor.

2.1 Scope of Works

2.1.1 Road Works

The scope of works for the project include the following:

- Providing an additional southbound lane on Henry Lawson Drive between Beale Street and Rabaul Road. Road widening would be required into the eastern road verge along a length of approximately 300 metres
- The installation of a new kerb and gutter system along the eastern verge of Henry Lawson Drive southbound between Beale Street and just south of Rabaul Road
- Prohibiting right turn movements from Henry Lawson Drive northbound onto Rabaul Road eastbound
- Utility readjustments
- Installation of new stormwater drainage pits and pipes throughout the proposal area
- Full depth pavement asphalt for the new southbound lane between Beale Street and just south of Rabaul Road
- The modification and reinstatement of driveways adjacent to the proposed road widening of the southbound carriageway of Henry Lawson Drive
- The removal and modification of numerous street trees and vegetation within the proposal area
- Removal of informal kerbside street parking adjacent to the Henry Lawson Drive southbound road corridor including approximately 12 metres of kerbside parking in the northern extent of the proposal area between Beale Street and Haig Avenue and approximately 25 metres of kerbside parking between Haig Avenue and Rabaul Road
- Banning of left-turn movements for large vehicles over 9 metres in length from Henry Lawson Drive southbound onto Haig Avenue eastbound
- Installing a new footpath on the eastern side of Henry Lawson Drive between Haig Avenue and Rabaul Road

2.1.2 Compound Site

The project will utilise a construction compound site during the proposed construction works. The proposed location of the compound site has been nominated to be in the existing car park located just south of the tennis courts at Coleman Park adjacent to Henry Lawson Drive.

The noise impact assessment due to the works associated with the nominated compound site has been carried out separately in this assessment. The location of the proposed road works and compound site is shown in Figure 1.

2.2 Noise Catchment Areas

The following noise catchment areas (NCAs) were nominated to provide an assessment of areas exposed to construction noise impacts.

Table 2.1 – Noise Catchment Areas

NCA	Description
NCA 1	Noise catchment area directly adjacent to the project area with direct line of sight to the construction works and predicted to be exposed to $L_{Aeq(15min)}$ construction noise levels >25dB(A) above the applicable construction noise management level (NML).
NCA 2	Noise catchment area predicted to be exposed to $L_{Aeq(15min)}$ construction noise levels that are between 15dB(A) and 25dB(A) above the applicable NML. This NCA would typically be behind the first row of buildings.
NCA 3	Noise catchment area predicted to be exposed to $L_{Aeq(15min)}$ construction noise levels that are between 5dB(A) and 15dB(A) above the applicable NML. This NCA would typically be behind rows of buildings
NCA 4	Noise catchment area predicted to be exposed to $L_{Aeq(15min)}$ construction noise levels that are <5dB(A) above the applicable NML. This NCA would typically be behind rows of buildings and well removed from the project site

Figure 1 presents the project site and surrounds of the study area.

2.3 Nearest Affected Receiver

The nearest representative receivers potentially affected by operational traffic noise due to the road widening have been identified and are presented in Table 2.2 below.

Table 2.2 – Nearest Affected Receivers

Receiver	Receiver Type	Description
R1	Residential	Residential receiver located at 227 Henry Lawson Drive, Georges Hall
R2	Residential	Residential receiver located at 237 Henry Lawson Drive, Georges Hall
R3	Residential	Residential receiver located at 243 Henry Lawson Drive, Georges Hall
R4	Recreational area	Recreational receiver located at the western extent of Coleman Park, adjacent to the tennis courts

These identified receivers are representative of the potentially most affected receivers impacted by the proposed widening of the southbound carriageway of Henry Lawson Drive, where the project results in traffic being located closer to these receiver locations. The receivers are shown in Figure 1 below.

2.4 Construction Hours

Potential daytime works would be conducted during standard construction hours as follows:

- 7:00am to 5:00pm, Monday to Friday and 8:00am to 1:00pm, Saturday;
- No work on Sunday and public holidays.

To minimise disruption to traffic and potential safety risks to construction personnel and road users, it would be necessary to carry out most of the works outside standard hours. The proposed out-of-hours works would take place during the following hours:

- Evening / night (out-of-hours) work – 6:00pm to 7:00am, Sunday to Thursday.

It is anticipated that work would be conducted for a maximum of five night shifts per week. High noise generating activities, such as saw cutting and jackhammering, would take place between 6:00pm and 12:00am (midnight). Less noisy construction work such as truck movements, loading and spreading material, laying new concrete kerbing, removing asphalt and laying new asphalt would be scheduled to take place between 6:00pm and 7:00am.

Construction works are expected to start in February 2021. The duration of works is estimated to be nine (9) to twelve (12) months.

Figure 1 – Locality Map Showing Site, Surrounds and Monitoring & Receiver Locations

3 Existing Noise Environment

3.1 Long Term Unattended Noise Monitoring

To determine existing L_{Aeq} traffic noise levels and background L_{90} noise levels along Henry Lawson Drive, long term noise monitoring was undertaken at the following locations.

Table 3.1 – Long Term Noise Monitoring Location

Location	Address	Description
M1	231 Henry Lawson Drive, Georges Hall	Noise monitor was located in the free field on the western extent of the property, facing Henry Lawson Drive and with direct line of sight to Henry Lawson Drive. The noise monitor was positioned approximately 1.5m above ground level and at a distance of approximately 5m from the edge of the existing Henry Lawson Drive kerb. Noise environment is considered representative of the sensitive receivers surrounding the proposed road works and north of Haig Avenue.
M2	249 Henry Lawson Drive, Georges Hall	Noise monitor was located in the free field on the western extent of the property, facing Henry Lawson Drive and with direct line of sight to Henry Lawson Drive. The noise monitor was positioned approximately 1.5m above ground level and at a distance of approximately 11m from the edge of the existing Henry Lawson Drive kerb. Noise environment is considered representative of the sensitive receivers surrounding the proposed road works and south of Haig Avenue.

To quantify the existing ambient noise environment, long-term (unattended) noise monitoring was conducted between Thursday 23rd July and Tuesday 4th August 2020 at the above monitoring locations. Figure 1 shows the long term noise monitoring locations.

The equipment used for noise monitoring included RTA Technology RTA06 and RTA07 noise loggers which are based on an NTi Audio Type XL2 precision sound level analyser which is a Class 1 instrument having accuracy suitable for field and laboratory use. The instrument was calibrated prior and subsequent to measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed. All instrumentation complies with IEC 61672 (parts 1-3) 'Electroacoustics - Sound Level Meters' and IEC 60942 'Electroacoustics - Sound calibrators' and carries current NATA certification (or if less than 2 years old, manufacturers certification).

Weather information was obtained from the Bureau of Meteorology for the area over this monitoring period and any data adversely affected by rain, wind or extraneous noise were excluded.

APPENDIX A of this report presents a description of acoustic terms. The graphically recorded output from long-term noise monitoring is included in APPENDIX D of this report. The graphs in APPENDIX D were analysed to determine a single assessment background level (ABL) for each day, evening and night period, in accordance with the NSW 'Noise Policy for Industry' (NPfI).

3.2 Existing Background and Ambient Noise Levels

Existing background and ambient noise levels representative of receivers surrounding the proposed road works on Henry Lawson Drive, as measured at Locations M1 and M2, are presented in Table 3.2 below.

Table 3.2 – Measured Existing Ambient (L_{Aeq}) & Background (L_{A90}) Noise Levels, dB(A)

Location	Address	Ambient L_{Aeq} Noise Levels			Background L_{A90} Noise Levels		
		Day	Evening	Night	Day	Evening	Night
M1	231 Henry Lawson Drive, Georges Hall	72	71	69	62	53	38
M2	249 Henry Lawson Drive, Georges Hall	70	69	66	61	53	39

3.3 Existing Traffic Noise Levels

Existing traffic noise levels as measured at Locations M1 and M2 are presented in Table 3.3 below.

Table 3.3 – Measured Existing $L_{Aeq\ (15\ hour)}$ and $L_{Aeq\ (9\ hour)}$ Traffic Noise Levels, dB(A)

Location	Address	$L_{Aeq\ (15\ hour)}$	$L_{Aeq\ (9\ hour)}$
M1	231 Henry Lawson Drive, Georges Hall	74	72
M2	249 Henry Lawson Drive, Georges Hall	72	69

Notes: 1. Noise monitoring conducted in the free field; therefore, facade correction applied (+2.5dB) to represent equivalent traffic noise levels at 1m from the façade.

Noise almost always varies with time. Noise environments can be described using various descriptors to show how a noise ranges about a level. In this report, noise values measured or referred to include the L_{90}, and L_{eq} levels. The statistical descriptor L_{90} measures the noise level exceeded for 90% of the sample measurement time. The L_{eq} level is the equivalent continuous noise level or the level averaged on an equal energy basis. Measurement sample periods are usually ten to fifteen minutes. The Noise -vs- Time graphs representing measured noise levels, as presented in APPENDIX D, illustrate these concepts for the broadband dB(A) results.

4 Construction Noise

4.1 Construction Noise Criteria

4.1.1 Construction Noise Management Level at Residences

The TfNSW 'Construction Noise and Vibration Guideline' (CNVG) provides guidance for the establishment of construction noise management levels (NMLs) and the methods for assessing construction noise. There are two parts to the CNVG that are used to determine the type of assessment required to be undertaken:

- Duration of impact to affected receivers
- Number of affected receivers.

The proposed intersection works are anticipated to occur for a duration of more than three weeks and the number of receivers potentially affected by the construction noise impacts would be many, in accordance with the CNVG.

Based on the proposed duration of works and many affected receivers, a quantitative assessment in accordance with the noise objectives of the NSW 'Interim Construction Noise Guideline' (ICNG, EPA 2009) is to be undertaken. Table 4.1 below (reproduced from Table 2 of the ICNG) sets out the noise management levels for residences and how they are to be applied.

The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.

The rating background level (RBL) is used when determining the NMLs. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).

Table 4.1 – Noise Management Levels at Residential Receivers

Time of Day	Management Level $L_{Aeq\ (15\ min)}$*	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10dB(A)	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

Time of Day	Management Level $L_{Aeq\ (15\ min)}$*	How to Apply
	Highly noise affected 75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: • times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) • if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5dB(A)	A strong justification should typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2 of the ICNG.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Residential receivers are considered 'noise affected' where construction noise levels are greater than the NMLs identified in Table 4.1 above. The noise affected level represents the point above which there may be some community reaction to noise. Where predicted and/or measured construction noise levels exceed NMLs, all feasible and reasonable work practices will be applied to meet the management levels.

During standard and outside of standard construction hours, a highly affected noise objective of $L_{Aeq(15min)}$ 75 dB(A) applies at all receivers.

Table 4.2 presents the construction NMLs established for the nearest affected noise sensitive residential receivers based upon the noise monitoring results and representative background noise levels outlined in Section 3.2, the proposed construction hours and the above ICNG requirements.

Table 4.2 – Construction Noise Management Levels at Residential Receivers, dB(A)

Receiver Location	Assessment Period	Noise Management Level $L_{Aeq(15\ min)}$
Residential receivers surrounding northern half of proposed road works.	Day (standard hours)[1]	62 + 10 = **72**
	Evening (outside standard hours)[2]	53 + 5 = **58**
	Night (outside standard hours)[3]	38 + 5 = **43**
Residential receivers surrounding southern half of proposed road works and compound site.	Day (standard hours)[1]	61 + 10 = **71**
	Evening (outside standard hours)[2]	53 + 5 = **58**
	Night (outside standard hours)[3]	39 + 5 = **44**

Notes:
1. Day period represent the construction hours period from 7am to 5pm, Monday to Friday and 8am to 1pm, Saturday
2. Evening period represents the construction hours period from 8pm to 10pm
3. Night period represents the construction hours period from 10pm to 5am

As stated in Section 2.4, the majority of works would take place outside of standard hours with some potential works during daytime standard hours. Thus, to present a worst case scenario, the construction noise assessment will be based on the night period NML. The night NML for Location M1 is considered representative of residential receivers north of Endeavour Road and the night NML for Location M2 is considered representative of residential receivers south of Endeavour Road.

4.1.2 Other Sensitive Land Uses

Other types of sensitive land uses potentially impacted by construction noise include schools, childcare centres, recreation areas and commercial premises during the construction works associated with the proposed road works and the compound site activities. However, it is noted that the schools, childcare centres, recreation areas and commercial premises would likely not operate during the evening and night time period.

Therefore, noise assessment for out of hours works would not be applicable to these sensitive receivers.

4.1.3 Sleep Disturbance

Given that night works are to occur, noise emanating from construction works associated with the project has been assessed for its potential to disturb sleep. The NSW EPA has made the following policy statement with respect to sleep disturbance:

> *"Peak noise level events, such as reversing beepers, noise from heavy items being dropped or other high noise level events, have the potential to cause sleep disturbance. The potential for high noise level events at night and effects on sleep should be addressed in noise assessments for both the construction and operational phases of a development. The INP does not specifically address sleep disturbance from high noise level events.*
>
> *Research on sleep disturbance is reviewed in the NSW Road Noise Policy. This review concluded that the range of results is sufficiently diverse that it was not reasonable to issue new noise criteria for sleep disturbance.*
>
> *From the research, the EPA recognised that the current sleep disturbance criterion of an $L_{A1, (1\ minute)}$ not exceeding the $L_{A90, (15\ minute)}$ by more than 15 dB(A) is not ideal. Nevertheless, as there is insufficient evidence to determine what should replace it, the EPA will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required.*
>
> *The detailed analysis should cover the maximum noise level or $L_{A1, (1\ minute)}$, that is, the extent to which the maximum noise level exceeds the background level and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the NSW Road Noise Policy. Other factors that may be important in assessing the extent of impacts on sleep include:*
>
> - *how often high noise events will occur*

- *time of day (normally between 10pm and 7am)*
- *whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).*

The $L_{A1, (1\ minute)}$ descriptor is meant to represent a maximum noise level measured under 'fast' time response. The EPA will accept analysis based on either $L_{A1, (1\ minute)}$ or $L_{A, (Max)}$."

Source: http://www.epa.nsw.gov.au/noise/applicnotesindustnoise.htm Downloaded: 04.12.2014

Where the background noise levels are less than 40dB(A), some studies indicate that the above approach may result in noise limits that are unnecessarily strict.

In relation to maximum noise level events, the NSW 'Road Noise Policy' (RNP) identifies several investigations into the impacts of intermittent and emerging noise sources on the disturbance of sleep. Reference is made to enHealth report (2004) which notes the following in relation to maximum noise level events:

"As a rule in planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) L_{Amax} more than 10 or 15 times per night."

The RNP summarises the research on sleep disturbance to date as follows:

"As a rule in planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) L_{Amax} more than 10 or 15 times per night."

- *maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
- *one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly*

The above references identify that internal noise levels of 45dB(A) and up to 55dB(A), may have the potential to impact sleep but are unlikely to cause awakenings. On the assumption that there is a 10dB(A) outside-to-inside noise loss through an open window, the above references indicate that external noise levels of L_{Amax} 55 to 65dB(A) are unlikely to cause awakening reactions.

To assess the likelihood of sleep disturbance, an initial screening level of L_{Amax} (or $L_{A1(1min)} \leq L_{A90(15min)}$ + 15dB(A) is used. In situations where this results in an external screening level of less than 55dB(A), a minimum screening level of 55dB(A) is set. Note that this is equivalent to a maximum internal noise level of 45dB(A) with windows open.

Where there are noise events found to exceed the initial screening level, further analysis is made to identify:

- the likely number of events that might occur during the night assessment period

- whether events exceed an 'awakening reaction' level of $L_{A1(1min)}$ 65dB(A).

Therefore, based on the measured RBLs for the night period the initial screening levels are as follows:

- Proposed road works on northern half (north of Haig Avenue) of proposal area:
  - Initial Screening level – $L_{A90(15min)}$ + 15 = (38+15) = **53dB(A)**
- Proposed road works on southern half (south of Haig Avenue) of proposal area:
  - Initial Screening level – $L_{A90(15min)}$ + 15 = (39+15) = **54dB(A)**

As the initial screening levels presented above are below 55dB(A), the minimum screening level of **55dB(A)** is set for all areas surrounding the proposed road works and compound site.

Based on the above information, the sleep disturbance assessment levels for the project are presented in Table 4.3.

Table 4.3 – $L_{A1,1min}$ (or L_{Amax}) Sleep Disturbance Assessment Levels

Receiver Location	External Screening Level ($L_{A90,15min}$ + 15)	Awakening Reaction Level
All affected residential receivers	55dB(A)	65dB(A)

4.2 Construction Noise Sources

The following table lists major plant and equipment likely to be used by the contractor to carry out the necessary construction activities for this project and their corresponding sound power levels.

Table 4.4 – Typical Activities and Sound Power Levels, dB(A) re. 1pW

Construction Activity	Associated Plant and Equipment	Activity Total L_{Aeq} Sound Power Levels	
		L_{Aeq}	L_{Amax}
Site Establishment			
Installing construction boundary fences and traffic barriers, vegetation clearing	Truck (medium rigid)	121[1]	126[2]
	Franna crane		
	Chainsaw		
	Chipsaw		
	Tub grinder/mulcher		
Utility Relocations			
Relocate underground and above ground utilities including adjusting utility covers; property adjustments	Excavator (tracked) 35T	116[1]	116[1]
	Jackhammer		
	Dump truck		
	Franna Crane		
	Concrete pump		
	Concrete saw		
	Vacuum truck		

Construction Activity	Associated Plant and Equipment	Activity Total L_{Aeq} Sound Power Levels	
		L_{Aeq}	L_{Amax}
	Light vehicle		
	Concrete truck		
	Generator		
Drainage Infrastructure			
Excavation of trenches and pits; delivery and placement of precast pipes and pits; filling and compacting	Excavator (tracked) 35T	115[1]	116[1]
	Jackhammer		
	Road truck		
	Franna crane		
	Concrete truck		
	Compressor		
	Backhoe		
	Vibrating roller		
	Concrete pump		
Kerb and Pavement Works			
Construction of new kerbs, gutters and driveways; construct new road pavement including subgrade improvements, sub base / base material placements; laying concrete and asphalt	Concrete saw	118[1]	123[1]
	Dump truck		
	Compactor		
	Water cart		
	Pavement profiler		
	Asphalt paving machine		
	Light vehicle		
	Concrete truck		
	Vibrating roller		
	Front end loader		
	Daymaker		
Road Furniture Installation and Finishing			
Signposting, line marking and finishing	Franna crane	110[1]	116[1]
	Road Truck		
	Line marking machine		
	Scissor lift		
	Light vehicle		
Site Compound Establishment			
Site compound establishment	Chainsaw	119[1]	126[2]
	Crane		
	Front end loader		
	Excavator		
	Grader		
	Vibratory roller		

Construction Activity	Associated Plant and Equipment	Activity Total L_{Aeq} Sound Power Levels	
		L_{Aeq}	L_{Amax}
	Concrete truck		
	Front end loader		
	Dump truck		
	Water cart		
	Concrete vibrator		
	Concrete pump		
	Power generator		
	Light vehicle		
Site Compound Operation			
Office and storage areas; typical operation of the compound site (ie. deliveries, plant and equipment, maintenance)	Front end loader	114[1]	116[1]
	Excavator		
	Road truck		
	Compressor		
	Welding equipment		
	Light vehicle		
	Power generator		

Notes: 1. Sound power level based on data presented in the RMS Construction Noise Estimator Spreadsheet tool
2. Sound power level based on data from previous projects and/or data from Renzo Tonin & Associates library

The sound power levels for the construction activities presented in the above table are typically based on the source list presented in the 'RMS Construction Noise Estimator' spreadsheet tool. Where data was not available from the RMS tool, then data was obtained from Renzo Tonin & Associates' library database and previous projects.

4.3 Construction Noise Assessment

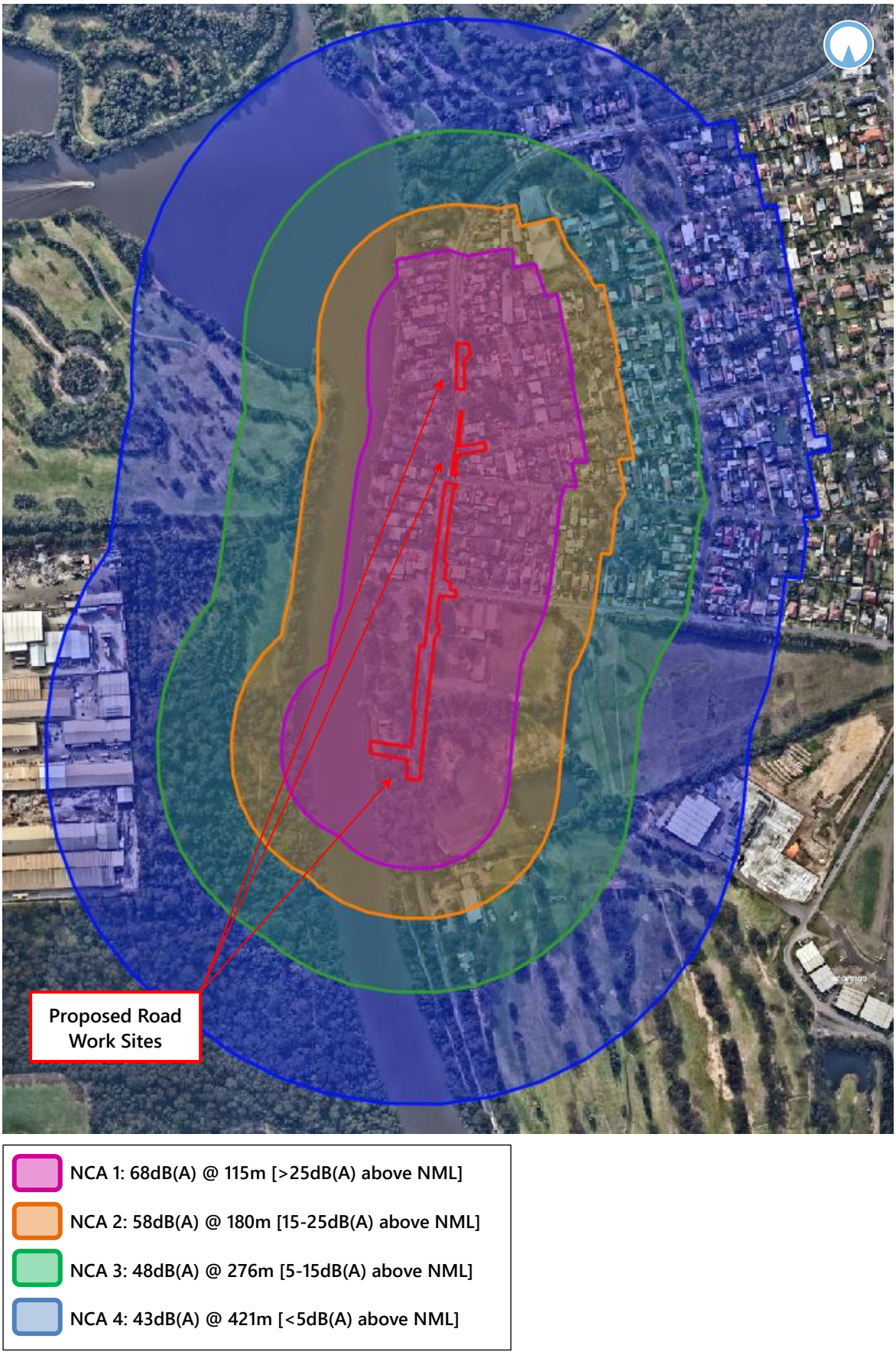
4.3.1 Road Works

As discussed previously, the majority of construction work is anticipated to be undertaken outside of standard construction hours.

Based on the proposed construction activities presented in Table 4.4, site establishment works has the highest total L_{Aeq} sound power level and for a conservative assessment, has been used as the noise source for the noise predictions.

Construction noise impacts were predicted using the 'RMS Construction Noise Estimator' spreadsheet tool to determine the distances where the corresponding NCAs listed in Table 2.1 would be applicable and are presented in Figure 2 below.

Figure 2 – NCAs Based on $L_{Aeq\ (15min)}$ Construction Noise Levels During Site Establishment Works

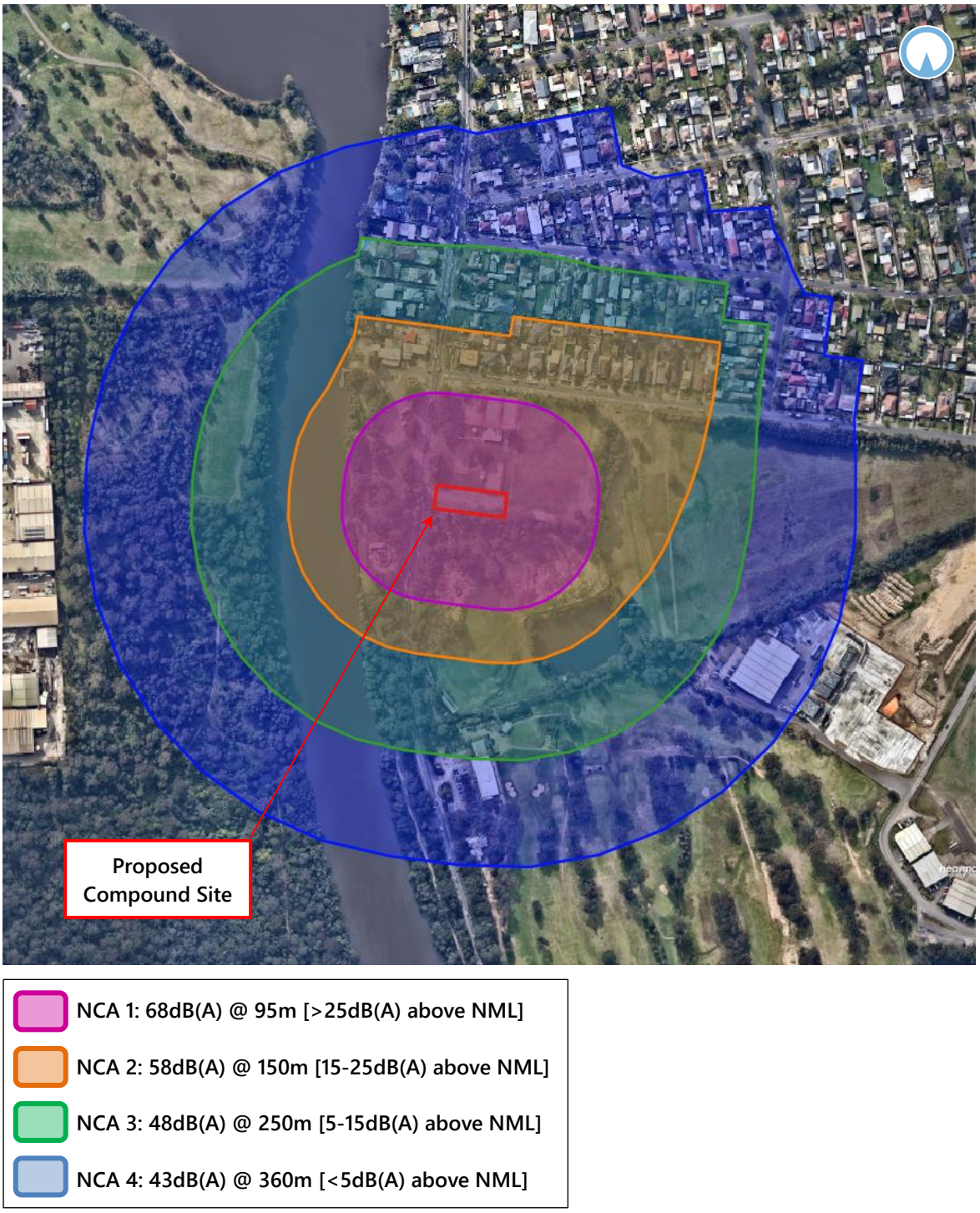


4.3.2 Compound Site

Based on the proposed construction activities at the construction compound site presented in Table 4.4, compound site establishment works has the highest total L_{Aeq} sound power level and for a conservative assessment, has been used as the noise source for the noise predictions.

Construction noise impacts were predicted for the nominated construction compound site using the 'RMS Construction Noise Estimator' spreadsheet tool to determine the distances where the corresponding NCAs listed in Table 2.1 would be applicable and is presented in Figure 3 below.

Figure 3 – NCAs Based on $L_{Aeg\ (15min)}$ Noise Levels for Proposed Compound Site



Based on predicted construction noise levels and the corresponding NCAs, a feasible and reasonable approach towards noise management measures is to be applied to reduce noise levels as much as possible to manage the impact from construction noise.

Further details on construction noise mitigation and management measures are provided in Section 4.5 below.

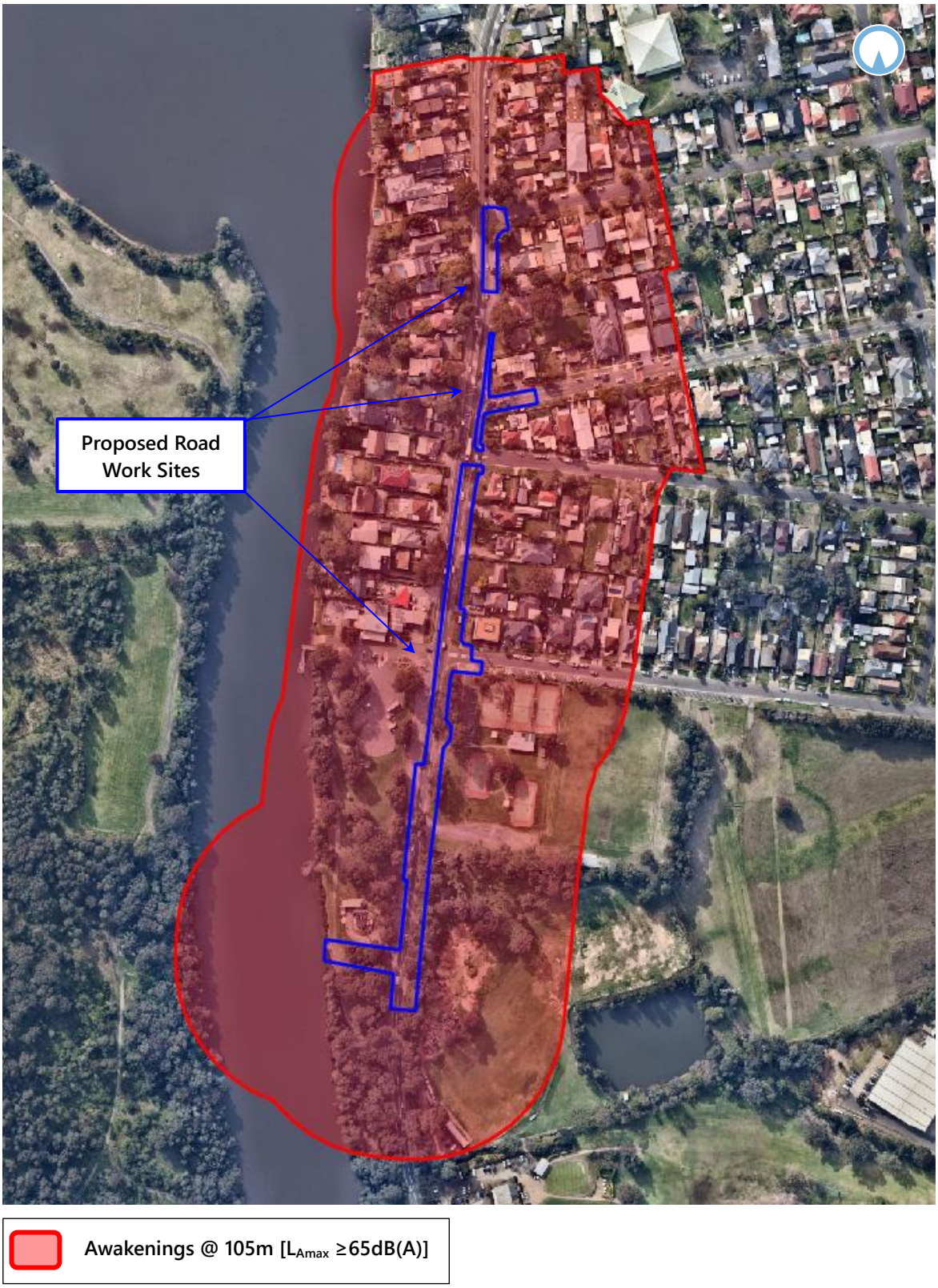
4.4 Sleep Disturbance Assessment

In addition to the above predicted $L_{Aeq\ (15min)}$ noise levels for the corresponding NCAs, areas where the L_{Amax} noise levels at residential receivers during night time works would cause sleep disturbance and awakening reactions [ie. ≥65dB(A)] are presented in the following sections. As discussed previously, in accordance with the ICNG the sleep disturbance assessment is only applicable where construction works are planned to extend over more than two consecutive nights.

4.4.1 Road Works

Based on the proposed construction activities presented in Table 4.4, maximum noise level predictions have been based on the site establishment activities to provide a conservative assessment as these activities have the highest L_{Amax} noise source level. Figure 4 presents the predicted L_{Amax} noise levels that would cause awakenings [ie. ≥65dB(A)] at residential receivers during site establishment works for the proposed road works sites.

Figure 4 – Areas Impacted by Maximum Noise Level During Site Establishment Works



4.4.2 Compound Site

Based on the proposed construction activities presented in Table 4.4, maximum noise level predictions during compound site activities have been based on compound site establishment activities to provide a conservative assessment as these activities have the highest L_{Amax} noise source level. Figure 5 presents the predicted L_{Amax} noise levels that would cause awakenings [ie. ≥65dB(A)] at residential receivers during compound site establishment works for the proposed compound site.

Figure 5 – Areas Impacted by Maximum Noise Levels for Proposed Compound Site

4.5 Construction Noise Mitigation

The following recommendations provide in-principle noise control solutions in accordance with the CNVG to reduce construction noise impacts to the affected residential receivers. Where actual construction activities differ from those assessed in this report, more detailed design of noise control measures may be required.

The advice provided here is in respect of noise only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

4.5.1 General Noise Management Measures

Appendix B of the CNVG presents standard noise mitigation measures, which are reproduced in Table 4.5 below.

Table 4.5 – Standard Noise Mitigation Measures

Action Required	Details
Management Measures	
Implementation of any project specific mitigation measures required	Implementation of any project specific mitigation measures required
Implement community consultation or notification measures	Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night period and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Website Contact telephone number for community Email distribution list
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures • site opening/closing times (including deliveries) • environmental incident procedures.
Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.
Update Construction Environmental Management Plans	The CEMP must be regularly updated to account for changes in noise management issues and strategies

Action Required	Details
Source Controls	
Construction hours and scheduling	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise levels should be scheduled during less sensitive time periods.
Equipment selection	Use quieter and less noise emitting construction methods where feasible and reasonable. Ensure plant including the silencer is well maintained.
Plant noise levels	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Appendix F of the CNVG. Implement a noise monitoring audit program to ensure equipment remains within the more stringent of the manufacturers specifications or Appendix F of the CNVG.
Rental plant and equipment	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in the CNVG
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site.
Plan worksites and activities to minimise noise	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noisy activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 12.00am (midnight). If programmed night works is postponed the work should be re-programmed and the approaches in the CNVG apply again.
Reduced equipment power	Use only the necessary size and power for equipment required for the works
Non-tonal and ambient sensitive reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for out of hours work. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.
Minimise disturbance arising from delivery of goods to construction sites	Loading and unloading of material/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Engine compression braking	Limit the use of engine compression brakes at night and in residential areas. Ensure vehicles are fitted with a maintained Original Equipment Manufacturer exhaust silencer or a silencer that complies with the National Transport Commission's 'in-service test procedure' and standard.

Action Required	Details
Path Controls	
Shield stationary noise sources such as pumps, compressors, fans etc.	Stationary noise sources should be enclosed or shielded where feasible and reasonable whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.
Shield sensitive receivers from noisy activities	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable); noise curtains and consideration of site topography when situating plant.

4.5.2 Additional Noise Mitigation Measures

Appendix C of the CNVG provides details of additional noise mitigation measures to be applied when there are still exceedances of the NMLs after all the appropriate standard mitigation measures from Section 4.5.1 have been applied. Based on the NCAs established and presented in Figure 3 and Figure 4, the appropriate additional mitigation measures for each NCA as specified in Table C.1 of the CNVG has been reproduced in Table 4.6 below.

Table 4.6 – Additional Noise Mitigation Measures for NCAs

Noise Catchment Area	NML, dB(A)	Predicted Noise Levels, dB(A)	Recommended Additional Mitigation Measures
NCA 1	*43*	68	AA, V, IB, N, PC, SN, R2, DR
NCA 2	*43*	58	V, IB, N, PC, SN, R2, DR
NCA 3	*43*	48	V, N, R2, DR
NCA 4	*43*	43	N

Notes: 1. Recommended additional mitigation measures as specified in Table C.1 of the Construction Noise and Vibration Guideline

A review of the recommended additional mitigation measures presented in the above table has been undertaken and the outcomes of the review are as follows.

- Letterbox drop (**N = Notification**) has been recommended for receivers within NCA 4 (blue catchment area in Figure 3 and Figure 4). The RMS construction noise estimator tool indicates that **Specific Notification (SN)** should be delivered to the residences within NCA 2 of the construction works (orange catchment area in Figure 3 and Figure 4). The specific notification provides additional information and is provided to more highly affected receivers than covered in general letterbox drops. However, it is not reasonable to undertake separate notifications (one to residences within NCA 1 and NCA 2, and one for residences between NCA 3 and NCA 4) as this would likely cause community upset and confusion. Instead, a single coordinated message should be delivered to the affected community.
- **Individual Briefings (IB)** and **Phone Calls (PC)** detailing relevant information made to identified / affected receivers within NCA 1 and NCA 2 is not considered practical.
- **Respite Offer (RO)** should be considered where there are high noise and vibration generating activities near receivers. RO proposes that works should be carried out in continuous blocks that do not exceed 3 hours each, with a minimum respite period of one

hour between each block. The purpose of such an offer is to provide residents with respite from an ongoing impact. However, this is not applicable to projects that are predominantly constructed at night as this would only cause nuisance to the residences and prolong the construction schedule. As such this mitigation offer is not recommended.

- **Respite Period 2 (R2)** implies that works should be limited to two consecutive nights except for where there is a **Duration Respite (DR)**. For night works these periods of work should be separated by not less than one week and 6 nights per month. Based on the work schedule, duration and nature of night works required, it is not considered practicable to implement R2 as this would extend the overall duration of construction considerably.

- **Duration Respite (DR)** is offered when works are unable to comply with R2. Where it can be strongly justified it may be beneficial to increase the work duration (number of evenings or nights worked) so that the project can be completed more quickly. For this project it is proposed that the night works would occur in five night blocks to reduce the overall works duration.

- **Alternate Accommodation (AA)** may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels. A review of whether AA is reasonable and feasible has been undertaken as follows:

  - Are works required beyond midnight? If so, has a justification been provided?
    Yes. The night works are necessary to avoid peak traffic conditions during the day which would generate traffic impacts (as well as potential greater hazard and higher risk to worker safety). However, high noise generating activities such as jackhammering and saw cutting will be completed before 12am.

  - Does the surrounding area have a high density of receivers?
    No, the majority of the surrounding environment includes single dwelling and other low density residential properties.

  - Could temporary alternate accommodation be consistently applied?
    No, due to the high number of noise sensitive receivers within the noise catchment area it would be impractical and difficult to consistently deliver alternate accommodation arrangements.

  - Will the application of duration respite mitigate noise impact?
    Yes, the works program has been condensed to reduce the overall duration of the works. The works are scheduled to be undertaken over five consecutive nights (weather permitting), respite on two nights per week.

  - Will receivers receive detailed information on the proposed work activities and mitigation measures to be applied?
    Yes, the letterbox drop would contain information on the proposed works as well as the proposed mitigation measures including the scheduling of works and contact details for more information.

Based on the above, alternative accommodation is not considered feasible or reasonable to implement. Therefore, this will be reviewed in response to receiving a complaint.

- **Verification (V)** measurements are recommended to be undertaken shortly after the commencement of construction activities to confirm that noise levels from construction are consistent with the predicted noise levels and that appropriate mitigation measures have been implemented given the existing background noise level.

Therefore, based on the above review of the recommended additional mitigation measures, the following additional mitigation measures are considered to be feasible and reasonable to implement in addition to the standard measures for the proposed intersection upgrade works.

1. Letterbox drop (**N = Notification**) for receivers within NCA4, NCA3, NCA2 and NCA1. Notifications should be detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period and contact telephone number. Notification will be sent a minimum of seven (7) calendar days prior to the start of works.

2. Works are unable to comply with **Respite Condition 2 (R2)** which implies that works should be limited to two consecutive nights except for where there is a **Duration Respite (DR)**. It is considered beneficial to increase the number of work shifts per week. This will allow condensing the night work into five night blocks per week to reduce the overall works duration.

3. **Verification (V)** measurements should be undertaken at the start of high noise generating activities and to assist in managing complaints. Predicted noise levels from the proposed works should be verified by measuring construction noise and background noise levels when high noise generating activities are undertaken or where complaints are received.

4.5.3 Recommendations

It is recommended that attended noise measurements be undertaken at the nearest affected receivers once equipment is introduced on site at the beginning of night works to establish and quantify actual L_{Amax} noise levels on site. Where L_{Amax} noise levels are measured to exceed the sleep disturbance limit, then a reasonable and feasible approach towards noise management measures should be considered to reduce noise levels as much as possible to manage the impact from construction noise during night time periods. For example, noisier works should be undertaken before 12am (midnight) and the quieter works be undertaken after 12am (midnight).

To minimise noise impacts from construction vehicles on surrounding roads, all drivers would be trained in the Project Heavy Vehicle Code of Conduct, including noise management methods such as limiting compression braking.

5 Construction Vibration

5.1 Vibration Criteria

Construction vibration is associated with three main types of impact:

- disturbance to building occupants;
- potential damage to buildings; and
- potential damage to sensitive equipment in a building.

Generally, if disturbance to building occupants is controlled, there is limited potential for structural damage to buildings.

Vibration amplitude may be measured as displacement, velocity, or acceleration.

- **Displacement** (x) measurement is the distance or amplitude displaced from a resting position. The SI unit for distance is the meter (m), although common industrial standards include mm.
- **Velocity** ($v=\Delta x/\Delta t$) is the rate of change of displacement with respect to change in time. The SI unit for velocity is meters per second (m/s), although common industrial standards include mm/s. The Peak Particle Velocity (PPV) is the greatest instantaneous particle velocity during a given time interval. If measurements are made in 3-axis (x, y, and z) then the resultant PPV is the vector sum (i.e. the square root of the summed squares of the maximum velocities) regardless of when in the time history those occur.
- **Acceleration** ($a=\Delta v/\Delta t$) is the rate of change of velocity with respect to change in time. The SI unit for acceleration is meters per second squared (m/s2).

Construction vibration goals are summarised below.

5.1.1 Disturbance to Building Occupants

Assessment of potential disturbance from vibration on human occupants of buildings is made in accordance with the DECC 'Assessing Vibration; a technical guideline' (DECC, 2006). The guideline provides criteria which are based on the British Standard BS 6472-1992 'Evaluation of human exposure to vibration in buildings (1-80Hz)'. Sources of vibration are defined as either 'Continuous', 'Impulsive' or 'Intermittent'. Table 5.1 provides definitions and examples of each type of vibration.

Table 5.1 – Types of Vibration

Type of Vibration	Definition	Examples
Continuous vibration	Continues uninterrupted for a defined period (usually throughout the day-time and/or night-time)	Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).
Impulsive vibration	A rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on frequency and damping). It can also consist of a sudden application of several cycles at approximately the same amplitude, providing that the duration is short, typically less than 2 seconds	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading.
Intermittent vibration	Can be defined as interrupted periods of continuous or repeated periods of impulsive vibration that varies significantly in magnitude	Trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer, this would be assessed against impulsive vibration criteria.

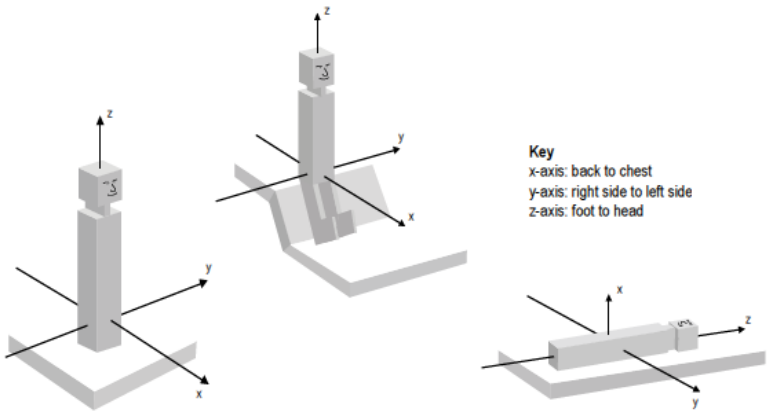
Source: Assessing Vibration; a technical guideline, Department of Environment & Climate Change, 2006

The vibration criteria are defined as a single weighted root mean square (rms) acceleration source level in each orthogonal axis. Section 2.3 of the guideline states:

> *"Evidence from research suggests that there are summation effects for vibrations at different frequencies. Therefore, for evaluation of vibration in relation to annoyance and comfort, overall weighted rms acceleration values of the vibration in each orthogonal axis are preferred (BS 6472)."*

When applying the criteria, it is important to note that the three directional axes are referenced to the human body; ie. x-axis (back to chest), y-axis (right side to left side) or z-axis (foot to head). Vibration may enter the body along different orthogonal axes and affect it in different ways. Therefore, application of the criteria requires consideration of the position of the people being assessed, as illustrated in Figure 6. For example, vibration measured in the horizontal plane is compared with x- and y-axis criteria if the concern is for people in an upright position, or with the y- and z- axis criteria if the concern is for people in the lateral position.

Figure 6 – Orthogonal Axes for Human Exposure to Vibration



The preferred and maximum values for continuous and impulsive vibration are defined in Table 2.2 of the guideline and values for the type of receivers surrounding the site are reproduced in Table 5.2.

Table 5.2 – Preferred and Maximum Levels for Human Comfort

Location	Assessment Period[1]	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous Vibration (Weighted RMS Acceleration, m/s^2, 1-80Hz)					
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools and educational institutions	Day- or night-time	0.020	0.014	0.040	0.028
Impulsive Vibration (Weighted RMS Acceleration, m/s^2, 1-80Hz)					
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools and educational institutions	Day- or night-time	0.64	0.46	1.28	0.92

Notes: 1. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am

The acceptable vibration dose values (VDV) for intermittent vibration are defined in Table 2.4 of the guideline and values for the type of receivers surrounding the site are reproduced in Table 5.3.

Table 5.3 – Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Residences	0.20	0.40	0.13	0.26
Offices, schools and educational institutions	0.40	0.80	0.40	0.80

Notes: 1. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am

5.1.2 Building Damage

Potential structural damage of buildings as a result of vibration is typically managed by ensuring vibration induced into the structure does not exceed certain limits and standards, such as British Standard 7385 Part 2 and German Standard DIN4150-3. Currently, there is no existing Australian Standard for assessment of structural building damage caused by vibration energy.

Within British Standard 7385 Part 1: 1990, different levels of structural damage are defined:

- **Cosmetic** - The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick/concrete block construction.
- **Minor** - The formation of large cracks or loosening of plaster or drywall surfaces, or cracks through bricks/concrete blocks.
- **Major** - Damage to structural elements of the building, cracks in supporting columns, loosening of joints, splaying of masonry cracks, etc.

The vibration limits in Table 1 of British Standard 7385 Part 2 (1993) are for the protection against cosmetic damage; however, guidance on limits for minor and major damage is provided in Section 7.4.2 of the Standard:

> *"7.4.2 Guide values for transient vibration relating to cosmetic damage*
>
> *Limits for transient vibration, above which cosmetic damage could occur are given numerically in Table 1 and graphically in Figure 1. In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the guide values for the building types corresponding to line 2 are reduced. Below a frequency of 4 Hz, where a high displacement is associated with a relatively low peak component particle velocity value a maximum displacement of 0.6 mm (zero to peak) should be used.*
>
> *Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 1, and major damage to a building structure may occur at values greater than four times the tabulated values."*

Within DIN4150-3, damage is defined as "any permanent effect of vibration that reduces the serviceability of a structure or one of its components" (p.2). The Standard also outlines:

> *"that for structures as in lines 2 and 3 of Table 1, the serviceability is considered to have been reduced if*
>
> - *cracks form in plastered surfaces of walls;*
> - *existing cracks in the building are enlarged;*
> - *partitions become detached from loadbearing walls or floors.*

These effects are deemed 'minor damage." ***(DIN4150.3, 1990, p.3)***

While the DIN Standard defines the above damage as 'minor', based on the definitions provided in BS7385, the DIN standard is considered to deal with cosmetic issues rather than major structural failures.

It is noted that British Standard 7385 Part 2 does not provide vibration limits to prevent structural damage to heritage structures. Instead, DIN4150-3 is referred to for vibration limits applicable to heritage type structures.

British Standard

British Standard 7385: Part 2 'Evaluation and measurement of vibration in buildings', is used as a guide to assess the likelihood of damage from ground vibration to industrial, commercial and residential type buildings. BS 7385 suggests levels at which 'cosmetic', 'minor' and 'major' categories of damage might occur.

The cosmetic damage levels set by BS 7385 are considered 'safe limits' up to which no damage due to vibration effects has been observed for certain particular building types. Damage comprises minor non-structural effects such as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks and separation of partitions or intermediate walls from load bearing walls. 'Minor' damage is considered possible at vibration magnitudes which are twice those given and 'major' damage to a building structure may occur at levels greater than four times those values.

BS 7385 is based on peak particle velocity and specifies damage criteria for frequencies within the range 4Hz to 250Hz, being the range usually encountered in buildings. At frequencies below 4Hz, a maximum displacement value is recommended. The values set in the Standard relate to transient vibrations and to low-rise buildings. Continuous vibration can give rise to dynamic magnifications due to resonances and may need to be reduced by up to 50%. Table 5.4 sets out the BS7385 criteria for cosmetic, minor and major damage.

Regarding heritage buildings, British Standard 7385 Part 2 (1993) notes that "a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive" (p.5). However, BS 7385 does not specify any vibration limits for heritage type buildings.

Table 5.4 – BS 7385 Structural Damage Criteria for Industrial, Commercial & Residential Buildings

Group	Type of Structure	Damage Level	Peak Component Particle Velocity[1], mm/s		
			4Hz to 15Hz	15Hz to 40Hz	40Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	Cosmetic	50		
		Minor[2]	100		
		Major[2]	200		

Group	Type of Structure	Damage Level	Peak Component Particle Velocity[1], mm/s		
			4Hz to 15Hz	15Hz to 40Hz	40Hz and above
2	Un-reinforced or light framed structures Residential or light commercial type buildings	Cosmetic	15 to 20	20 to 50	50
		Minor[2]	30 to 40	40 to 100	100
		Major[2]	60 to 80	80 to 200	200

Notes: 1. Peak Component Particle Velocity is the maximum Peak particle velocity in any one direction (x, y, z) as measured by a tri-axial vibration transducer.

2. Minor and major damage criteria established based on British Standard 7385 Part 2 (1993) Section 7.4.2

German Standard

As discussed previously, German Standard DIN 4150 - Part 3 'Structural vibration in buildings - Effects on Structure' (DIN 4150-3) has been referred to for recommended maximum levels of vibration that reduce the likelihood of damage caused by vibration to heritage type structures.

DIN 4150-3 presents the recommended maximum limits over a range of frequencies (Hz), measured in any direction, and at the foundation or in the plane of the uppermost floor of a heritage building or structure. The vibration limits increase as the frequency content of the vibration increases. The criteria applicable to heritage type structures or buildings surrounding the site are presented in Table 5.5.

Table 5.5 – DIN 4150-3 Structural Damage Criteria for Heritage Structures / Buildings

Group	Type of Structure	Vibration Velocity, mm/s			
		At Foundation at Frequency of			Plane of Floor Uppermost Storey
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All frequencies
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic value (eg buildings under a preservation order)	3	3 to 8	8 to 10	8

5.2 Potential Vibration Impacts

Based on the proposed plant items presented in Section 4.2 vibration generated by construction plant was estimated and potential vibration impacts are summarised in Table 5.6 below. The assessment is relevant to the identified residential and commercial type buildings surrounding the sites based on the BS 7385 and the DECC vibration guideline. The vibration impacts have been determined based on a worst case scenario of utilising a vibratory roller (>18 tonnes) for the project. The assessment has been based on information sourced from data libraries and previous projects worked on by Renzo Tonin & Associates.

Properties are most at risk from vibration impacts during kerb and pavement works while vibratory rollers are used. The potential for vibration impacts affecting human comfort could occur while vibratory rollers (>1 tonne) and excavators are used during drainage, kerb and pavement works. The

potential for vibration impacts resulting in cosmetic damage could occur while vibratory rollers (>4 tonnes) are used.

Table 5.6 – Potential Vibration for Residential Properties

Approx. distance to nearest buildings from works	Type of nearest sensitive buildings	Assessment on potential vibration impacts	
		Structural damage risk	Human disturbance
5 – 10m	Residential	Medium to high risk of structural damage from construction works	Very high risk of adverse comment as a result of construction works
10 – 15m	Residential	Medium risk of structural damage from construction works	High risk of adverse comment as a result of construction works
15 – 30m	Residential	Low risk of structural damage from construction works	Medium risk of adverse comment as a result of construction works
30 – 50m	Residential	Very low risk of structural damage from construction works	Low risk of adverse comment as a result of construction works
>50m	Residential	Very low risk of structural damage from construction works	Very low risk of adverse comment as a result of construction works

No heritage receivers have been identified within the vicinity of the proposal area, therefore the German standard has not been considered as part of this assessment.

Recommendations for reduction of potential vibration impacts, including minimum working distances for construction plant are provided in Section 5.3 below.

5.3 Vibration Mitigation

5.3.1 Recommended Minimum Buffer Distances

The pattern of vibration radiation is very difference to the pattern of airborne noise radiation and is very site specific as final vibration levels are dependent on many factors including the actual plant used, its operation and the intervening geology between the activity and the receiver. Accordingly, based on a database containing vibration measurements from past projects and library information, Table 5.7 below presents the recommended minimum working distances for high vibration generating plant based on the BS 7385 for cosmetic damage and the DECC vibration guideline for human response.

Table 5.7 – Recommended Minimum Working Distances for Vibration Intensive Plant

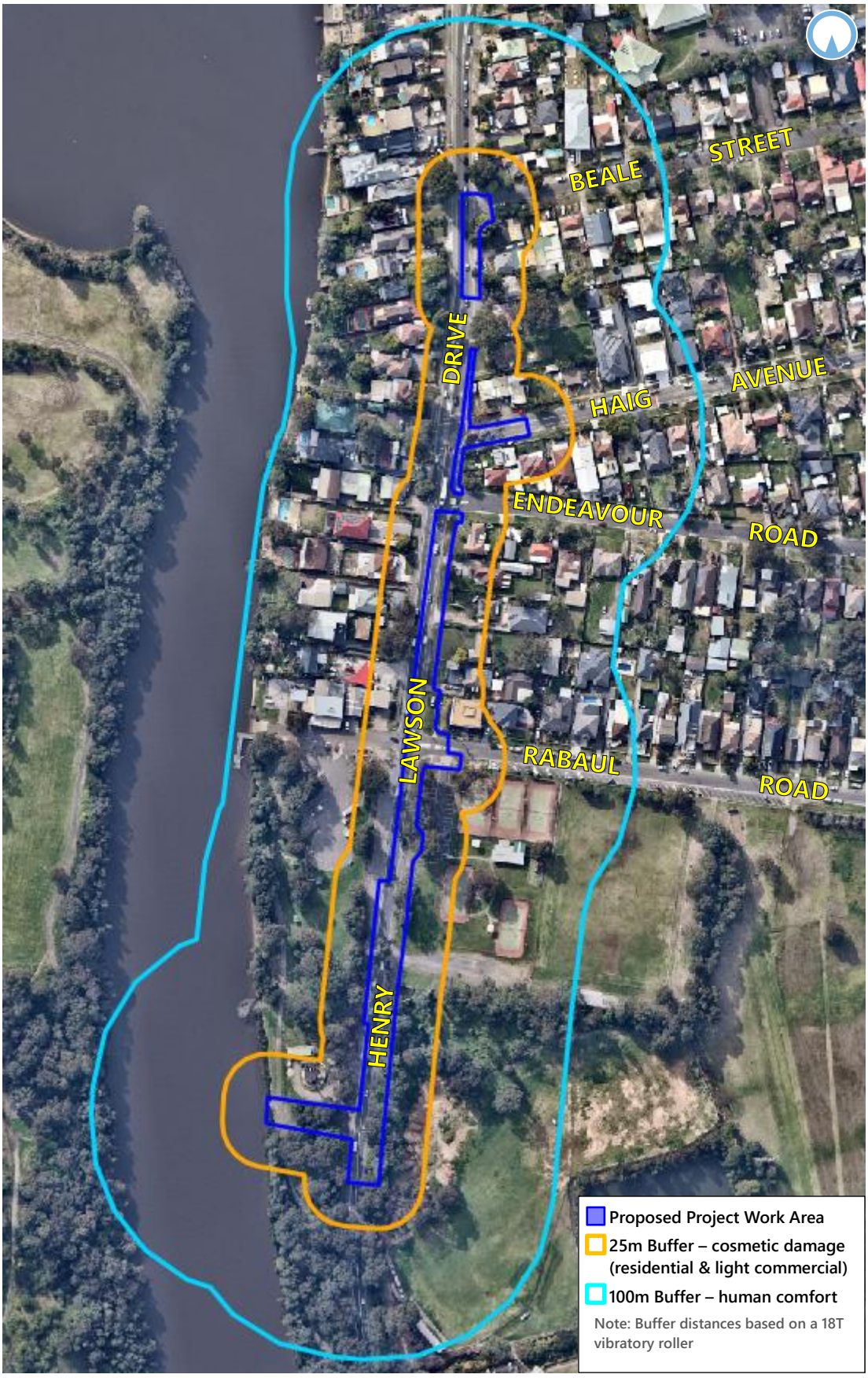
Plant item	Rating / description	Minimum working distance	
		Cosmetic damage (BS 7385) Light-framed structures	Human response
Vibratory Roller[1]	< 50 kN (Typically 1-2 tonnes)	5 m	15 m – 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m

Plant item	Rating / description	Minimum working distance	
		Cosmetic damage (BS 7385) Light-framed structures	Human response
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (Typically > 18 tonnes)	25 m	100 m
Compactors[2]	-	15 m	100 m
Excavators[2]	< 30 tonne (travelling/ digging)	10 m	15 m
Grader[3]	< 20 tonne	2 m (nominal)	10 m
Loaders[2]	-	-	5 m
Jackhammer[1]	Hand held	1 m (nominal)	3 m

Notes: 1. RMS Construction Noise and Vibration Guideline (CNVG)
2. Renzo Tonin & Associates project files, databases & library
3. TCA Construction Noise Strategy (Rail Projects) November 2011

Based on the above vibration intensive plant and minimum working distances, properties at risk or cosmetic damage and / or human comfort disturbance have been identified in Figure 7 below.

Figure 7 – Recommended Vibration Impact Minimum Working Distances



Receivers most at risk of vibration impacts include the first row of residential properties along Henry Lawson Drive surrounding the proposed project work site.

Site specific buffer distances should be determined once vibration emission levels are measured from each plant item prior to the commencement of their regular use on site. Where construction activity occurs in close proximity to sensitive receivers, minimum buffer distances for building damage should be determined by site measurements and maintained.

The appropriate machinery / works would need to be planned accordingly such that the vibration requirements are met (eg. use a different roller with lower vibration levels or without vibration).

5.3.2 Vibration Management Measures

The following vibration management measures are provided to minimise vibration impact from construction activities to the nearest affected receivers and to meet the relevant human comfort and building damage vibration limits:

- A management procedure should be implemented to deal with vibration complaints. Each complaint should be investigated and where vibration levels are established as exceeding the set limits, appropriate amelioration measures should be put in place to mitigate future occurrences. An example of a construction vibration complaints management procedure is presented in APPENDIX C.
- Where vibration is found to be excessive, management measures should be implemented to ensure vibration compliance is achieved. Management measures may include modification / substitution of construction methods such as using smaller equipment, establishment of safe buffer zones as mentioned above, and if necessary, time restrictions for the most excessive vibration activities. Time restrictions are to be negotiated with affected receivers.
- Where construction activity occurs in close proximity to sensitive receivers, vibration testing of actual equipment on site would be carried out prior to their commencement of site operations to determine acceptable buffer distances to the nearest affected receiver locations.
- Building condition assessments should be conducted at receivers determined, by the contractor (through a vibration risk assessment), to be sensitive to vibration impacts. These measures are to address potential community concerns that perceive vibration may cause damage to property.

5.3.3 Additional Vibration Mitigation Measures

Appendix C of the CNVG provides details of additional vibration mitigation measures to be applied when predicted vibration levels at receivers exceed the criteria for human comfort after all the appropriate standard mitigation measures from Section 5.3.2 have been applied. The additional mitigation measures to be applied for this project are shown in Table 5.8.

Table 5.8 – Additional Vibration Mitigation Measures

Predicted vibration level VDV, $m/s^{1.75}$ at receiver	Additional mitigation measures
Standard hours: Mon - Fri (7am - 6pm), Sat (8am - 1pm), Sun/Public Holiday (Nil)	
Predicted vibration exceeds maximum levels	N
OOHW Period 1: Mon - Fri (6pm - 10pm), Sat (7am - 8am & 1pm - 10pm), Sun/Public Holiday (8am - 6pm)	
Predicted vibration exceeds maximum levels	N
OOHW Period 2: Mon - Fri (10pm - 7am) Sat (10pm - 8am), Sun/Public Holiday (6pm - 7am)	
Predicted vibration exceeds maximum levels	N

Notes: N = Notification (letterbox drop or equivalent)

The additional mitigation measures shown above apply to all affected receivers.

Prior to the commencement of work, receivers around the site would be notified to advise that vibration from the works may at times be perceptible. Building condition assessments may be conducted prior to construction works to determine the condition of surrounding sensitive receivers. All potentially impacted receivers would be kept informed of the nature of works to be carried out, the expected vibration levels and duration, and be given contact details for enquiries and complaints.

5.4 Minimum Buffer Distances

Site-specific minimum working distances should be determined whenever significant vibration generating plant will be working close to or within the CNVG recommended minimum working distances listed in Table 5.7. The structural damage site-specific minimum working distances should be determined based on the BS 7385 limits listed in Table 5.4 for residential and commercial buildings.

Further attended vibration monitoring should be considered whenever significant vibration generating plant items are operating close to or within the determined minimum working distances. Locations for vibration monitoring during particular works would be determined by the construction contractor based on the advice of a suitable qualified person.

6 Road Traffic Noise Assessment

6.1 Construction Traffic Noise Criteria

The CNVG requires an initial screening test to evaluate whether noise levels would increase by more than 2dB(A) due to construction traffic or a temporary reroute to a road closure. Where increases are 2dB(A) or less then no further assessment is required. The EPA's 'Road Noise Policy' (RNP) states that in assessing feasible and reasonable mitigation measures, an increase of up to 2dB(A) represents a minor impact. Where noise levels increase by more than 2dB(A) then further assessment is required using the TfNSW 'Noise Criteria Guideline' (NCG).

In considering feasible and reasonable mitigation measures, consideration should be given to whether the noise levels associated with construction traffic comply with the relevant road traffic noise criteria presented in the RNP. It is noted that Henry Lawson Drive is classified as a sub-arterial road and the following traffic noise criteria from the RNP are applicable.

- **$L_{Aeq,15hr}$ 60dB(A) Day and $L_{Aeq,9hr}$ 55dB(A) Night for freeway / arterial / sub-arterial roads**

6.2 Operational Traffic Noise Criteria

The RNP sets out criteria to be applied to particular types of road and land uses. These noise criteria are to be applied when assessing noise impact and determining mitigation measures for developments that are potentially affected by road traffic noise, with the aim of preserving the amenity appropriate to the land use. However, the RNP states the following on page 5 of the policy:

> *"Some works that are either minor or required to improve safety are not covered by this RNP."*

The proposed upgrades to Henry Lawson Drive involve upgrading the existing road with an additional lane in the southbound direction and prohibiting right turn movements from Henry Lawson Drive northbound onto Rabaul Road eastbound.

The works would also require carriageway widening on the eastern side of Henry Lawson Drive between Beale Street and just south of Rabaul Road. Therefore, the project is not specifically assessed against the RNP.

Furthermore, due to prohibiting right turn movements from Henry Lawson Drive onto Rabaul Road, traffic would likely be rerouted from Henry Lawson Drive onto Haig Avenue then onto Ashcroft Street to access Rabaul Road. Hence, traffic noise impacts onto sensitive receivers along Haig Avenue and Ashcroft Street due to additional traffic generated by the right turn ban will be assessed as part of this study.

The TfNSW 'Noise Criteria Guideline' (NCG) further states the following;

> *"Some works may be primarily to improve safety. This may include minor straightening of curves, installing traffic control devices, intersection widening and turning bay extensions or making minor road realignments.*
>
> *These works are not considered redeveloped or new as they are not intended to increase the traffic carrying capacity of the overall road or accommodate a significant increase in heavy vehicle traffic"*

In accordance with the above statement from the NCG, the project is considered to be minor works. For minor works, the NCG states the following regarding noise level targets:

> *"Roads and Maritime (now TfNSW) applies the existing road criteria (RNP Table 8) where the minor works increase noise levels by more than 2.0dBA relative to the existing noise levels at the worst affected receiver."*

Table 8 of the RNP (Section 4.4) has the following target noise abatement levels for existing roads not subject to redevelopment.

- **$L_{Aeq,15hr}$ 60dB(A) Day and $L_{Aeq,9hr}$ 55dB(A) Night for freeway / arterial / sub-arterial roads**
- **$L_{Aeq,1hr}$ 55dB(A) Day and $L_{Aeq,1hr}$ 50dB(A) Night for local roads**

Based on the class and traffic volumes, Henry Lawson Drive is assessed as an arterial road, while Haig Avenue and Ashcroft Street are assessed as a local roads.

Additionally, the TfNSW 'Noise Mitigation Guideline' (NMG) states the following:

> *"For minor works Roads and Maritime (now TfNSW) applies the criteria from the NCG if noise levels increase by more than 2.0dBA at the worst affected receiver.*
>
> *When this is demonstrated, all sensitive receivers must be assessed where noise levels exceed the controlling criterion within the minor works study area (NCG). Where the total noise level for the 'build' year exceeds the criterion and there is an increase of more than 2.0dBA (ie 2.1dBA), relative to the 'no-build' year, then the receiver qualifies for consideration of noise mitigation. This includes the situation where the 'no-build' noise level is below the criterion value(s)."*

Therefore, based on the NMG affected receivers qualify for noise mitigation treatment, where reasonable and feasible, only if traffic noise levels predicted for the 'build' year (ie. the year the upgrade is completed and opened) exceed the existing road criteria (Table 8 of RNP) and the increase in traffic noise between the 'build' and 'no-build' years is greater than 2.0dB(A).

6.3 Traffic Flow and Composition Summary

6.3.1 Construction Related Road Traffic Volumes

During night time works most trucks would be going directly to the construction work area. However, a limited number of delivery trucks would access the proposed compound site during standard hours and outside of daytime hours. Construction traffic accessing the compound site would typically travel along Henry Lawson Drive and access the compound site via an entry / exit on Henry Lawson Drive.

During standard hours, there is anticipated to be six (6) to ten (10) truck movements per day to and from the compound site and would only occur up to two times a week. During the night period there is anticipated to be three (3) to six (6) truck movements to and from the compound site per night.

Table 6.1 presents the maximum number of forecasted heavy vehicle movements during the peak construction period at the selected compound site.

Table 6.1 – Number of Heavy Vehicle Movements Associated the Compound Site

Accessing Site	Day Period[1]	Night Period[2]
Compound Site	6 to 10	3 to 6

Notes: 1. Day period is 7:00am to 10:00pm
2. Night period is 10:00pm to 7:00am

6.3.2 Operational Traffic Volumes

A traffic classification survey was undertaken by Matrix Traffic and Transport Data over a seven (7) day period from Friday 24th to Thursday 30th July 2020 at the following locations.

1. Henry Lawson Drive, north of Beale Street
2. Henry Lawson Drive, south of Rabaul Road.

The traffic survey was conducted concurrently with the noise monitoring. The traffic data obtained was used to validate the traffic noise prediction tool.

The existing day time (15 hour) and night time (9 hour) traffic volumes as surveyed by Matrix Traffic and Transport Data are presented in Table 6.2 below.

As the works are considered to be a minor upgrade, the existing traffic volumes and compositions along Henry Lawson Drive for the 'build' and 'no build' scenarios are expected to be identical because the proposal is intended to improve efficiency along the road corridor, not generate additional traffic.

Table 6.2 – Existing 2020 Day (15 hour) and Night (9 hour) Traffic Volumes on Henry Lawson Drive

Road	Direction	7am to 10pm (15 hour)			10pm to 7am (9 hour)		
		Volume	Heavy Vehicle %	Average Speed (km/h)	Volume	Heavy Vehicle %	Average Speed (km/h)
Henry Lawson Drive (north of Beale Street)	Northbound	13,294	9.1	53	2,670	10.0	59
	Southbound	12,512	7.8	44	2,648	8.4	56
Henry Lawson Drive (south of Rabaul Road)	Northbound	13,870	7.3	46	2,667	9.1	59
	Southbound	14,417	6.5	52	2,963	7.8	61

Notes: 1. Traffic volumes based on survey undertaken by Matrix Traffic and Transport Data from Friday 24th to Thursday 30th July 2020

Additionally, a right turn ban traffic assessment was prepared by Transport for NSW (ref. P.0043031, dated July 2020). As a result of the proposed right turn ban onto Rabaul Road from Henry Lawson Drive, additional vehicles would take an alternative route to access Rabaul Road. Vehicles would likely take an alternative route along either Haig Avenue or Beale Street. It is likely that vehicles would take the shorter alternative route along Haig Avenue. As a worst case scenario, it has been assumed that all traffic that would turn right onto Rabaul Road would now take the route through Haig Avenue once the right turn ban is implemented. The existing peak traffic volumes on Haig Avenue and the additional traffic predicted on Haig Avenue due to the right turn ban at Rabaul Road has been presented in Table 1 of the traffic assessment report and reproduced in Table 6.3 below.

Table 6.3 – Existing and Additional Traffic at Haig Avenue due to Right Turn Ban at Rabaul Road

	AM Peak	PM Peak
Existing traffic volume	94	53
Additional traffic due to right turn ban at Rabaul Road[1]	41	9

Notes: 1. Assuming worst case scenario that all vehicles turning right at Rabaul Road will now take the right turn at Haig Avenue
2. Reproduced from Table 1 of the Right Turn Ban Assessment report undertaken by Transport for NSW (ref. P.0043031, dated July 2020)

All traffic noise predictions in Section 6.4 below are based on the traffic volumes and heavy vehicle composition data set out in the above tables.

6.4 Traffic Noise Prediction Modelling

6.4.1 Noise Prediction Model

Noise modelling was undertaken using a Renzo Tonin & Associates developed prediction tool that incorporates the United Kingdom of Environment's method of calculating traffic noise entitled 'Calculation of Road Traffic Noise (1988)' known as the CoRTN88 method. This method has been adapted to Australian conditions and extensively tested by the Australian Road Research Board. The CoRTN88 method predicts noise levels for free flowing traffic.

Table 6.4 following sets out the inputs and assumptions used in the traffic noise prediction model.

Table 6.4 – Summary of Prediction Tool Inputs

Input Parameters	Data Acquired From
Traffic volumes, compositions	Henry Lawson Drive: 2020 traffic classification survey undertaken by Matrix Traffic and Transport Data (Table 6.2) Haig Avenue: Traffic volume data based on information provided by Transport for NSW (see Table 6.3)
Speeds	Noise model verification: Measured average speeds Noise prediction modelling: Existing posted speeds
Ground topography	Determined during site inspection
Angles of view from receiver	Determined during site inspections and aerial photos
Structures and cuttings on opposite side of road	Determined during site inspections and review of aerial photos. No significant structures or cuttings identified
Ground absorption	Detailed within CoRTN88, ground absorption varied along route. Numeric values varied between 0 (hard surface) to 1 (soft ground). A value of 0.5 was used for this project
Receiver heights	1.5 metre above ground level for ground floor and 4.5 metre above ground level for 1st floor
Facade correction	+2.5dB(A)
Correction for Australian conditions	-1.7 dB(A) for 'at facade' conditions, -0.7 dB(A) for 'free field' conditions
Acoustic properties of road surfaces	Dense graded asphalt – no corrections applied
Roadside barriers	No existing roadside barriers

6.4.2 Model Validation

The prediction tool was validated and calibrated using the noise monitoring results at Location M1 and M2 with the concurrent traffic classification surveys undertaken by Matrix Traffic and Transport Data between Friday 24th and Thursday 30th July 2020. Table 6.5 summarises the results of the traffic noise prediction tool validation, providing a comparison between the predicted traffic noise levels for existing conditions and the measured traffic noise levels.

Table 6.5 – Noise Prediction Tool Verification Results, dB(A)

Location	Day Traffic Noise Level, $L_{Aeq\ (15hr)}$			Night Traffic Noise Level, $L_{Aeq\ (9hr)}$		
	Measured	Modelled	Variation	Measured	Modelled	Variation
Location M1 – 231 Henry Lawson Drive	74.5	74.0	-0.5	71.6	70.3	-1.3
Location M2 – 249 Henry Lawson Drive	72.2	71.4	-0.8	69.5	67.8	-1.7

Notes: 1. Model validated based on concurrent long term monitoring for the day and night period from Friday 24th to Thursday 30th July 2020.

The noise model validation results presented in Table 6.5 above show that the prediction tool results are in good agreement with the measured noise levels and there is a reasonable level of confidence that can be placed on the prediction tool for predicting future traffic noise levels on Henry Lawson Drive.

The $L_{Aeq\ (15hr)}$ and $L_{Aeq\ (9hr)}$ variations are within ±2dB(A) and therefore, no calibration correction is required.

6.5 Traffic Noise Model Prediction Result

6.5.1 Construction Related Road Traffic Noise

As presented in Table 6.1, during the peak construction period there is expected to be no more than six (6) to ten (10) heavy vehicles accessing the compound site during the day time period (ie. 7am to 10pm) and no more than three (3) to six (6) heavy vehicles accessing the compound site during the entire night time period (ie. 10pm to 7am).

Construction traffic accessing the proposed compound site would typically travel along Henry Lawson Drive which is classified as an arterial road.

Given the functionality of the road and the high existing day and night time traffic volumes along Henry Lawson Drive, construction traffic is not expected to contribute to existing traffic noise levels during the day or night time periods along Henry Lawson Drive.

6.5.2 Road Operation Traffic Noise

Noise impacts were predicted for the representative receivers most affected by the widening of the road and intersections, where traffic would move closer to the receiver due to the project. These receivers were identified as being Receivers R1, R2, R3 and R4, as shown in Figure 1. Receivers R1, R2 and R3 are residential receivers between Beale Street and Rabaul Road with facades of the dwellings facing the Henry Lawson Drive carriageway. As such, these receivers are considered representative of the receivers most affected by traffic noise due to the project. Receiver R4 is a recreational receiver located south of Rabaul Road directly adjacent to the road widening of Henry Lawson Drive and also potentially impacted by operational road traffic noise.

Other nearby residential receivers located on the western side of Henry Lawson Drive are unlikely to experience an increase in noise levels due to traffic being dispersed over the additional proposed southbound lane and also resulting in the proposed southbound lanes being located further away from the sensitive receivers on the western side of Henry Lawson Drive.

The predicted traffic noise levels for the 'build' and 'no build' scenarios at the worst affected receivers for the opening year are presented in the table below.

Table 6.6 – Predicted Opening Year Traffic Noise Levels on Henry Lawson Drive, dB(A)

Receiver	Approx. distance closer to road with upgrade	$L_{Aeq(15\ hour)}$ Daytime Noise Level			$L_{Aeq(9\ hour)}$ Night Time Noise Level		
		No Build	Build	Difference	No Build	Build	Difference
R1 – 227 Henry Lawson Drive	3m	69.9	70.3	0.4	66.4	66.8	0.4
R2 – 237 Henry Lawson Drive	3m	70.9	71.4	0.5	66.4	67.0	0.6
R3 – 243 Henry Lawson Drive	3m	70.6	71.2	0.6	66.2	66.7	0.5
R4 – Coleman Park	3m	68.0	68.3	0.3	-[1]	-[1]	-[1]

Receiver	Approx. distance closer to road with upgrade	$L_{Aeq(15\ hour)}$ Daytime Noise Level			$L_{Aeq(9\ hour)}$ Night Time Noise Level		
		No Build	Build	Difference	No Build	Build	Difference

Notes: 1. Recreational areas not expected be in use during the night time period

The predicted noise levels presented in Table 6.6 show that the worst affected receivers are predicted to incur a minor increase of up to 0.6dB(A) if Henry Lawson Drive was to be upgraded ('build' scenario) compared to if it was not upgraded ('no build' scenario). The predicted noise level increases are below the 2dB(A) increase allowance presented in the NCG and NMG.

As previously stated, the right turn ban onto Rabaul Road from Henry Lawson Drive would result in vehicles taking an alternative route along Haig Avenue to access Rabaul Road from Henry Lawson Drive. The predicted traffic noise levels for the 'build' and 'no build' scenarios based on the traffic volumes as detailed in Table 6.3 at residences along Haig Avenue are presented in the table below.

Table 6.7 – Predicted Opening Year Traffic Noise Levels on Haig Avenue, dB(A)

Receiver	Distance to Road	Criteria, $L_{Aeq\ (1\ hour)}$	Predicted Traffic Noise Level, $L_{Aeq\ (1\ hour)}$						Comply?
			AM Peak			PM Peak			
		Day	No Build	Build	Diff.	No Build	Build	Diff.	
Residences on Haig Avenue	10m[1]	*55*	56.6	58.4	1.8	54.2	54.9	0.7	Yes

Notes: 1. Based on a typical distance from facade of dwelling to road

The predicted noise levels presented in Table 6.7 show that residences on Haig Avenue are predicted to incur a minor increase of up to 1.8dB(A) if the proposed right turn ban onto Rabaul Road is to be implemented ('build' scenario) compared to if it was not implemented ('no build' scenario). Hence, the predicted noise level increase complies with the 2.0dB(A) increase allowance presented in the NCG and NMG.

Therefore, no feasible and reasonable noise mitigation measures are required for any sensitive receivers along Henry Lawson Drive or Haig Avenue due to the proposal.

7 Conclusion

Renzo Tonin & Associates has completed a noise and vibration assessment for the construction and operation of the proposed upgrade of Henry Lawson Drive in Georges Hall. The upgrade includes an additional southbound lane between Beale Street and just south of Rabaul Road and a right turn ban from Henry Lawson Drive onto Rabaul Road.

Noise emissions from evening and night time construction works (ie. road works and compound site activities) associated with the intersection upgrade were predicted to potentially exceed the applicable noise management levels at the nearest affected receivers. Furthermore, maximum noise levels for the assessment of sleep disturbance may exceed the applicable sleep disturbance limit for awakening reactions at the nearest affected residences.

Therefore, in-principle feasible and reasonable noise mitigation measures have been provided in accordance with the CNVG to aid in reducing construction noise impacts.

Construction vibration may potentially impact nearby residential receivers. Therefore, minimum working distances were recommended based on the proposed construction plant and equipment to be used. Additional vibration management measures recommended include equipment-specific vibration risk assessments, vibration monitoring and building condition assessments to address potential concerns of damage to property.

Construction traffic noise impacts due to the proposal are expected to comply with the applicable traffic noise criteria for the day and night periods along Henry Lawson Drive. Sleep disturbance from construction traffic is not expected to be significant given the low number of construction vehicle movements compared to existing traffic volumes during the night time period.

Noise emissions from day time and night time operation of the existing roads with and without the project were predicted to the nearest most affected sensitive receivers. Operational traffic noise impacts from the project were predicted to increase by up to 0.6dB(A) at the nearest potentially affected receivers along Henry Lawson Drive and up to 1.8dB(A) at residences along Haig Avenue, which is less than the 2dB(A) increase allowance presented in the NCG and NMG. Therefore, there is no requirement for any further operational traffic noise mitigation measures.

APPENDIX A Glossary of Terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Absorption Coefficient α	The absorption coefficient of a material, usually measured for each octave or third-octave band and ranging between zero and one. For example, a value of 0.85 for an octave band means that 85% of the sound energy within that octave band is absorbed on coming into contact with the material. Conversely, a low value below about 0.1 means the material is acoustically reflective.
Adverse weather	Weather effects that enhance noise (particularly wind and temperature inversions) occurring at a site for a significant period of time. In the NSW INP this occurs when wind occurs for more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of nights in winter.
Air-borne noise	Noise which is fundamentally transmitted by way of the air and can be attenuated by the use of barriers and walls placed physically between the noise source and receiver.
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Amenity	A desirable or useful feature or facility of a building or place.
AS	Australian Standard
Assessment period	The time period in which an assessment is made. e.g. Day 7am-6pm, Evening 6pm-10pm, Night 10pm-7am.
Assessment Point	A location at which a noise or vibration measurement is taken or estimated.
Attenuation	The reduction in the level of sound or vibration.
Audible Range	The limits of frequency which are audible or heard as sound. The normal hearing in young adults detects ranges from 20 Hz to 20 kHz, although some people can detect sound with frequencies outside these limits.
A-weighting	A filter applied to the sound recording made by a microphone to approximate the response of the human ear.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the LA90 noise level if measured as an overall level or an L90 noise level when measured in octave or third-octave bands.
Barrier (Noise)	A natural or constructed physical barrier which impedes the propagation of sound and includes fences, walls, earth mounds or berms and buildings.
Berm	Earth or overburden mound.
Buffer	An area of land between a source and a noise-sensitive receiver and may be an open space or a noise-tolerant land use.
Bund	A bund is an embankment or wall of brick, stone, concrete or other impervious material, which may form part or all of the perimeter of a compound.
BS	British Standard
CoRTN	United Kingdom Department of Environment entitled "Calculation of Road Traffic Noise (1988)"

Decibel [dB]	The units of sound measurement. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear, defined as 20 micro Pascal 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 110dB Operating a chainsaw or jackhammer 120dB Deafening
dB(A)	A-weighted decibel. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies. The dB(C) level is not widely used but has some applications.
Diffraction	The distortion of sound waves caused when passing tangentially around solid objects.
DIN	German Standard
ECRTN	Environmental Criteria for Road Traffic Noise, NSW, 1999
EPA	Environment Protection Authority
Fluctuating Noise	Noise that varies continuously to an appreciable extent over the period of observation.
Free-field	An environment in which there are no acoustic reflective surfaces. Free field noise measurements are carried out outdoors at least 3.5m from any acoustic reflecting structures other than the ground.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Ground-borne noise	Vibration propagated through the ground and then radiated as noise by vibrating building elements such as wall and floor surfaces. This noise is more noticeable in rooms that are well insulated from other airborne noise. An example would be vibration transmitted from an underground rail line radiating as sound in a bedroom of a building located above.
Habitable Area	Includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom. Excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.
Heavy Vehicle	A truck, transporter or other vehicle with a gross weight above a specified level (for example: over 8 tonnes).
IGANRIP	Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects, NSW DEC 2007
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
INP	NSW Industrial Noise Policy, EPA 1999
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.

Intrusive noise	Refers to noise that intrudes above the background level by more than 5 dB(A).
ISEPP	State Environmental Planning Policy (Infrastructure), NSW, 2007
ISEPP Guideline	Development Near Rail Corridors and Busy Roads - Interim Guideline, NSW Department of Planning, December 2008
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
$L_{10(1hr)}$	The L10 level measured over a 1 hour period.
$L_{10(18hr)}$	The arithmetic average of the L10(1hr) levels for the 18 hour period between 6am and 12 midnight on a normal working day.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{Aeq} or L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time, which would produce the same energy as a steady sound level occurring over the same period of time. When A-weighted, this is written as the L_{Aeq}.
$L_{Aeq(1hr)}$	The L_{Aeq} noise level for a one-hour period. In the context of the NSW EPA's Road Noise Policy it represents the highest tenth percentile hourly A-weighted L_{eq} during the period 7am to 10pm, or 10pm to 7am (whichever is relevant).
$L_{Aeq(8hr)}$	The L_{Aeq} noise level for the period 10pm to 6am.
$L_{Aeq(9hr)}$	The L_{Aeq} noise level for the period 10pm to 7am.
$L_{Aeq(15hr)}$	The L_{Aeq} noise level for the period 7am to 10pm.
$L_{Aeq\ (24hr)}$	The L_{Aeq} noise level during a 24 hour period, usually from midnight to midnight.
L_{max}	The maximum sound pressure level measured over a given period. When A-weighted, this is usually written as the L_{Amax}.
L_{min}	The minimum sound pressure level measured over a given period. When A-weighted, this is usually written as the L_{Amin}.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on. That is, the sound of 85 dB is four times or 400% the loudness of a sound of 65 dB.
Microphone	An electro-acoustic transducer which receives an acoustic signal and delivers a corresponding electric signal.
NCA	Noise Catchment Area. An area of study within which the noise environment is substantially constant.
NCG	Roads and Maritime 'Noise Criteria Guideline'
NMG	Roads and Maritime 'Noise Mitigation Guideline'
Noise	Unwanted sound
Pre-construction	Work in respect of the proposed project that includes design, survey, acquisitions, fencing, investigative drilling or excavation, building/road dilapidation surveys, minor clearing (except where threatened species, populations or ecological communities would be affected), establishing ancillary facilities such as site compounds, or other relevant activities determined to have minimal environmental impact (e.g. minor access roads).
RBL	Rating Background Level is the representative LA90 background noise level for a period, as defined in the NSW EPA's noise ploicies.
Reflection	Sound wave reflected from a solid object obscuring its path.
RING	Rail Infrastructure Noise Guideline, NSW, May 2013
RMS	Root Mean Square value representing the average value of a signal.

Rw	Weighted Sound Reduction Index A measure of the sound insulation performance of a building element. It is measured in very controlled conditions in a laboratory. The term supersedes the value STC which was used in older versions of the Building Code of Australa. Rw is measured and calculated using the procedure in ISO 717-1. The related field measurement is the DnT,w. The higher the value the better the acoustic performance of the building element.
R'w	Weighted Apparent Sound Reduction Index. As for Rw but measured in-situ and therefore subject to the inherent accuracies involved in such a measurement. The higher the value the better the acoustic performance of the building element.
RNP	Road Noise Policy, NSW, March 2011
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy by conversion to thermal energy.
Sound Insulation	Sound insulation refers to the ability of a construction or building element to limit noise transmission through the building element. The sound insulation of a material can be described by the Rw and the sound insulation between two rooms can be described by the DnT,w.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 pico watt.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone referenced to 20 mico Pascal.
Spoil	Soil or materials arising from excavation activities.
Structure-borne Noise	Audible noise generated by vibration induced in the ground and/or a structure. Vibration can be generated by impact or by solid contact with a vibrating machine. Structure-borne noise cannot be attenuated by barriers or walls but requires the isolation of the vibration source itself. This can be achieved using a resilient element placed between the vibration source and its support such as rubber, neoprene or springs or by physical separation (using an air gap for example). Examples of structure-borne noise include the noise of trains in underground tunnels heard to a listener above the ground, the sound of footsteps on the floor above a listener and the sound of a lift car passing in a shaft. See also 'Impact Noise'.
Tonal Noise	Sound containing a prominent frequency and characterised by a definite pitch.
Transmission Loss	The sound level difference between one room or area and another, usually of sound transmitted through an intervening partition or wall. Also the vibration level difference between one point and another. For example, if the sound level on one side of a wall is 100dB and 65dB on the other side, it is said that the transmission loss of the wall is 35dB. If the transmission loss is normalised or standardised, it then becomes the Rw or R'w or DnT,w.
Vibration	A mechanical phenomenon whereby oscillations occur about an equilibrium point; a periodic back-and-forth motion of an elastic body or medium, commonly resulting when almost any physical system is displaced from its equilibrium condition.

APPENDIX B Specification for Construction Noise Monitoring

B.1 Scope

This document specifies methods for undertaking noise monitoring during the construction phase of the project.

B.2 Referenced Standards and Guidelines

- Australian Standard AS IEC 61672.1 2004 '*Electroacoustics - Sound Level Meters - Specifications*'
- Australian Standard AS 1259.2-1990 '*Acoustics - Sound Level Meters*'
- Australian Standard AS 1055-1997 '*Acoustics - Description and Measurement of Environmental Noise*'
- NSW '*Interim Construction Noise Guideline*' (Department of Environment and Climate Change 2009)
- NSW '*Industrial Noise Policy*' (Environment Protection Authority 2000)

B.3 Testing Procedures

The following procedures are to be followed by personnel suitably qualified and experienced in undertaking acoustic measurements.

All noise monitoring equipment used must be at least Type 2 instruments as described in AS 1259.2-1990 and calibrated to standards that are traceable to Australian Physical Standards held by the National Measurement Laboratory (CSIRO Division of Applied Physics). The calibration of the monitoring equipment shall also be checked in the field before and after the noise measurement period, and in the case of long-term noise monitoring, calibration levels shall be checked at minimum weekly intervals.

Long-term noise monitoring equipment or Noise Loggers, consist of sound level meters housed in weather resistant enclosures. The operator may retrieve the data at the conclusion of each monitoring period in person or remotely if the logger is fitted with mobile communications.

All environmental noise measurements shall be taken with the following meter settings:

- Time constant: FAST (ie 125 milliseconds)
- Frequency weightings: A-weighting
- Sample period: 15 minutes

All outdoor noise measurements shall be undertaken with a windscreen over the microphone. Windscreens reduce wind noise at the microphones.

Measurements of noise should be disregarded when it is raining and/or the wind speed is greater than 5m/s (18km/h).

B.4 Long-Term (Unattended) Monitoring

Noise monitoring shall be undertaken in accordance with the environmental noise measurement requirements stipulated in the reference standards and documents listed above.

Noise monitoring equipment shall be placed at positions which have unobstructed views of general site activities, while acoustically shielded as much as possible from non-construction site noise (eg. road traffic, rail noise and other surrounding noise).

Noise levels are to be recorded at a minimum rate of 10 samples per second. Every 15 minutes, the data is to be processed statistically and stored in memory. The minimum range of noise metrics to be stored in memory for later retrieval is the following A-weighted noise levels: L_{min}, L_{90}, L_{eq}, L_{10}, L_1 and L_{max}.

Where the noise monitors are placed within 3.5 metres of building facades, walls or cliffs, then a reflection correction of up to -2.5dB(A) shall be applied to remove the effect of increased noise due to sound reflections from such structures.

Meteorological conditions including wind velocity, wind direction and rainfall shall be monitored over the entire noise monitoring period, either on site or recorded from the nearest weather station to the project site.

B.5 Short-Term (Attended) Monitoring

Where noise complaints or requests from relevant authorities are received, attended short-term noise monitoring shall also be conducted at the requested outdoor location (unless the issue is related to regenerated noise from tunnelling and driveage works) and at any other relevant noise receiver location with closest proximity to the construction activities.

Short-term noise monitoring shall be used to supplement long-term noise monitoring undertaken at nearby locations, and to establish whether noise levels measured by the long-term noise monitors are determined by construction activities carried out on site.

All attended short-term noise monitoring shall be recorded over 15 minute sample intervals. Noise levels are to be recorded at a minimum rate of 10 samples per second. Every 15 minutes, the data is to be processed statistically and stored in memory. The minimum range of noise metrics to be stored in memory and reported is the following A-weighted noise levels: L_{min}, L_{90}, L_{eq}, L_{10}, L_1 and L_{max}.

In addition to measuring and reporting overall A-weighted noise levels, statistical L_{90}, L_{eq}, L_{10} noise levels shall be measured and reported in third-octave band frequencies from 31.5Hz to 8kHz.

Where the noise monitors are placed within 3.5 metres of building facades, walls or cliffs, then a reflection correction of up to -2.5dB(A) shall be applied to remove the effect of increased noise due to sound reflections from such structures.

Outdoor noise monitoring is to be undertaken with the microphone at a height of 1.2 – 1.5m from the ground, unless noise measurements are taken from a balcony or veranda, in which case the same microphone height shall apply off the floor.

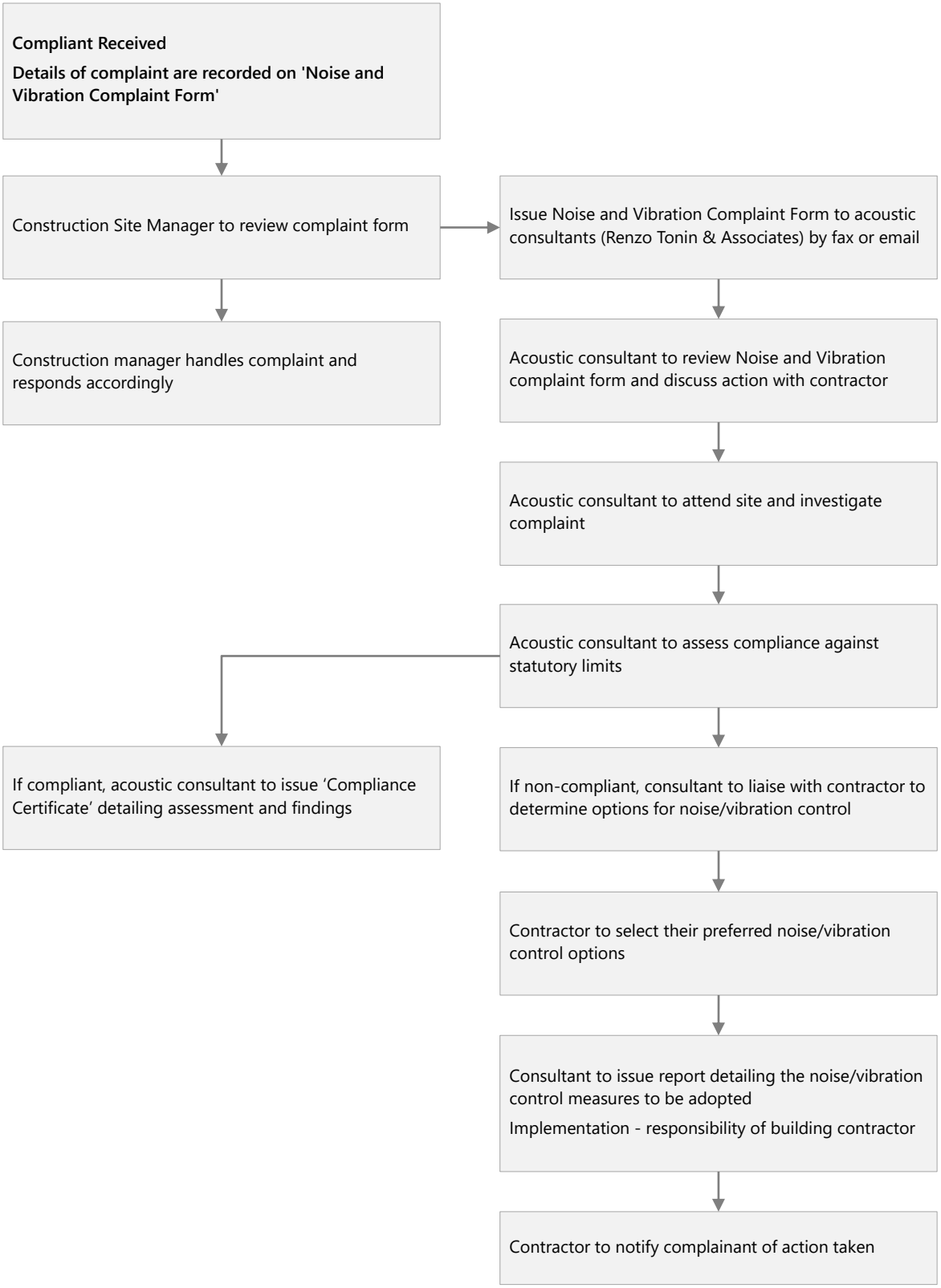
Noise measurements inside buildings should be at least 1m from the walls or other major reflecting surfaces, 1.2 m to 1.5m above the floor, and 1.5m from windows.

Noise monitoring shall be undertaken in accordance with the environmental noise measurement requirements stipulated in the reference standards and documents listed above.

The following information shall be recorded:

- Date and time of measurements;
- Type and model number of instrumentation;
- Results of field calibration checks before and after measurements;
- Description of the time aspects of each measurement (ie sample times, measurement time intervals and time of day);
- Sketch map of area;
- Measurement location details and number of measurements at each location;
- Weather conditions during measurements, including wind velocity, wind direction, temperature, relative humidity and cloud cover
- Operation and load conditions of the noise sources under investigation
- Any adjustment made for presence or absence of nearby reflecting surfaces; and
- Noise due to other sources (eg traffic, aircraft, trains, dogs barking, insects etc).

APPENDIX C Noise / Vibration Complaint Management Procedure



NOISE / VIBRATION COMPLAINT FORM

Project title: _____ **Date:** _____

Site contractor: _____ **Phone:** _____

Site contact: _____ **Email:** _____

Complaint details

Received by (circle): Phone / Email / In person / Other: _____

Name: _____ H Ph: _____

Address: _____ W Ph _____

Email: _____ M Ph _____

Describe when the problem occurred (date and time), what equipment caused the complaint (if known) and where person was standing when he/she experienced the noise/vibration:

Investigation

Question foreman responsible on site and obtain information on what equipment or processes would most likely have caused the complaint:

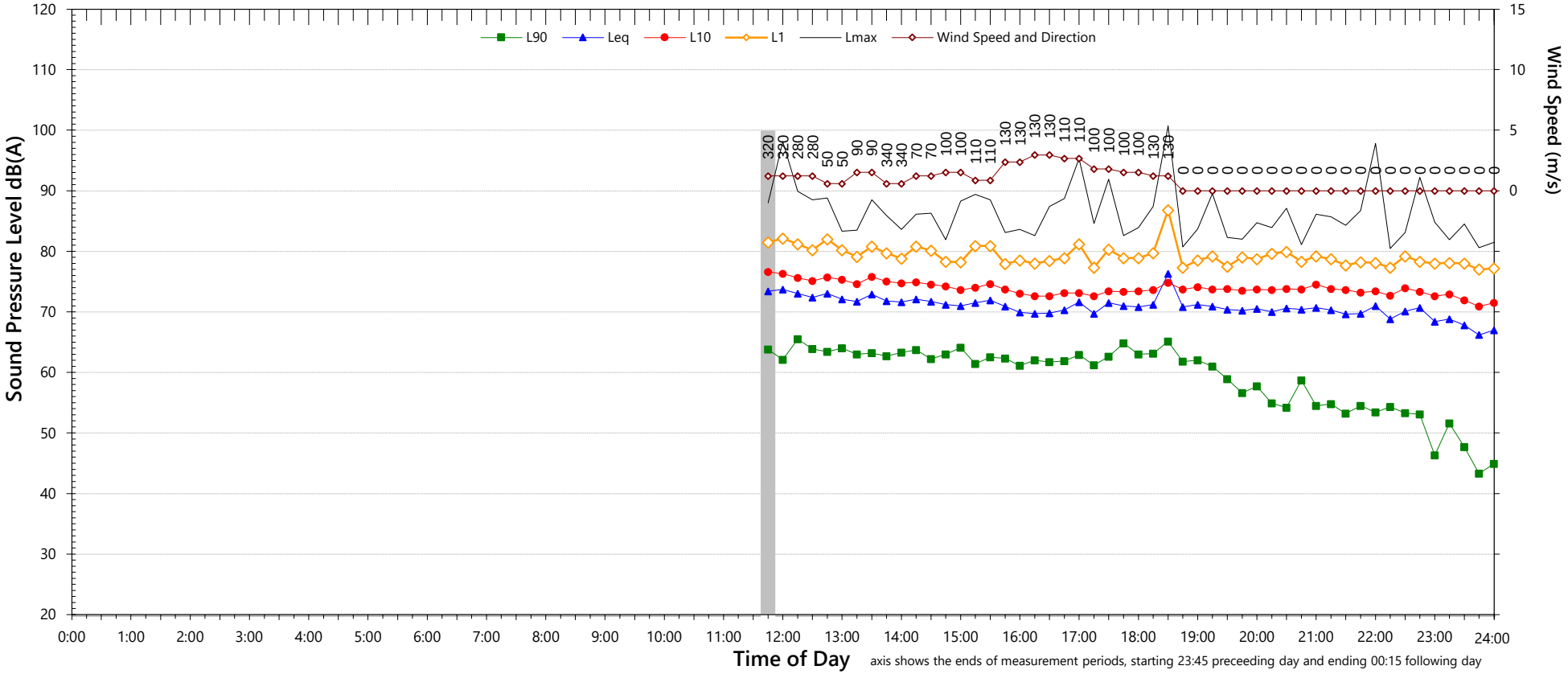
Following approval from the Project Manager, email/fax this form to Renzo Tonin & Associates

APPENDIX D Long Term Noise Monitoring Results

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Thursday, 23 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	-	54	39
LAeq	-	71	69

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74	72
$L_{eq\ 1hr}$ upper 10 percentile	76	75
$L_{eq\ 1hr}$ lower 10 percentile	73	68

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	83	to	95
L_{Max} - L_{eq} (Range)	16	to	23

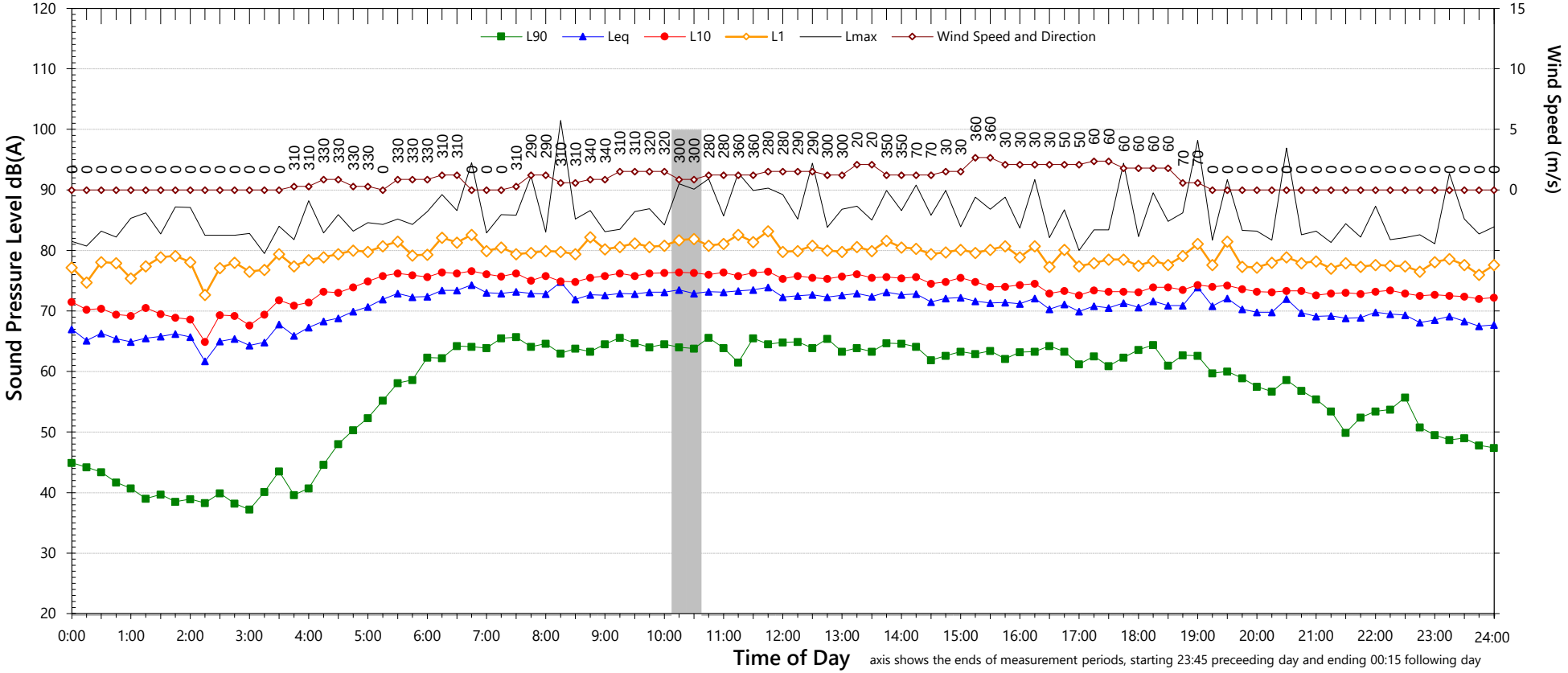
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Friday, 24 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	62	53	38
LAeq	72	71	67

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	75	70
$L_{eq\ 1hr}$ upper 10 percentile	76	72
$L_{eq\ 1hr}$ lower 10 percentile	73	67

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	83	to	93
L_{Max} - L_{eq} (Range)	15	to	25

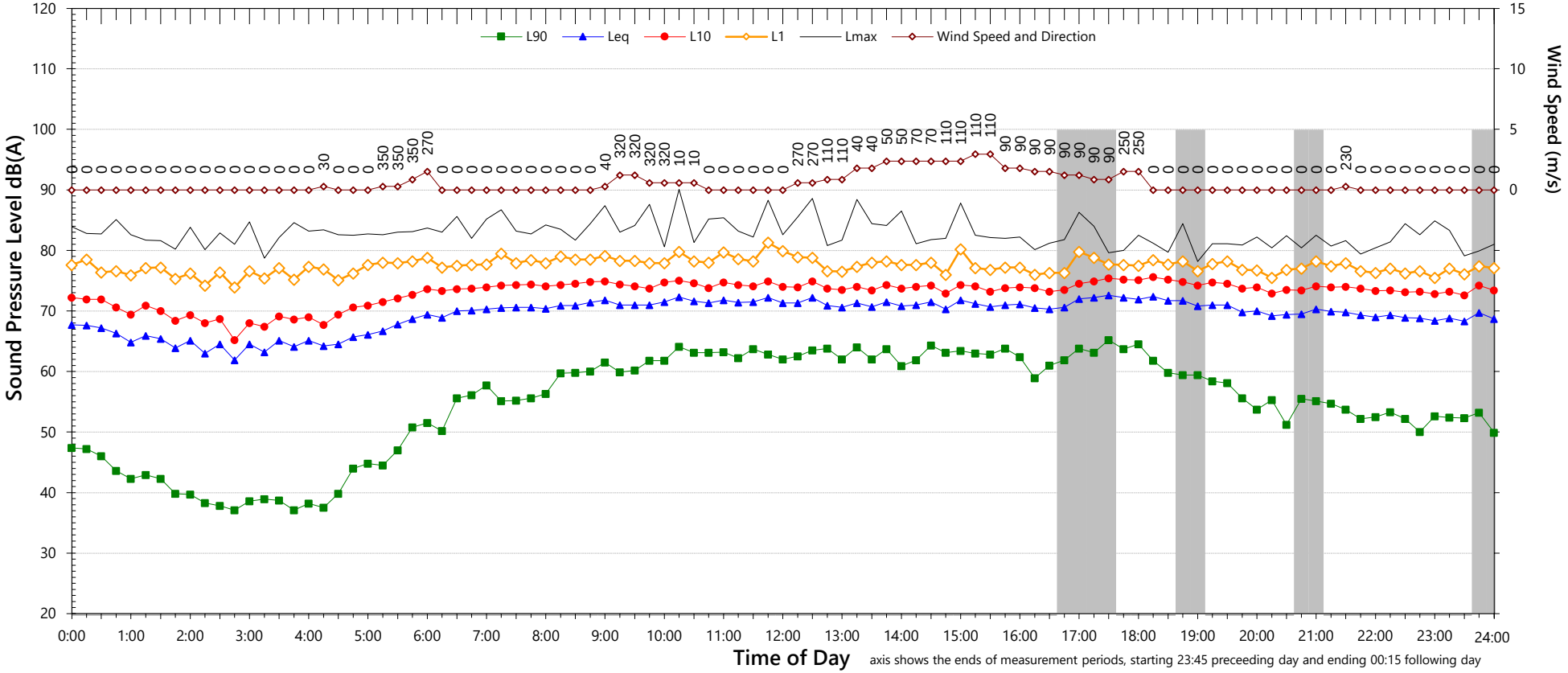
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Saturday, 25 July 2020



axis shows the ends of measurement periods, starting 23:45 preceeding day and ending 00:15 following day

NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	59	-	-
LAeq	71	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	84	to	85
L_{Max} - L_{eq} (Range)	16	to	18

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74	70
$L_{eq\ 1hr}$ upper 10 percentile	74	71
$L_{eq\ 1hr}$ lower 10 percentile	72	69

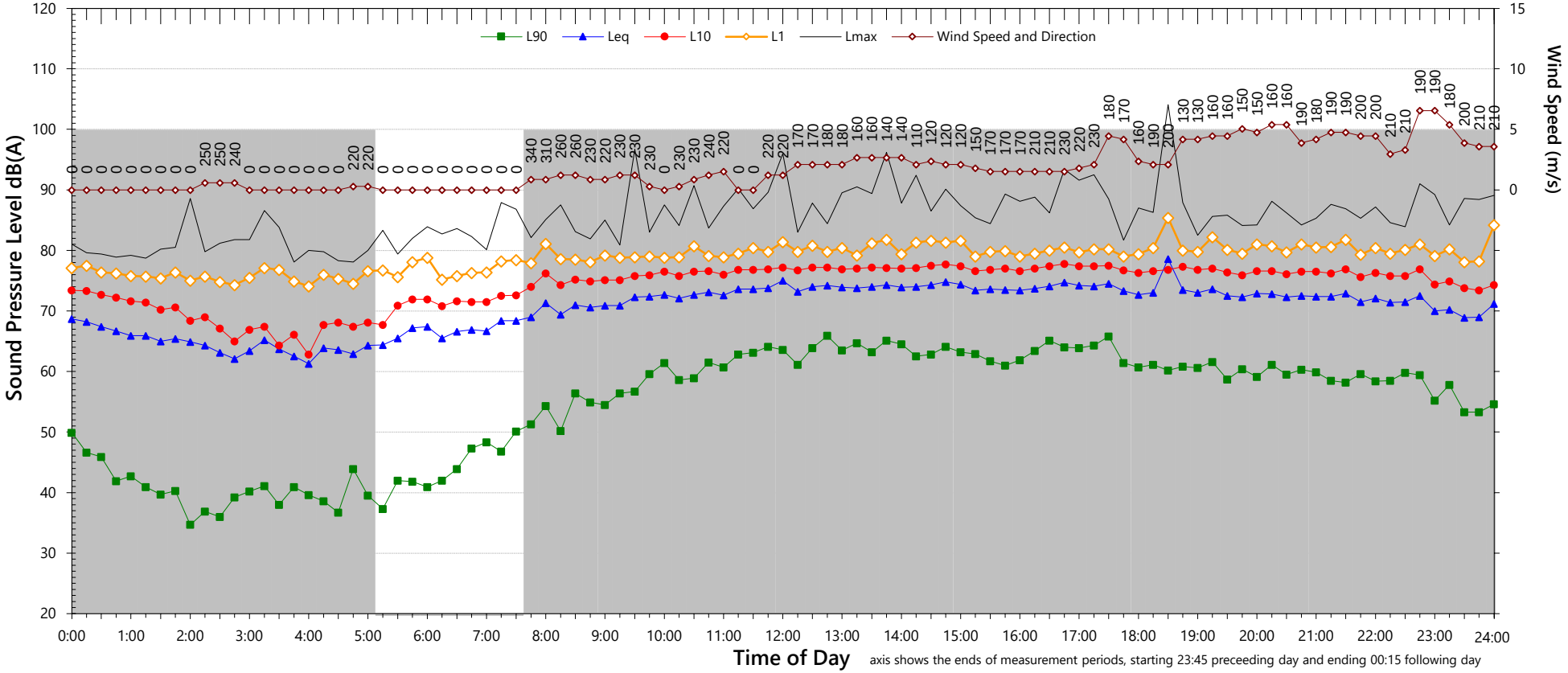
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Sunday, 26 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	87	to	93
L_{Max} - L_{eq} (Range)	16	to	18

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71	76
$L_{eq\ 1hr}$ upper 10 percentile	71	78
$L_{eq\ 1hr}$ lower 10 percentile	71	74

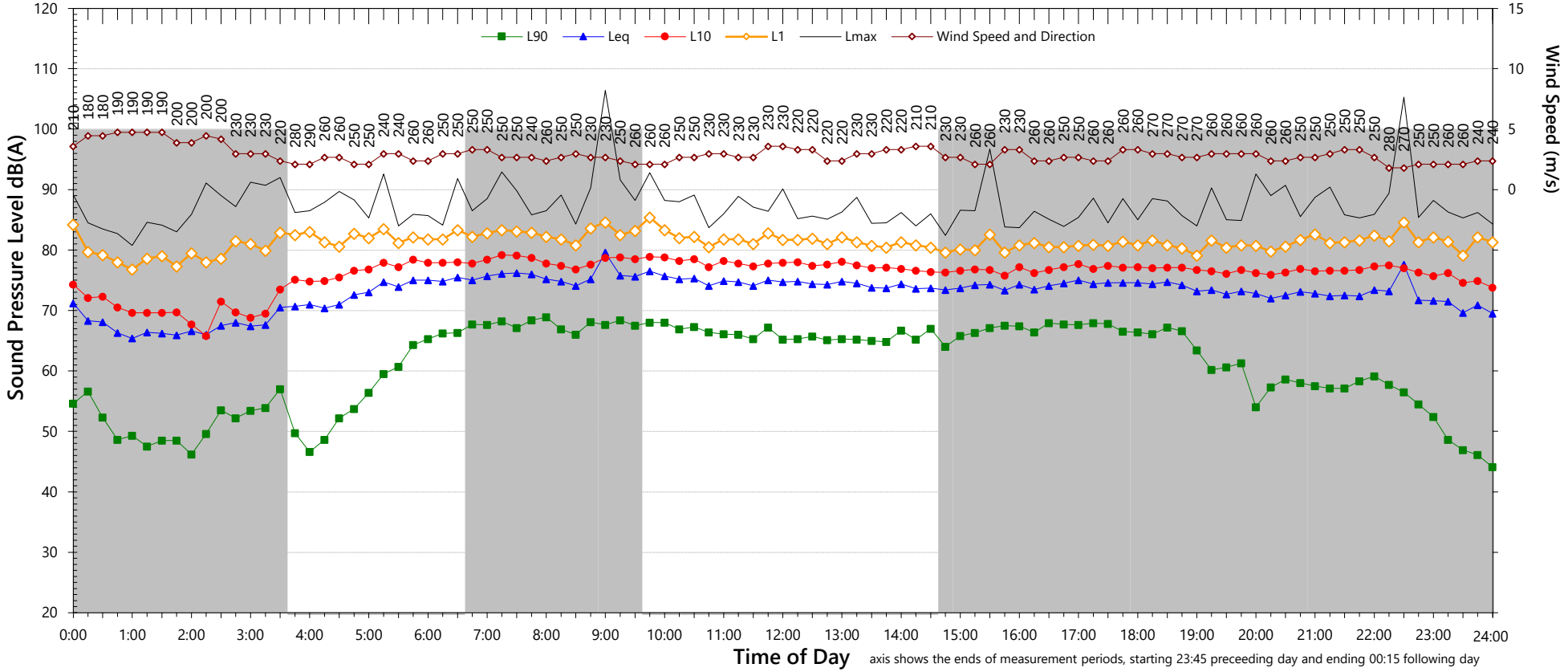
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Monday, 27 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	91	to	91
L_{Max} - L_{eq} (Range)	15	to	15

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	77	78
$L_{eq\ 1hr}$ upper 10 percentile	78	78
$L_{eq\ 1hr}$ lower 10 percentile	76	78

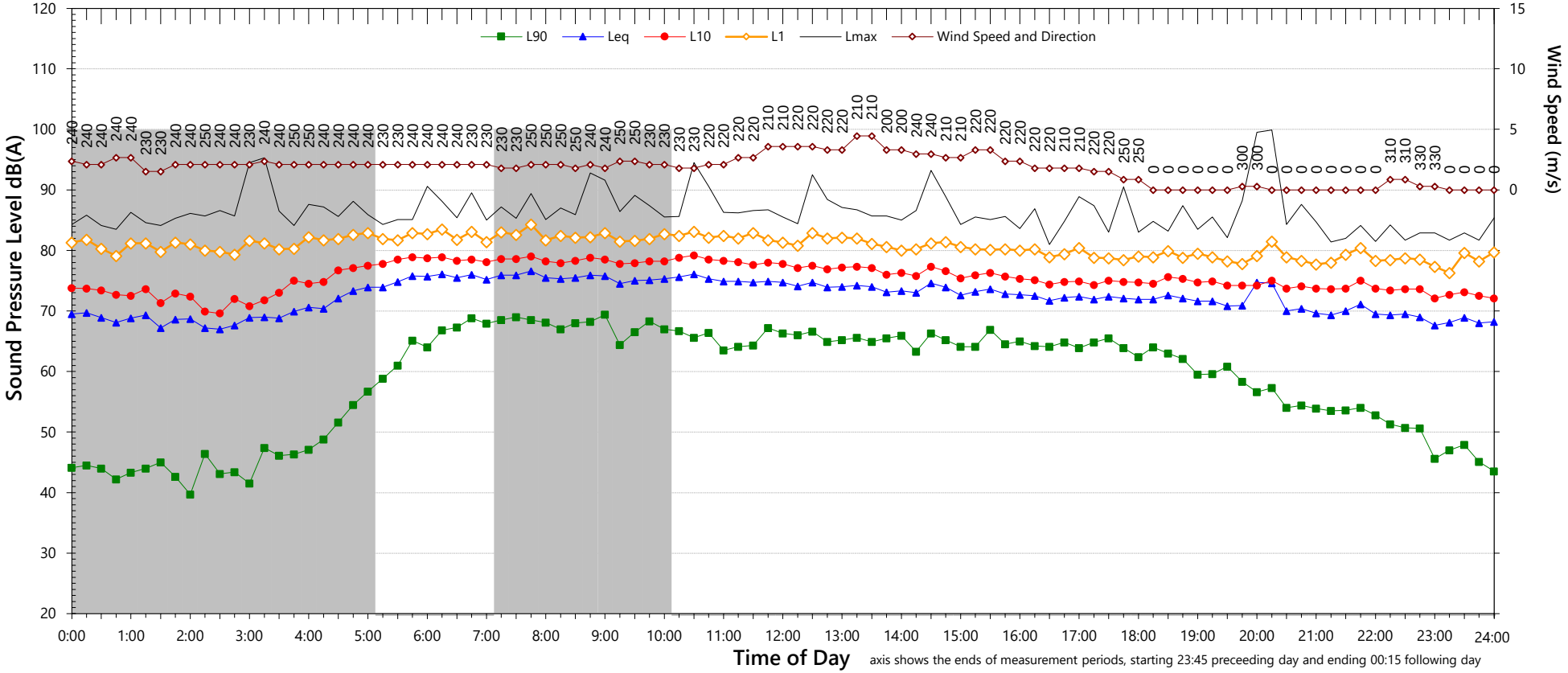
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Tuesday, 28 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	54	38
LAeq	-	72	70

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	84	to	89
L_{Max} - L_{eq} (Range)	15	to	22

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	76	73
$L_{eq\ 1hr}$ upper 10 percentile	77	76
$L_{eq\ 1hr}$ lower 10 percentile	74	68

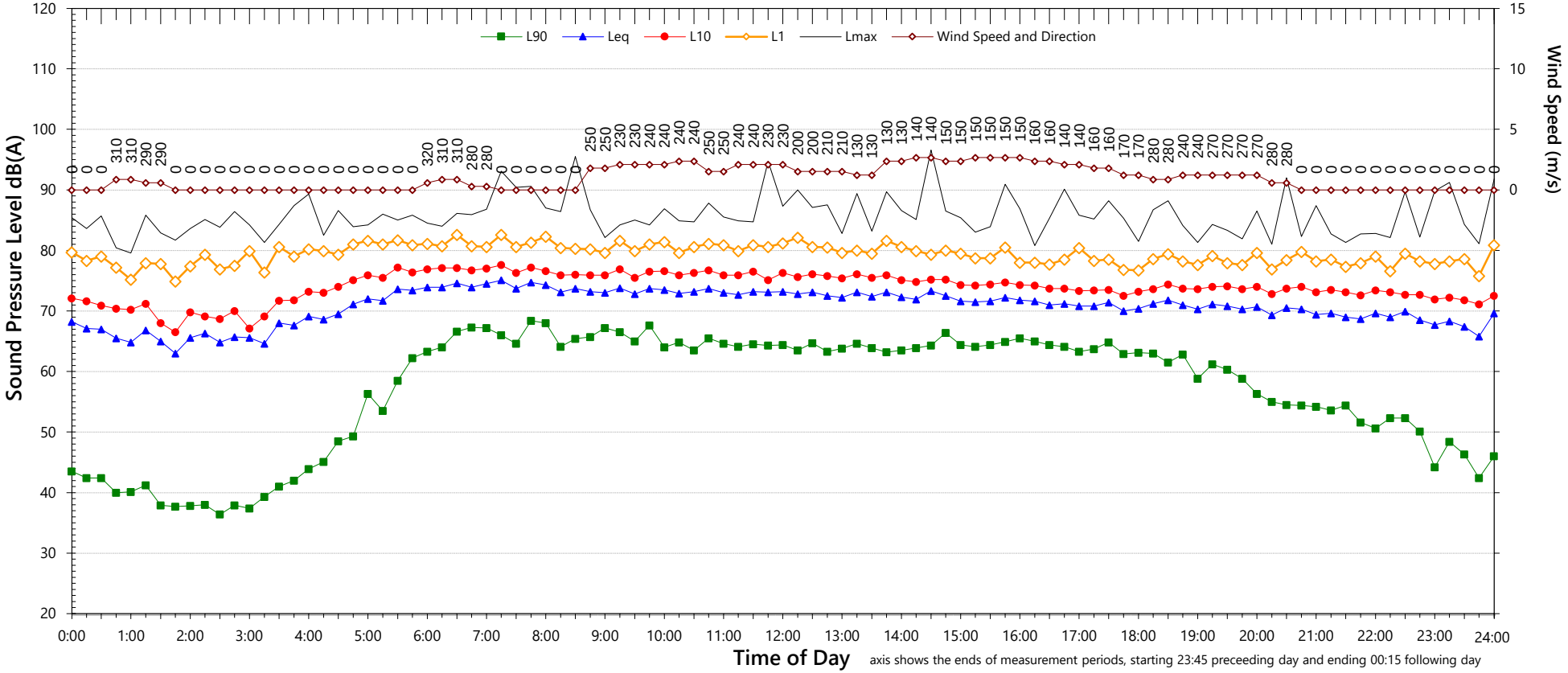
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Wednesday, 29 July 2020



axis shows the ends of measurement periods, starting 23:45 preceeding day and ending 00:15 following day

NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	63	53	41
LAeq	73	70	69

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	85	to	94
L_{Max} - L_{eq} (Range)	17	to	24

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	75	72
$L_{eq\ 1hr}$ upper 10 percentile	76	75
$L_{eq\ 1hr}$ lower 10 percentile	73	68

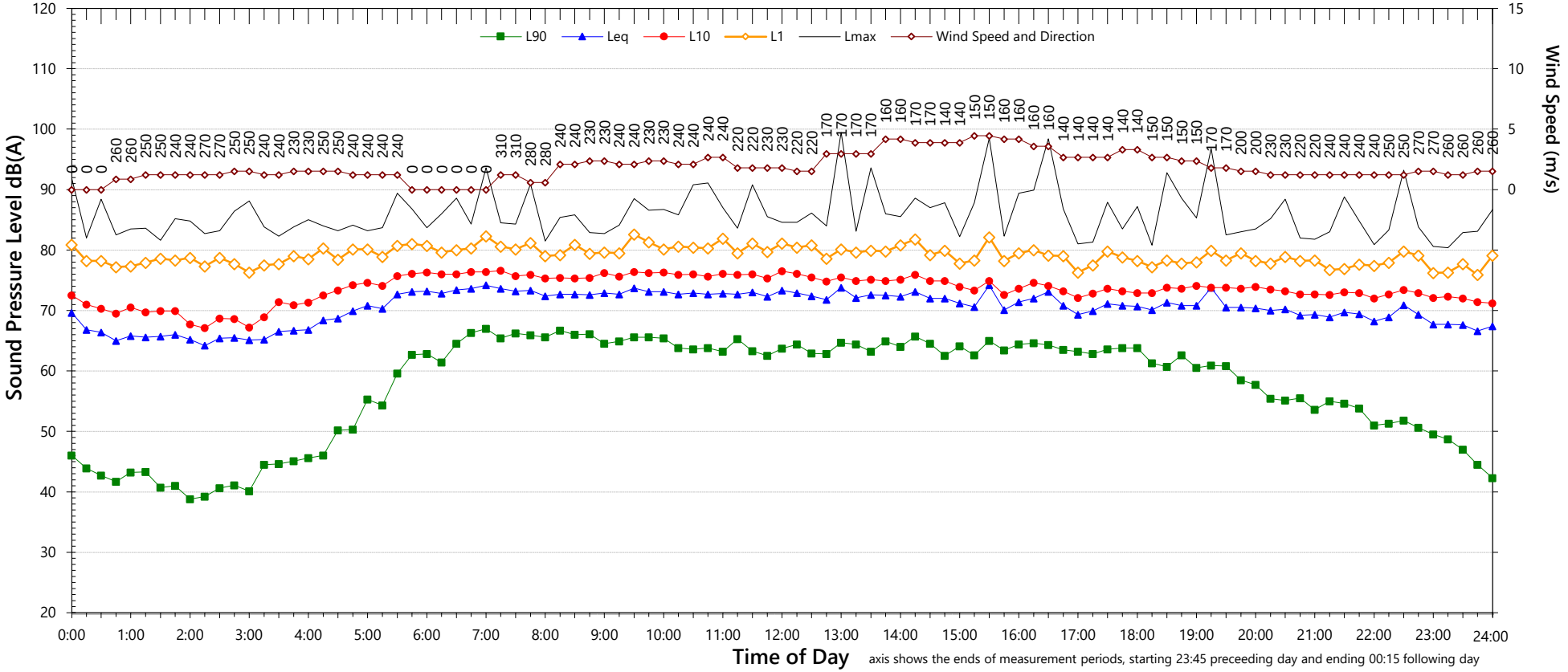
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Thursday, 30 July 2020



axis shows the ends of measurement periods, starting 23:45 preceeding day and ending 00:15 following day

NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	63	54	38
LAeq	72	70	69

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	85	to	93
L_{Max} - L_{eq} (Range)	17	to	24

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74	72
$L_{eq\ 1hr}$ upper 10 percentile	76	75
$L_{eq\ 1hr}$ lower 10 percentile	73	67

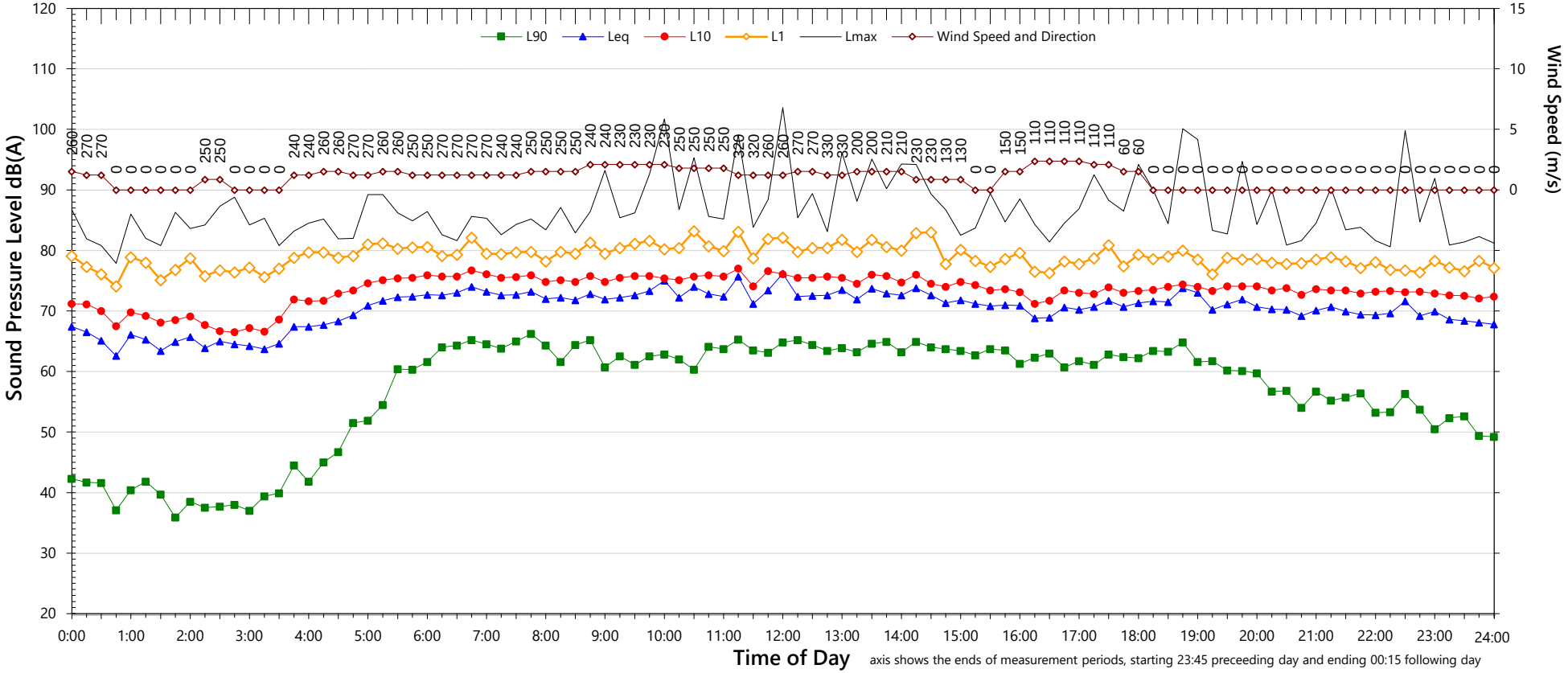
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Friday, 31 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	61	55	37
LAeq	72	71	68

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	81	to	100
L_{Max} - L_{eq} (Range)	16	to	30

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	75	70
$L_{eq\ 1hr}$ upper 10 percentile	76	73
$L_{eq\ 1hr}$ lower 10 percentile	72	67

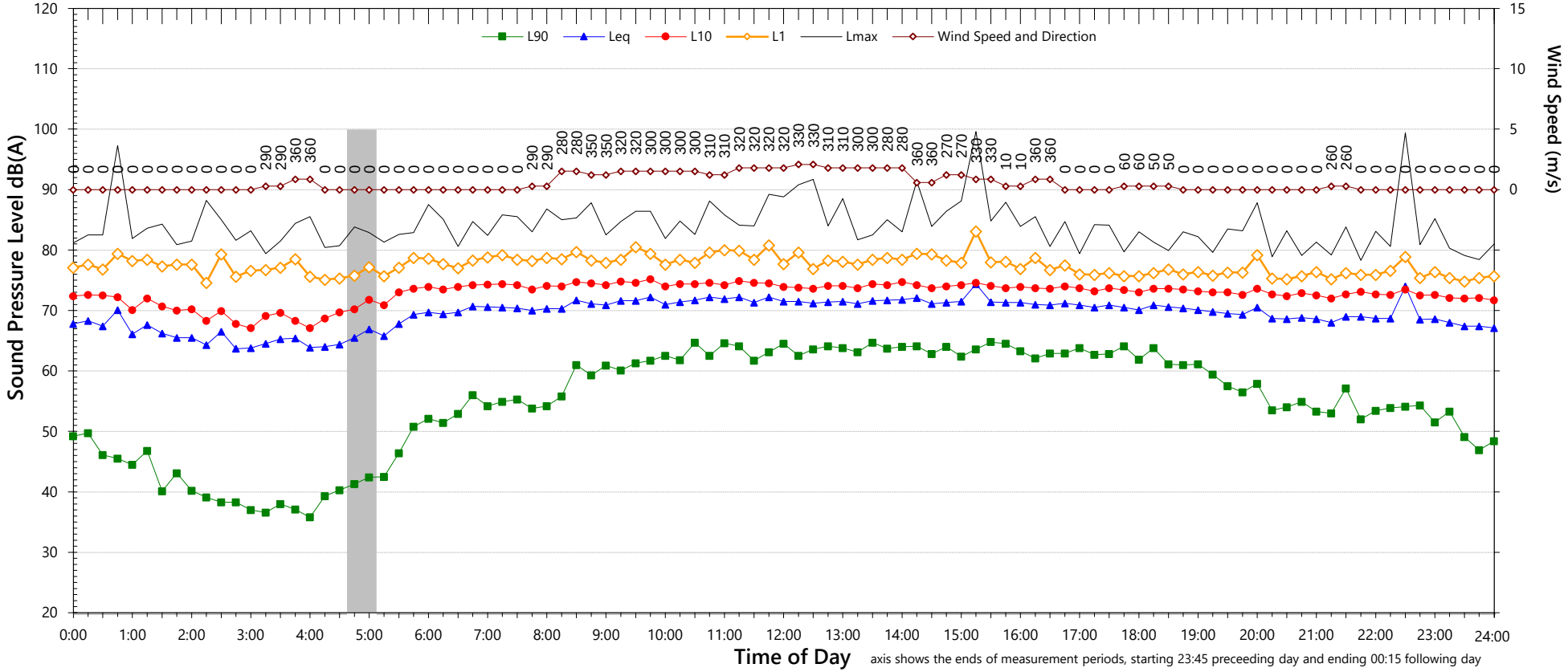
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Saturday, 1 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	57	53	37
LAeq	71	69	67

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73	69
$L_{eq\ 1hr}$ upper 10 percentile	74	72
$L_{eq\ 1hr}$ lower 10 percentile	72	65

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	82	to	99
L_{Max} - L_{eq} (Range)	18	to	30

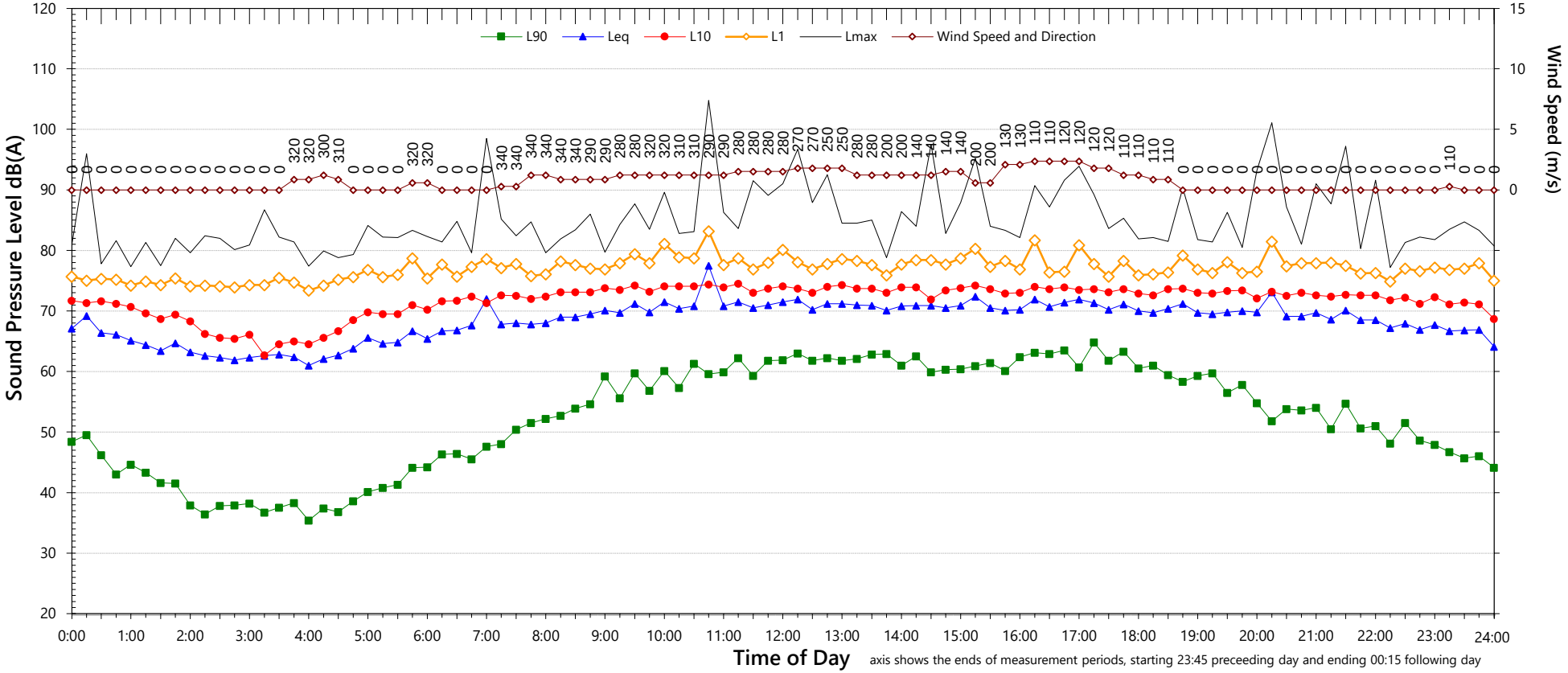
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Sunday, 2 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	57	51	36
LAeq	71	70	69

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	83	to	95
L_{Max} - L_{eq} (Range)	16	to	26

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73	71
$L_{eq\ 1hr}$ upper 10 percentile	74	75
$L_{eq\ 1hr}$ lower 10 percentile	72	66

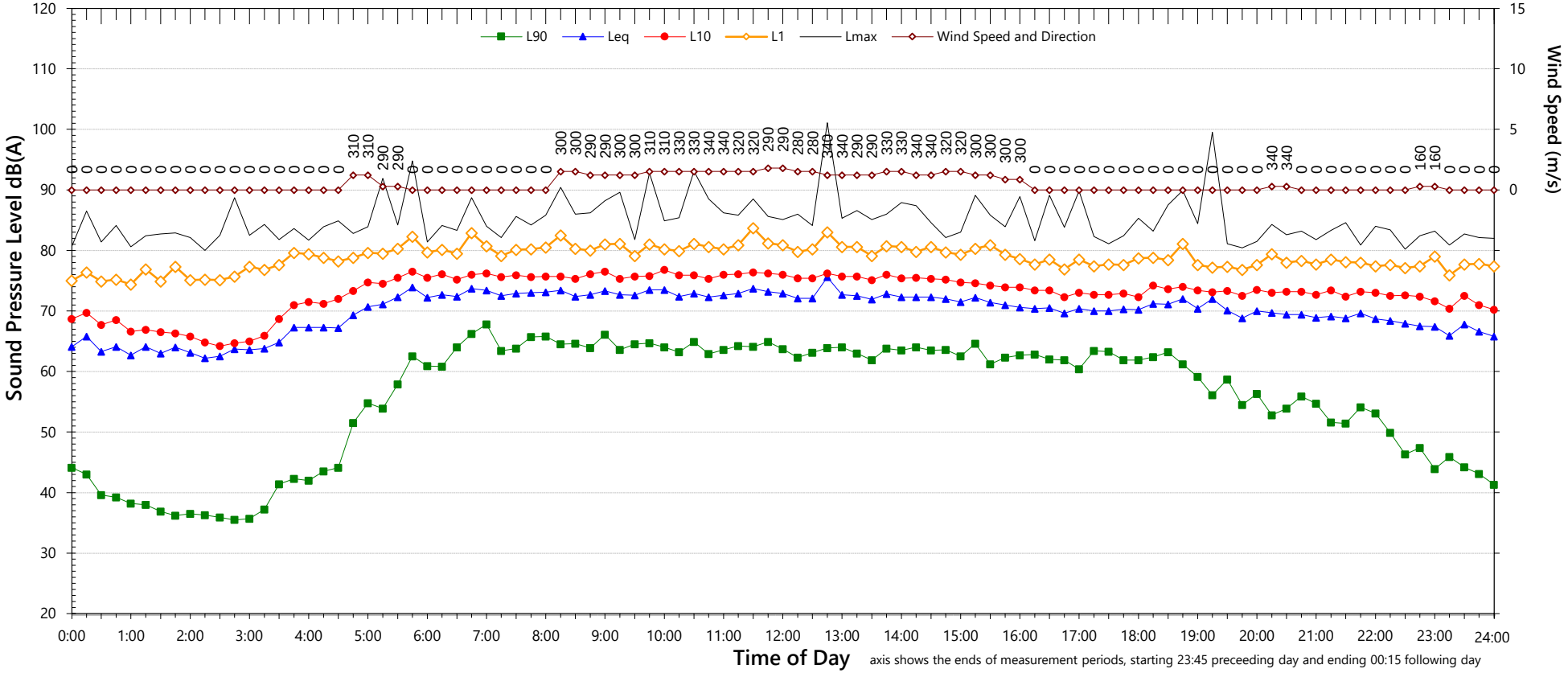
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Monday, 3 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	62	52	38
LAeq	72	70	69

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	83	to	96
L_{Max} - L_{eq} (Range)	16	to	25

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74	72
$L_{eq\ 1hr}$ upper 10 percentile	76	75
$L_{eq\ 1hr}$ lower 10 percentile	72	68

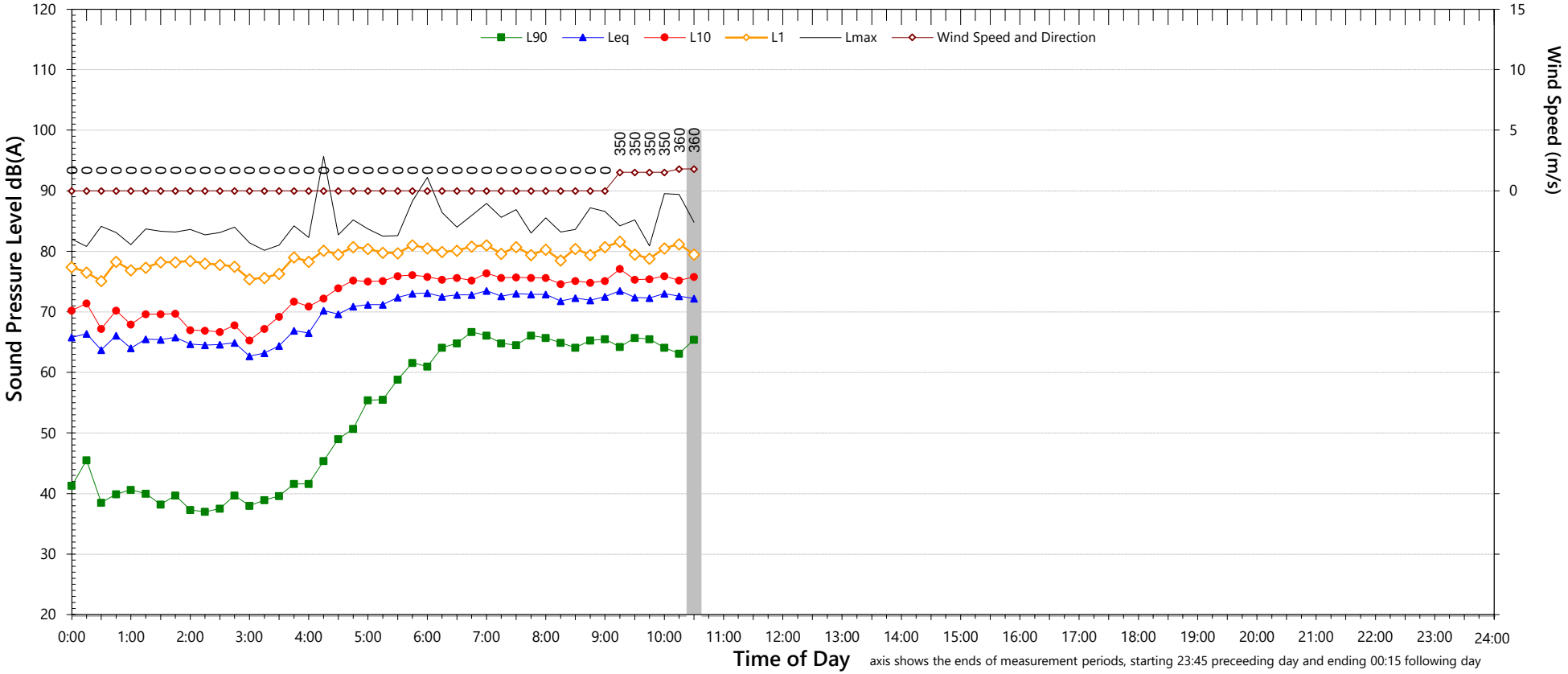
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

231 Henry Lawson Drive, Georges Hall

Tuesday, 4 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	-	to	-
L_{Max} - L_{eq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	75	-
$L_{eq\ 1hr}$ upper 10 percentile	75	-
$L_{eq\ 1hr}$ lower 10 percentile	75	-

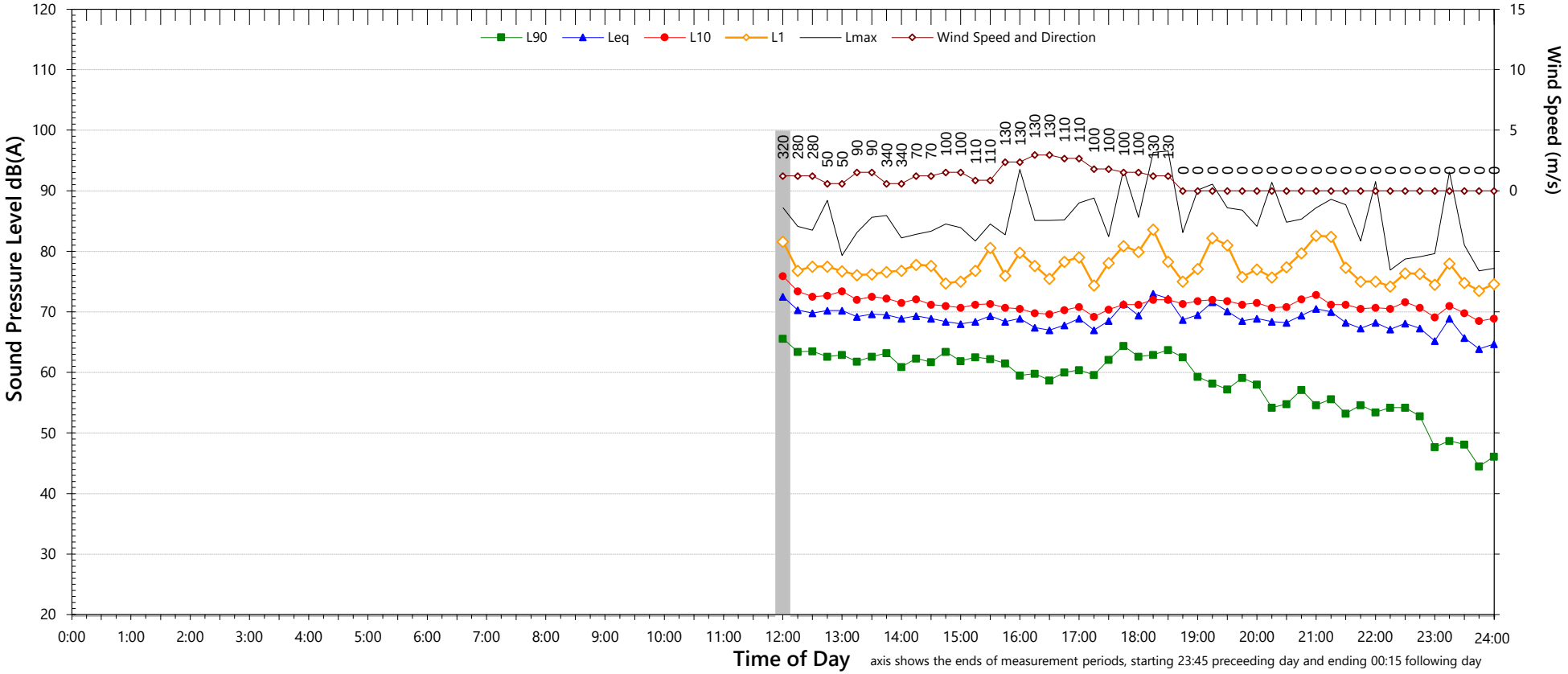
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Thursday, 23 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	54	40
LAeq	-	70	67

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	80	to	94
L_{Max} - L_{eq} (Range)	17	to	27

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72	70
$L_{eq\ 1hr}$ upper 10 percentile	73	73
$L_{eq\ 1hr}$ lower 10 percentile	71	65

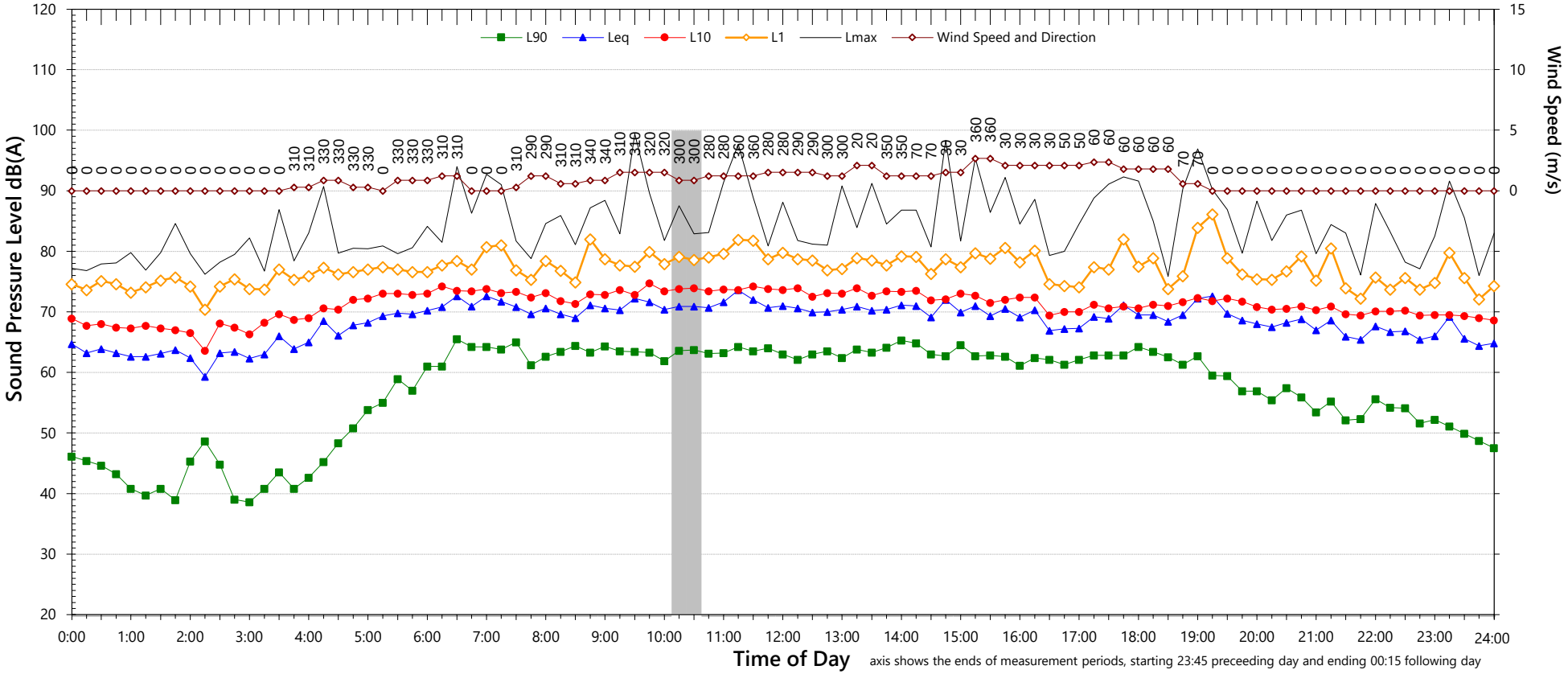
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Friday, 24 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	62	53	39
LAeq	70	69	65

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	79	to	93
L_{Max} - L_{eq} (Range)	15	to	27

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73	67
$L_{eq\ 1hr}$ upper 10 percentile	74	69
$L_{eq\ 1hr}$ lower 10 percentile	71	64

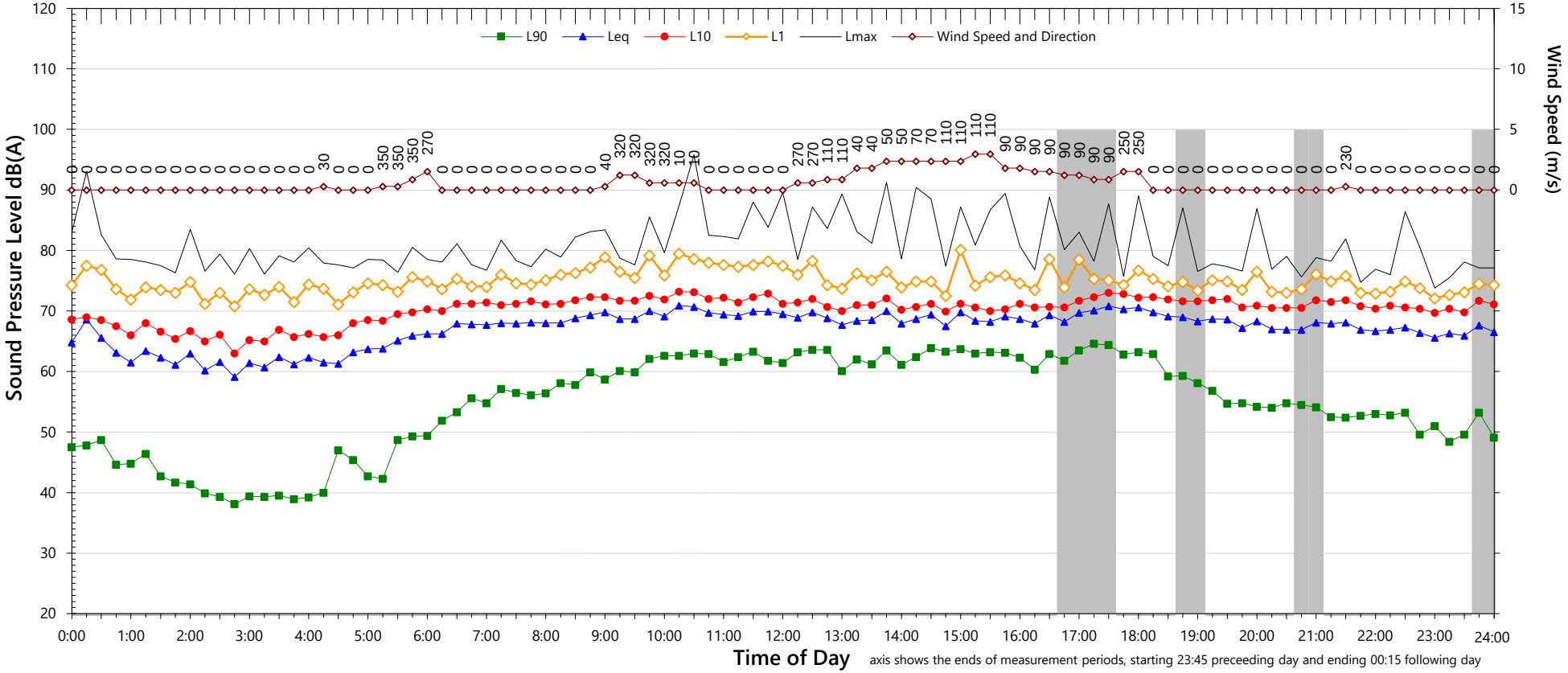
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Saturday, 25 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	58	-	-
LAeq	69	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	79	to	86
L_{Max} - L_{eq} (Range)	15	to	20

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71	68
$L_{eq\ 1hr}$ upper 10 percentile	72	69
$L_{eq\ 1hr}$ lower 10 percentile	70	67

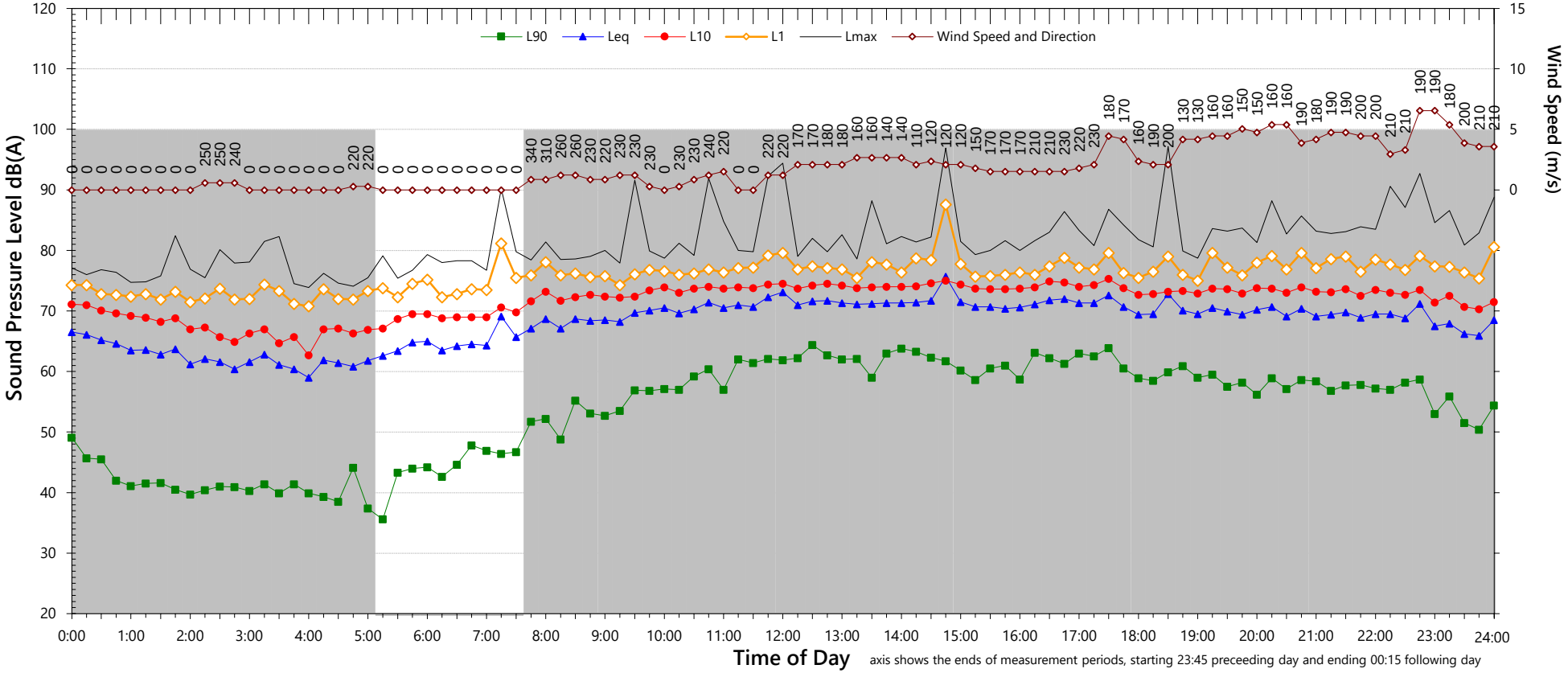
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Sunday, 26 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	86	to	93
L_{Max} - L_{eq} (Range)	17	to	20

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70	73
$L_{eq\ 1hr}$ upper 10 percentile	70	75
$L_{eq\ 1hr}$ lower 10 percentile	70	72

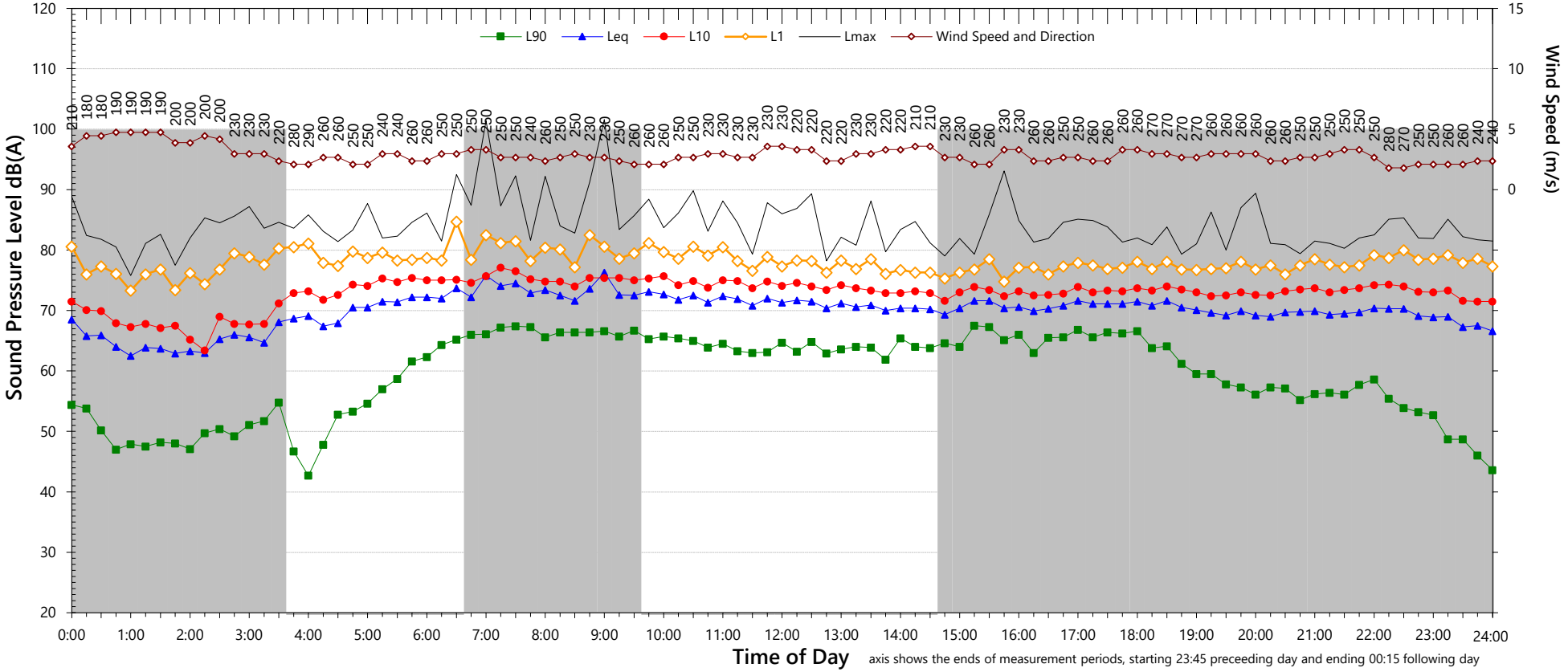
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Monday, 27 July 2020



axis shows the ends of measurement periods, starting 23:45 preceeding day and ending 00:15 following day

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	-	-	-
LAeq	-	-	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74	75
$L_{eq\ 1hr}$ upper 10 percentile	75	75
$L_{eq\ 1hr}$ lower 10 percentile	73	75

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	89	to	94
L_{Max} - L_{eq} (Range)	17	to	21

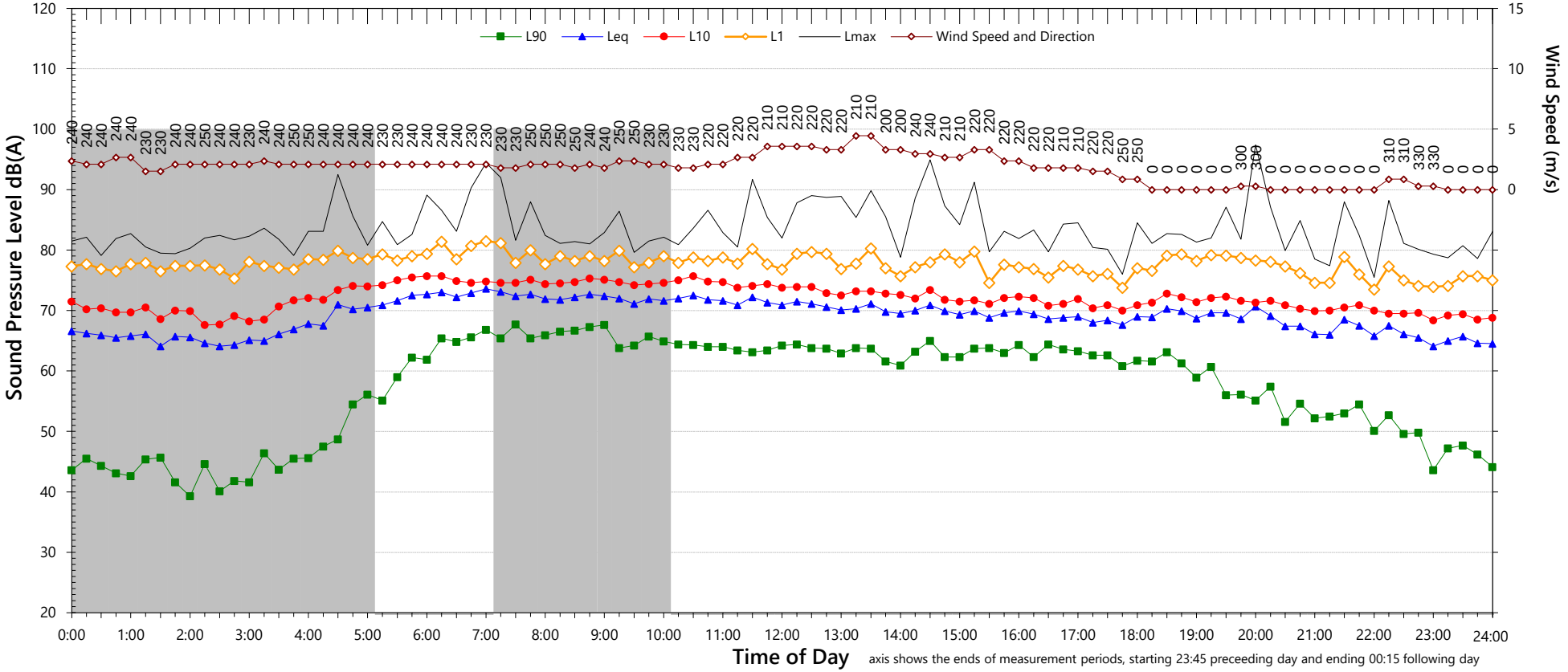
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Tuesday, 28 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	52	38
LAeq	-	69	67

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	80	to	91
L_{Max} - L_{eq} (Range)	18	to	26

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72	70
$L_{eq\ 1hr}$ upper 10 percentile	74	73
$L_{eq\ 1hr}$ lower 10 percentile	70	65

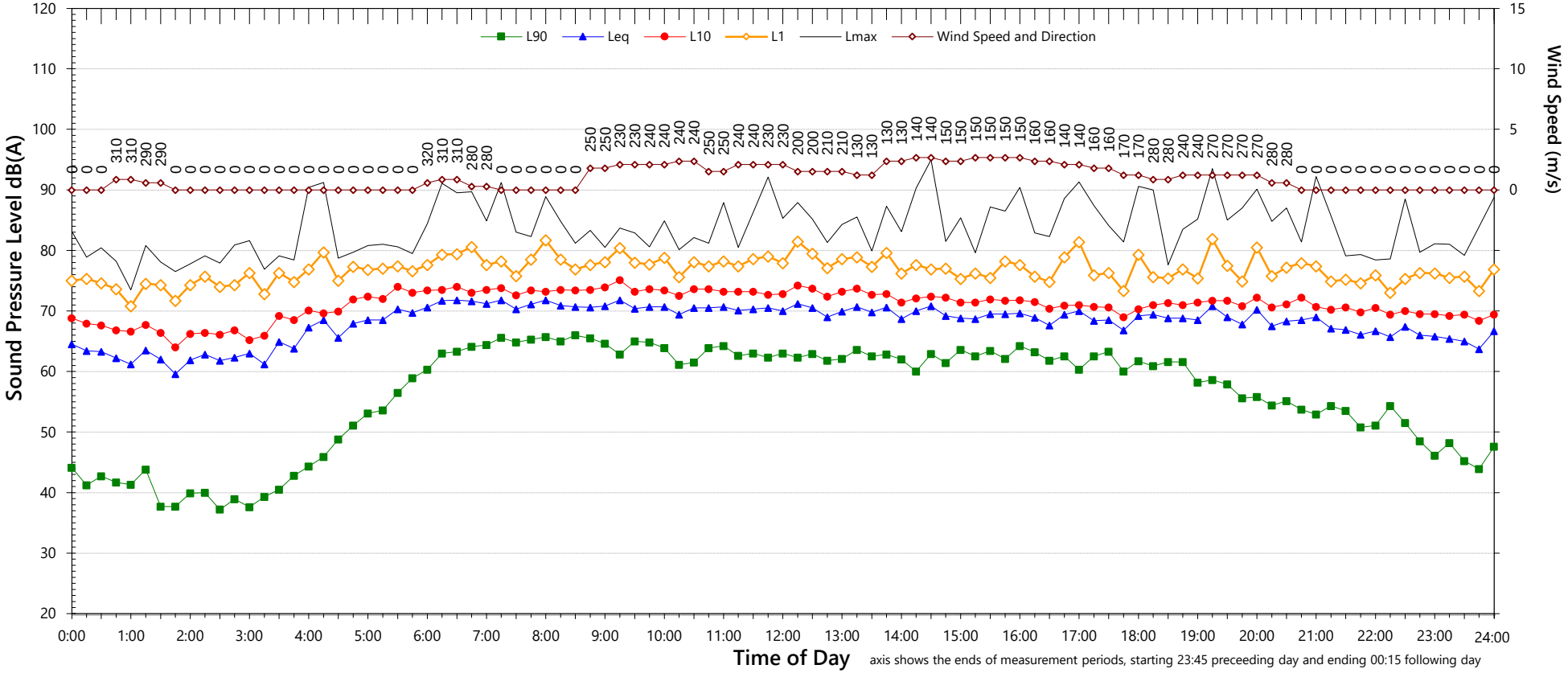
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Wednesday, 29 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	61	52	41
LAeq	70	69	67

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	82	to	94
L_{Max} - L_{eq} (Range)	15	to	26

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72	70
$L_{eq\ 1hr}$ upper 10 percentile	73	73
$L_{eq\ 1hr}$ lower 10 percentile	71	66

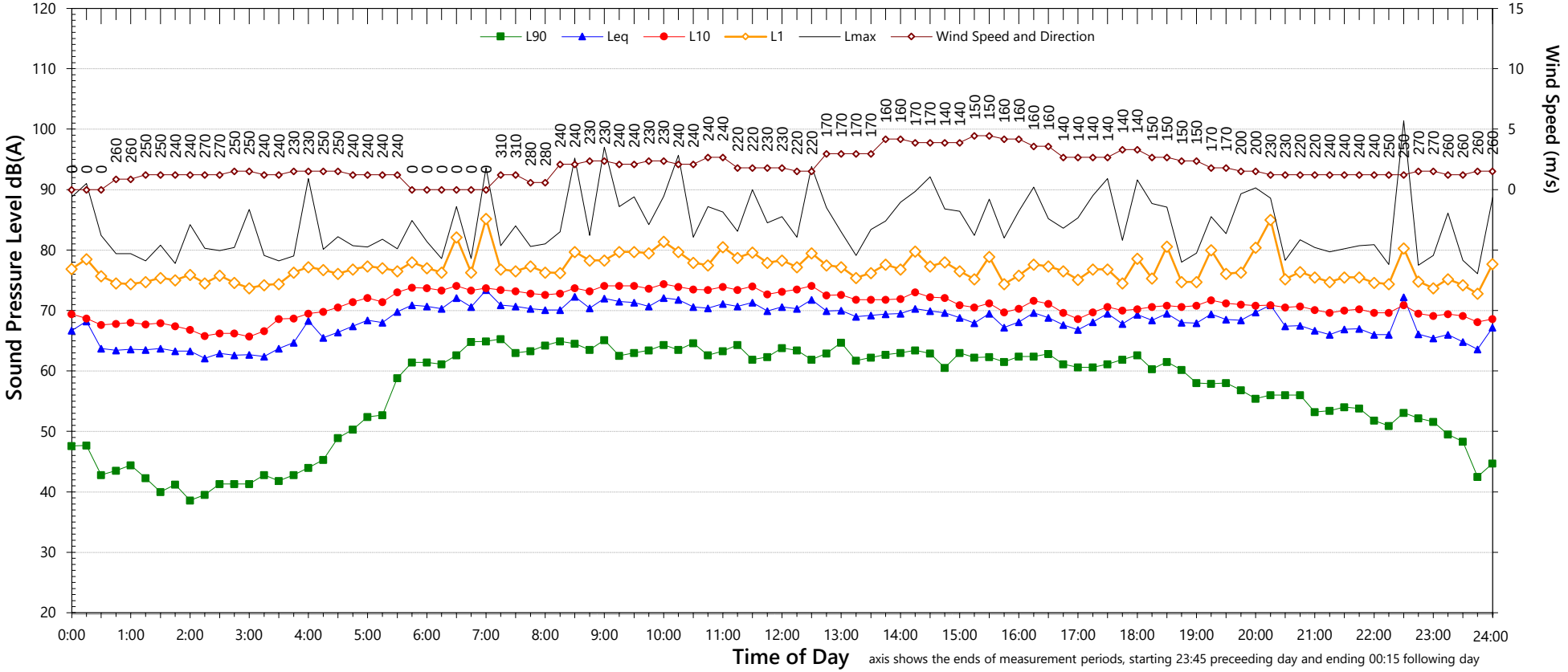
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Thursday, 30 July 2020



axis shows the ends of measurement periods, starting 23:45 preceeding day and ending 00:15 following day

NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	61	53	39
LAeq	70	68	67

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72	70
$L_{eq\ 1hr}$ upper 10 percentile	74	73
$L_{eq\ 1hr}$ lower 10 percentile	71	65

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	82	to	101
L_{Max} - L_{eq} (Range)	16	to	33

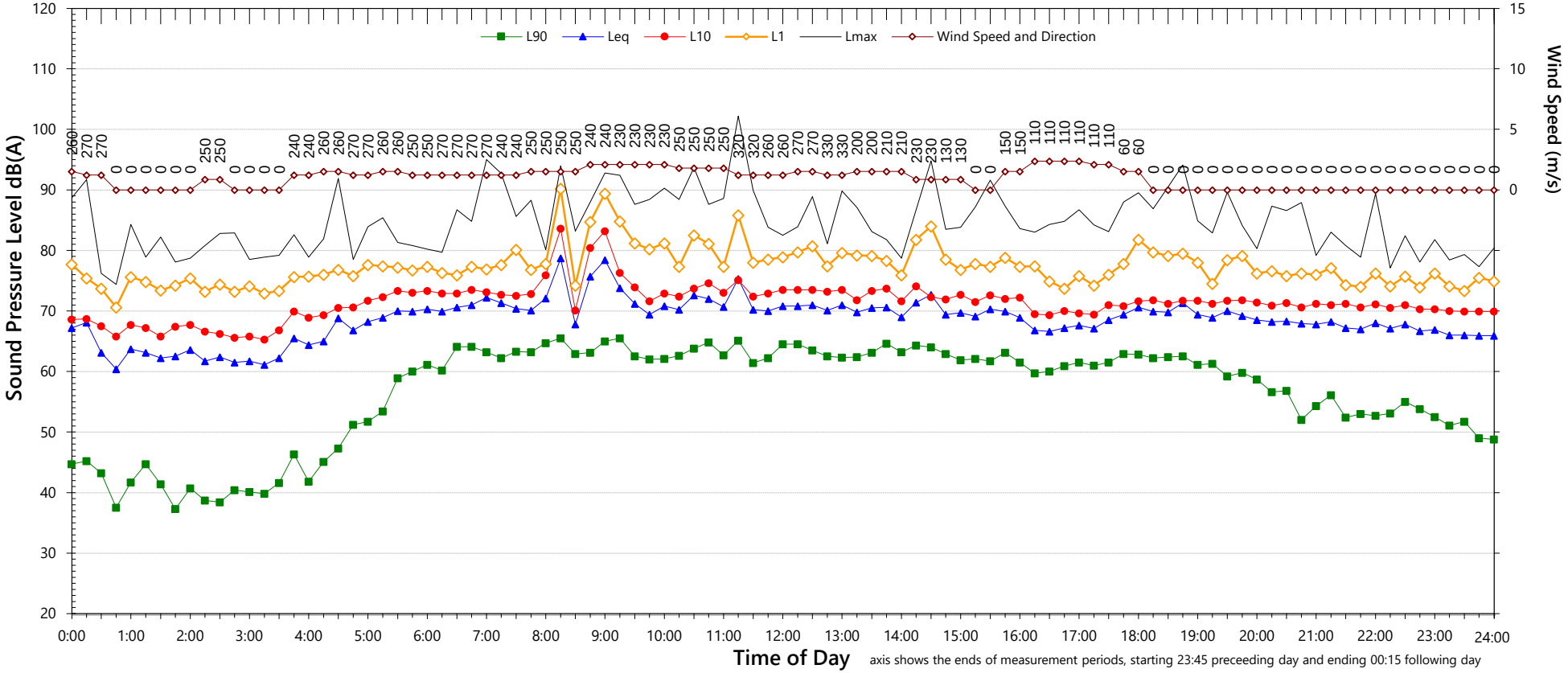
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Friday, 31 July 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	61	53	38
LAeq	72	69	66

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	78	to	93
L_{Max} - L_{eq} (Range)	15	to	27

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74	68
$L_{eq\ 1hr}$ upper 10 percentile	74	70
$L_{eq\ 1hr}$ lower 10 percentile	70	65

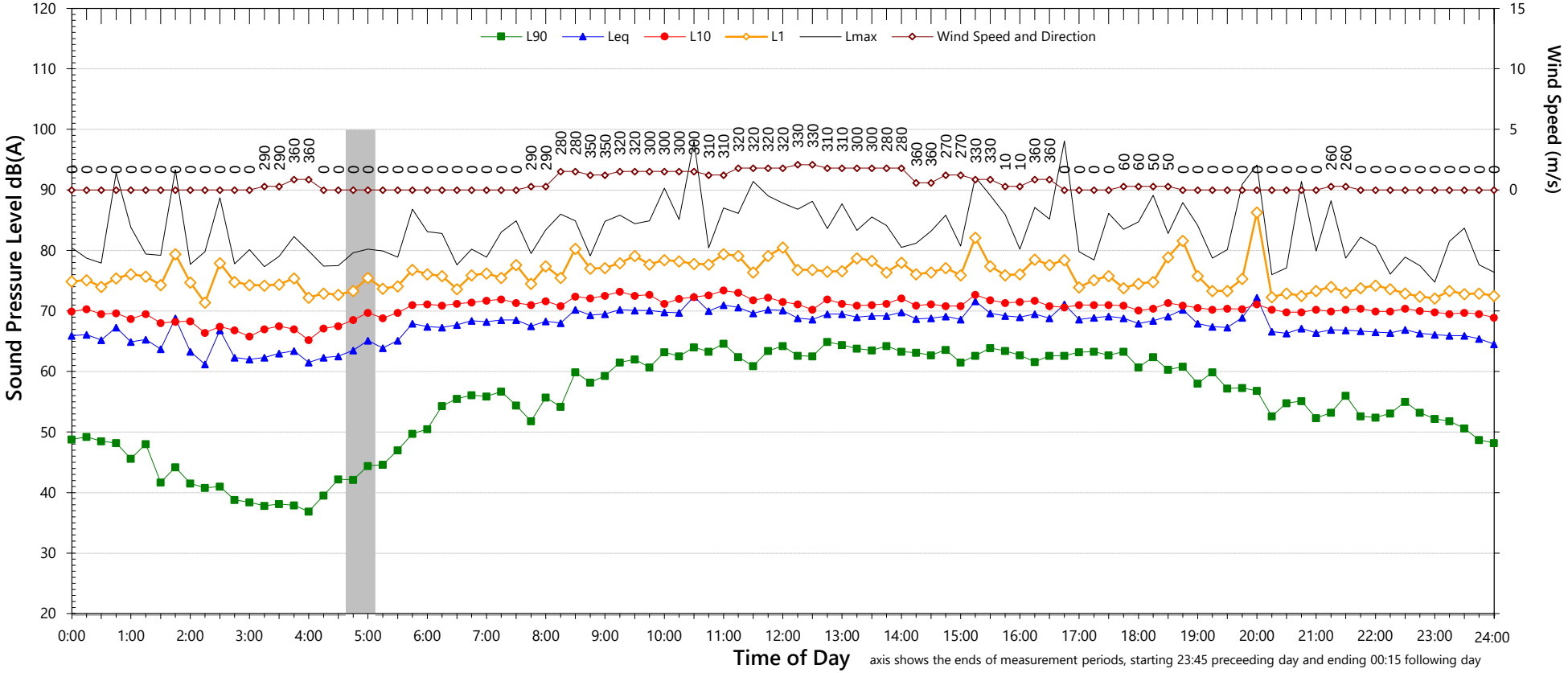
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Saturday, 1 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	57	53	38
LAeq	70	68	64

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	79	to	88
L_{Max} - L_{eq} (Range)	17	to	26

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72	67
$L_{eq\ 1hr}$ upper 10 percentile	73	69
$L_{eq\ 1hr}$ lower 10 percentile	70	64

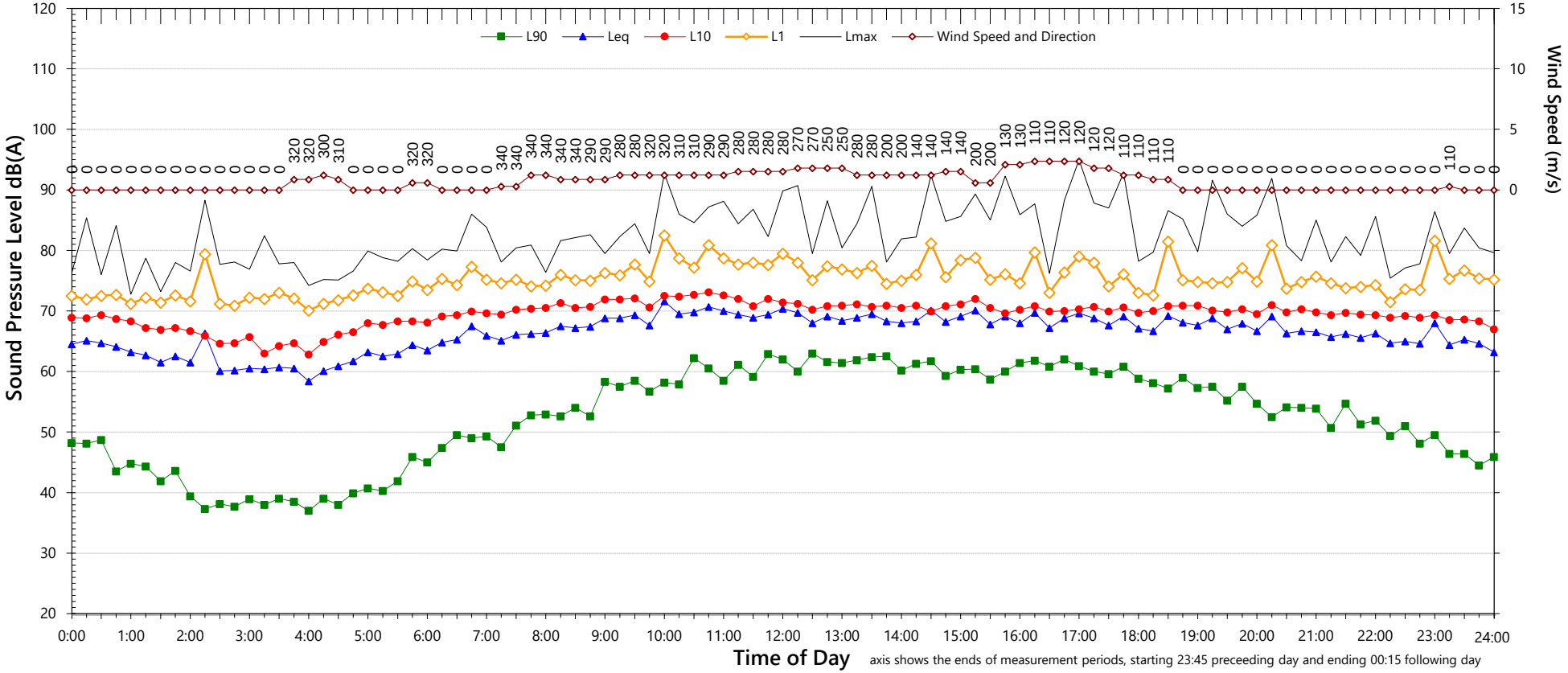
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Sunday, 2 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	57	52	38
LAeq	69	67	67

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	80	to	91
L_{Max} - L_{eq} (Range)	17	to	23

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71	69
$L_{eq\ 1hr}$ upper 10 percentile	72	73
$L_{eq\ 1hr}$ lower 10 percentile	69	64

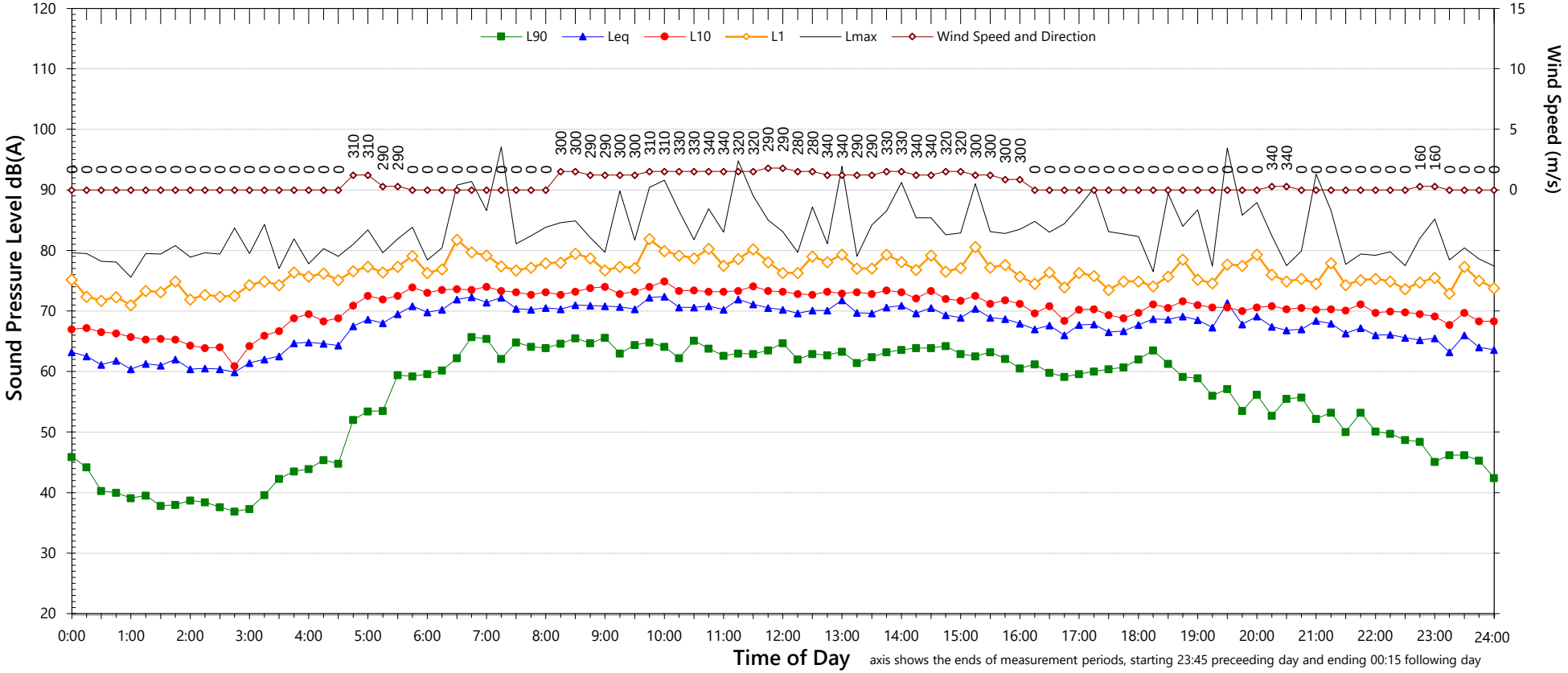
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Monday, 3 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	60	51	40
LAeq	70	68	67

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	80	to	94
L_{Max} - L_{eq} (Range)	16	to	28

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72	69
$L_{eq\ 1hr}$ upper 10 percentile	73	73
$L_{eq\ 1hr}$ lower 10 percentile	70	65

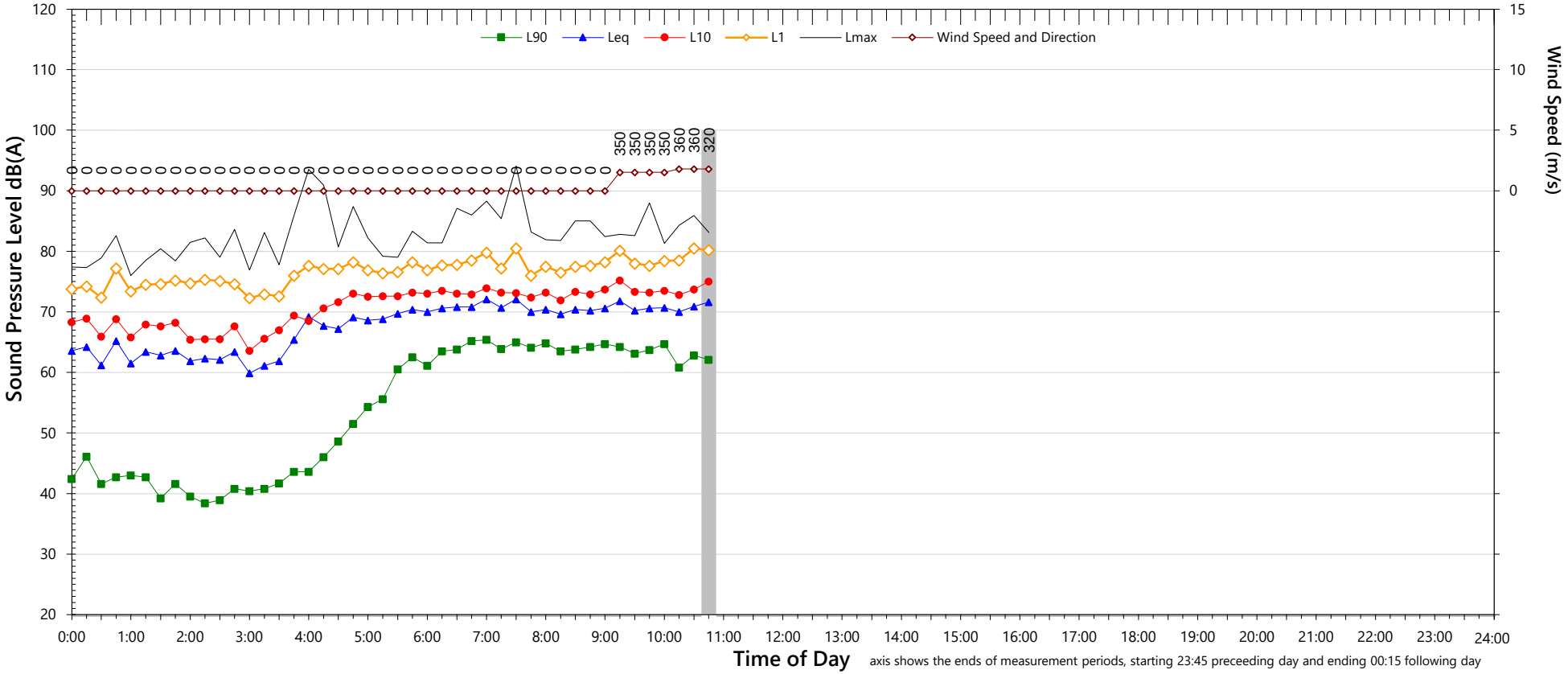
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

249 Henry Lawson Drive, Georges Hall

Tuesday, 4 August 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	-	to	-
L_{Max} - L_{eq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73	-
$L_{eq\ 1hr}$ upper 10 percentile	73	-
$L_{eq\ 1hr}$ lower 10 percentile	73	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Appendix K

Biodiversity Assessment and Search Results (BioNet Atlas / PMST)

AECOM Imagine it. Delivered.

Transport for NSW
28-Jan-2021

Intersection Upgrades on Henry Lawson Drive, Georges Hall

Biodiversity Assessment Report

Intersection Upgrades on Henry Lawson Drive, Georges Hall

Biodiversity Assessment Report

Client: Transport for NSW

ABN: 76 236 371 088

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

17-Feb-2021

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality Information

Document Intersection Upgrades on Henry Lawson Drive, Georges Hall

Date 17-Feb-2021

Prepared by Jamie McMahon

Reviewed by

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
1	23-Dec-2020	First draft for TfNSW review	Jamie McMahon, Associate Director	
2	18-Jan-2021	Second Draft for TfNSW review	Jamie McMahon, Associate Director	
3	22-Jan-2021	Updated draft in response to project changes	Jamie McMahon, Associate Director	
4	17-Feb-2021	Final	Jamie McMahon, Associate Director	

Table of Contents

List of Tables

List of Figures

List of Acronyms

BC Act	*Biodiversity Conservation Act 2016* (NSW)
DoEE	Department of the Environment and Energy
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
FM Act	*Fisheries Management Act 1994*
ha	Hectare
km	Kilometre
KTP	Key Threatening Process
LEP	Local Environmental Plan
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NPWS	National Parks and Wildlife Service, NSW
NSW	New South Wales
OEH	Office of Environment and Heritage, NSW.
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
WoNS	Weeds of National Significance

1.0 Introduction

1.1 Background

Transport for NSW (Transport) has identified the need to undertake intersection upgrades on Henry Lawson Drive (HLD) between Beale Street and up to 140 metres south of Rabaul Road in Georges Hall, NSW (the proposal). The upgrades would include localised road widening eastwards within the existing road corridor between Beale Street and up to 140 metres south of Rabaul Road to facilitate optimal traffic flow and improve road safety. The proposal would also include localised drainage improvements and utility relocations to accommodate the upgraded roadway.

A key feature of the proposal is to increase the through movement capacity of the southbound carriageway of HLD from one lane to two lanes between Beale Street and just south of Rabaul Road. To improve traffic movements in the area and road safety issues, the proposal would restrict motorists turning right from HLD northbound into Rabaul Road eastbound to limit motorist crashes that occur from queues for northbound traffic on HLD. Other proposed improvements include a new pedestrian footpath along the eastern verge of HLD between Haig Avenue and Rabaul Road, upgrades to the road's stormwater drainage system, road re-surfacing and improvements to the road design layout.

About 6,100 vehicles travel along HLD in Georges Hall during the AM and PM peak periods alone. Southbound congestion during peak periods can extend from the Milperra Road intersection 1.4 kilometres to the south) all the way back to Flinders Road, Georges Hall (about one kilometre to the north). At the same time northbound traffic is slowed or stopped by vehicles waiting to turn right at the non-signalised intersection of HLD and Rabaul Road.

The Proposal is part of a commitment to improve travel on the entire HLD corridor, TfNSW is fast-tracking this Proposal to provide early relief for local residents and road users who currently experience significant congestion along this busy road corridor. The Proposal would complement the NSW Government's separate $100 million commitment to upgrade the length of HLD to a four lane road in three stages, between Hume Highway and the M5 South Western Motorway, Milperra; a distance of about 7.5 kilometres.

1.2 Proposal description

TfNSW propose to undertake road improvements on HLD between Beale Street and just south of Rabaul Road in Georges Hall in order to ease congestion and improve travel reliability along this road corridor, particularly at its intersections with Haig Avenue and Rabaul Road. The Proposal also includes improvements to address potential safety issues in this location.

Transport for NSW proposes to provide an additional southbound traffic lane on HLD between Beale Street and just south of Rabaul Road adjacent to Coleman Park (Figure 1 and Figure 2).

Key features of the Proposal would include:

- Establishing an additional southbound through lane on HLD between Beale Street and just south of Rabaul Road, including the following:
    - Converting the existing HLD southbound left turn slip lane between Beale Street and Haig Avenue from left turn only to a shared left and through lane and converting about 30 metres of the existing southbound road shoulder just south of Beale Street into chevron area
    - Constructing an additional southbound lane on Henry Lawson Drive between Endeavour Road and Rabaul Road, a length of about 140 metres
    - Constructing a merge lane along HLD southbound from Rabaul Road for a length of about 140 metres
- Banning right turns from HLD northbound onto Rabaul Road eastbound and encouraging road users to use the signalised intersections at Tower Road, to the south, and Haig Avenue, immediately to the north.

- Installing a new pedestrian footpath on the eastern road verge of HLD between Haig Avenue and Rabaul Road.
- Installing new stormwater drainage pits and pipes on the eastern verge of HLD between Beale Street and just south of Rabaul Road to improve stormwater drainage functionality which is currently under capacity
- Installing a new kerb and gutter system along the eastern verge of HLD between Beale Street and just south of Rabaul Road which are currently in poor condition or non-existent causing localised stormwater ponding
- Replacing the existing stormwater pipe and headwall near the sewage pumping facility at 256 HLD to accommodate for the deficiencies of the existing stormwater drainage system in this location. Replacement of the headwall would require the temporary removal of the existing sandstone wall two metres either side of the existing headwall and the removal of mangroves up to a metre either side of the existing head wall.

The proposal is expected to involve the following vegetation impacts:

- Removal of up to 33 roadside trees on the eastern verge of HLD between Beale Street and about 200 metres south of Rabaul Road (specific tree references and locations are identified in the Arboricultural Impact Assessment prepared for the proposal referenced in this document)
- Removal of numerous small juvenile trees within the treatment facility at 256 HLD for the construction of the replacement headwall and stormwater pipe including:
    - *Tristaniopsis laurina* (Water Gum) x 1, *Callistemon viminalis* (Weeping Bottlebrush) x 3
    - *Eucalyptus tereticornis* (Forest Red Gum) x 17
    - *Corymbia citriodora* (Lemon Scented Gum) x 4
    - *Eucalyptus spp*. (Rough Barked Eucalypt) x 1
    - *Angophora floribunda* (Rough Barked Apple) x 5
    - *Eucalyptus baueriana* (Blue Box) x 8
    - Dead Tree (species unrecorded) x 1
- Removal of mangroves within a metre either side of the existing headwall structure
- Trimming of trees on private property fronting the proposed work area where tree branches are overhanging the road corridor.

Most of road, utility and drainage works would be undertaken within land under the care and control of Transport and Canterbury-Bankstown Council. Minor civil works would be required in the front yard of some private properties on the eastern side of HLD between Beale Street and Rabaul Road to tie into the new road and utility alignment. The proposed site compound is located on Crown land under the management of Canterbury-Bankstown Council.

The proposal would be constructed over a period of about 12 months, commencing in 2021. Construction would generally be conducted outside of standard working hours to minimise disruption to road users and to provide a safe work environment for the Contractor.

Figure 1 Key features of the proposal (1 of 2)

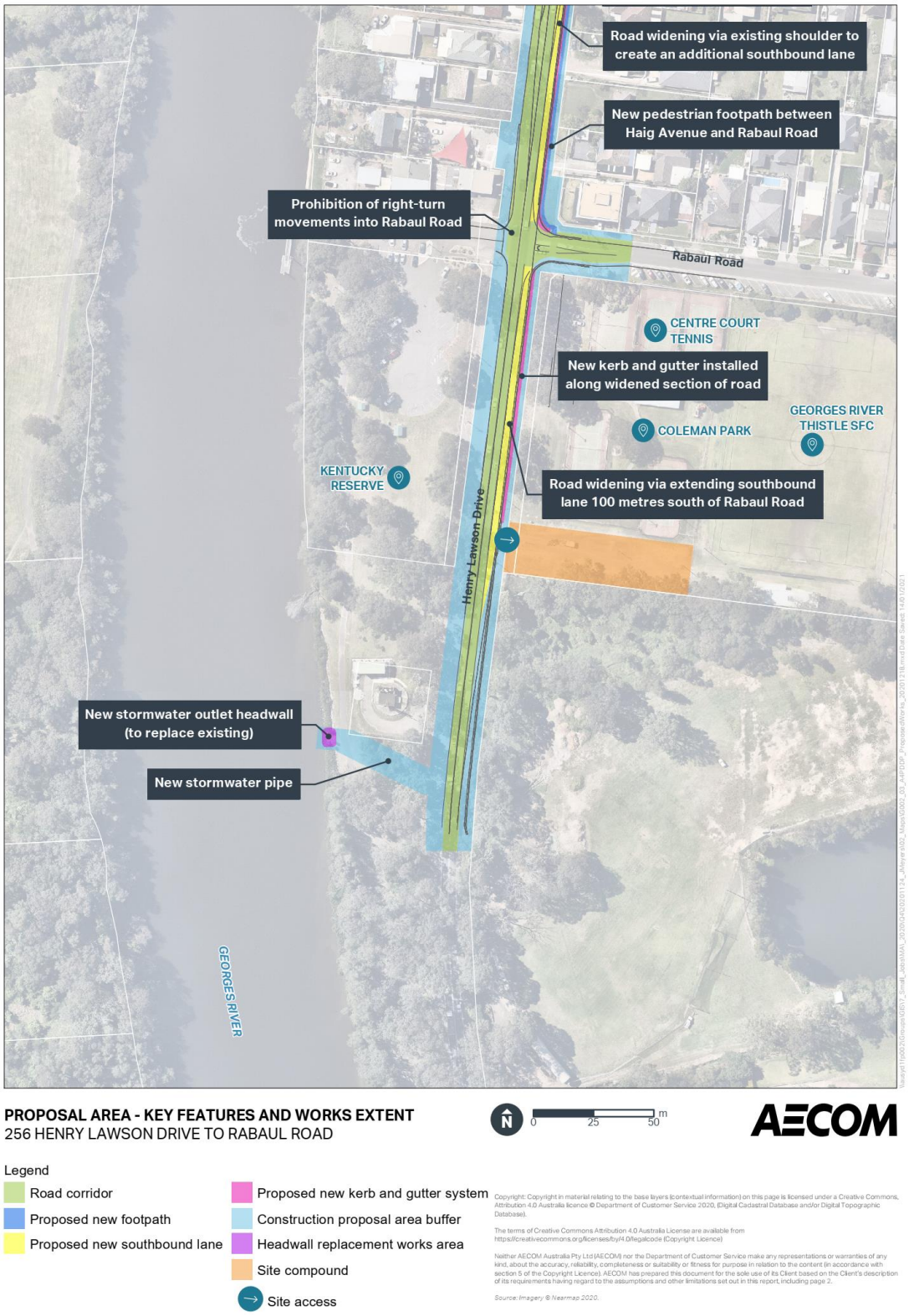


Figure 2 Key features of the proposal (2 of 2)

1.3 Study and proposal area

The proposal is located within the Canterbury-Bankstown Council Local Government Area (LGA), approximately 22 km southwest of the Sydney CBD. For the purposes of this biodiversity assessment the 'proposal area' refers to the area immediately affected by the proposed works. This includes the footprint of the intersection upgrades and drainage works, as well as temporary and permanent infrastructure to facilitate the proposal. Also included are additional areas required during construction, such as site compounds, stockpile areas, laydown areas and construction accesses, as well as additional operational infrastructure such as traffic signals, utilities and drainage.

The study area for this biodiversity assessment refers to the broader area in which the proposal area is located which influences the nature of the existing ecology. For this assessment the study area includes an area with an approximate 40 metres buffer around the proposal area.

The database search area includes the areas searched for both BioNet and Protected Matters Search Tool (MPST) searches. The BioNet searches included threatened species and communities within a 10 km x 10 km area centred on the proposal area, while the Protected Matters Search included a 5 km radius area centred on the proposal area.

The location of the study area is shown in Figure 3. The area to the south of Rabaul Road, where the majority of impacts to biodiversity values would occur, is shown in Figure 4.

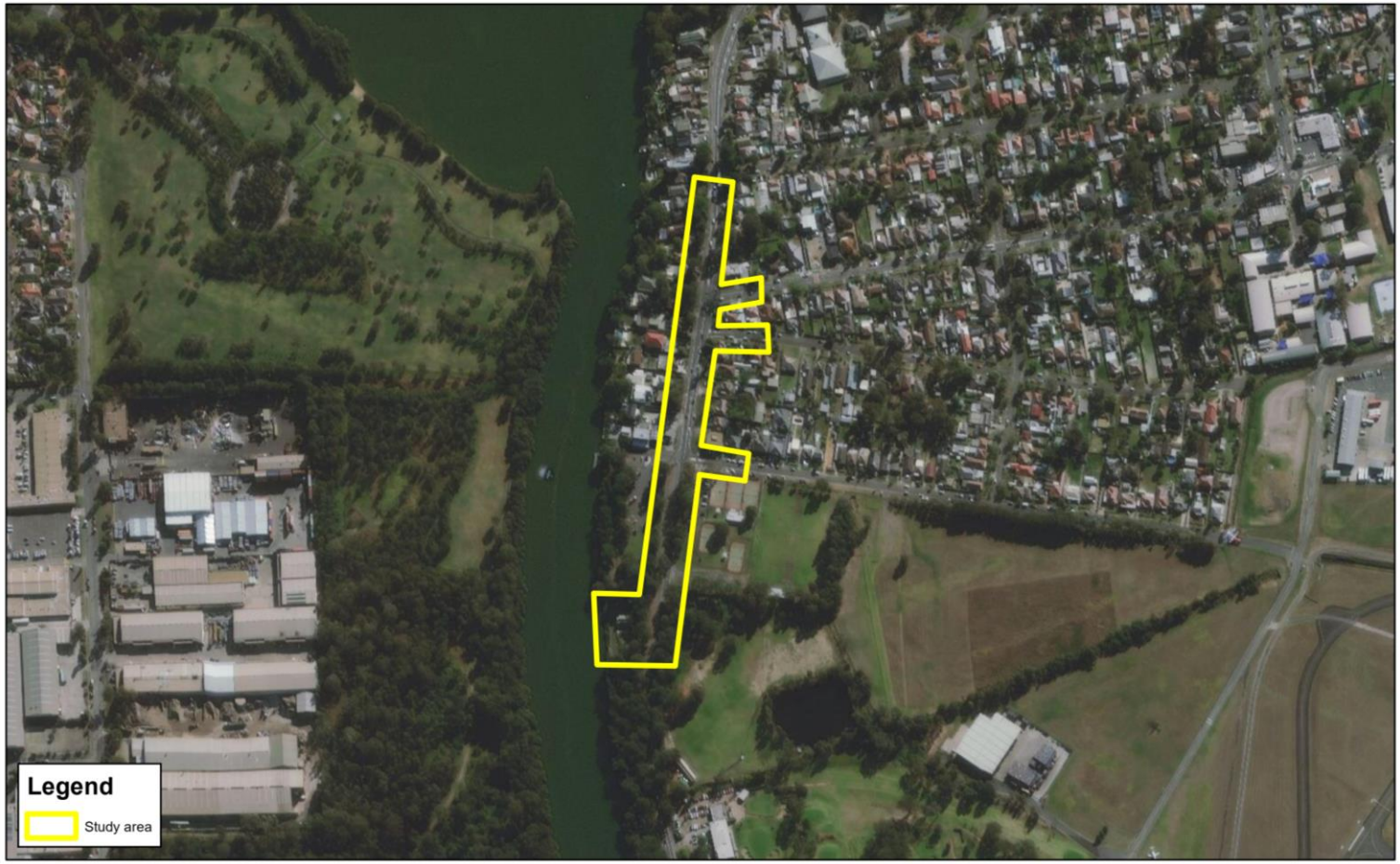


Figure 3 Regional context and study area

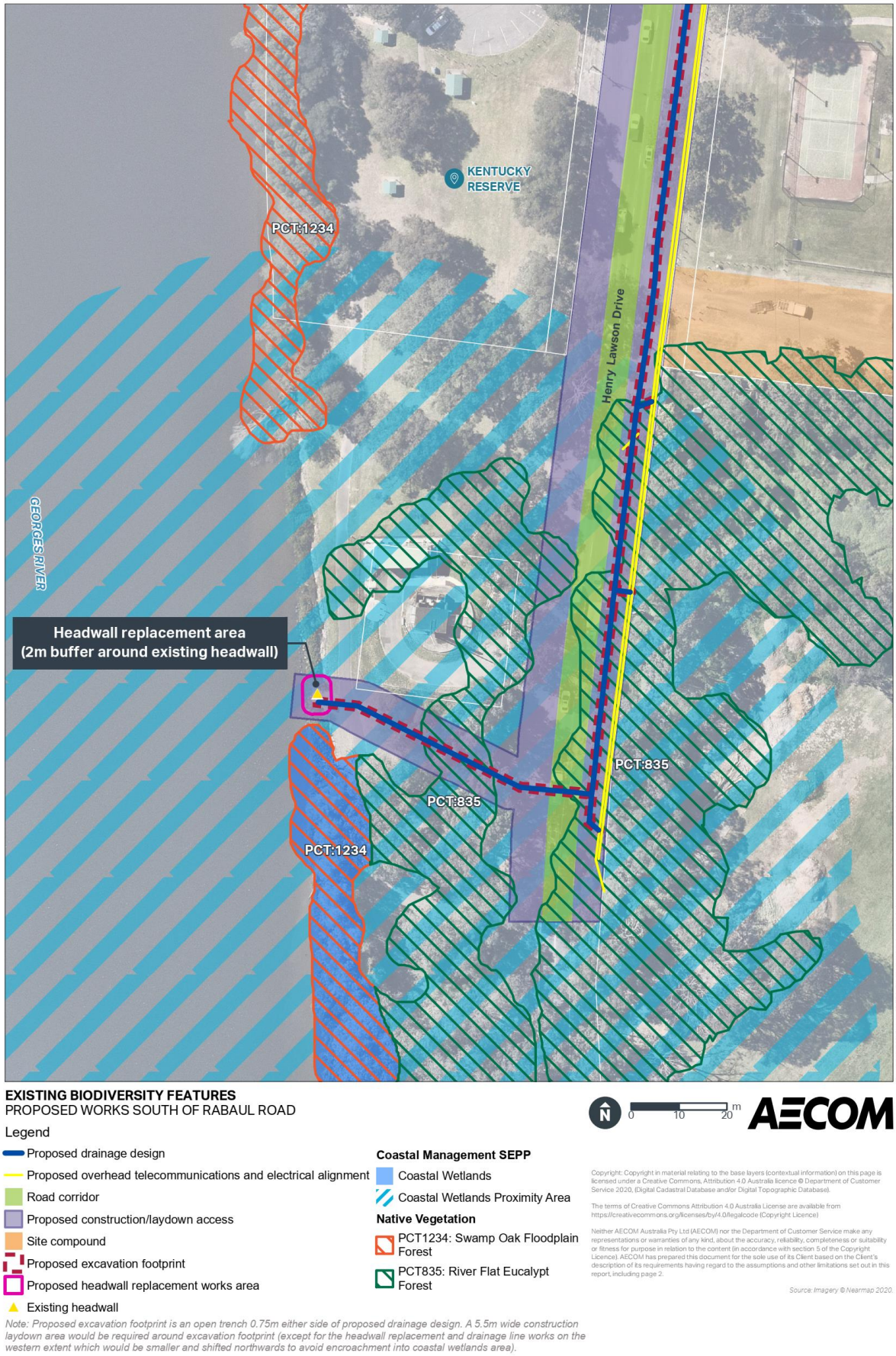


Figure 4 Biodiversity features south of Rabaul Road

1.4 Legislative context

Environmental Planning and Assessment Act 1979

This assessment has been prepared to consider the potential biodiversity impacts of the proposal, in keeping with the legislative requirements of Part 5 of *the Environmental Planning and Assessment Act 1979* (EP&A Act). The EP&A Act provides the statutory basis for planning and environmental assessment in New South Wales. This biodiversity assessment report is provided as part of the environmental assessment and technical considerations prepared in support of the REF for the proposal. Further detail of the EP&A Act implications of the proposal may be found within the REF.

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires that Commonwealth approval be obtained for certain actions and establishes an assessment and approvals system for actions that have or are likely to have, a significant impact on Matters of National Environmental Significance (MNES). Matters of NES considered in this report include listed threatened species, populations and ecological communities as well as migratory species protected under international agreements. Particular consideration has been given to potential impacts on threatened biota that occur or are likely to occur within the study area. Potential impacts are discussed in Section 4.0 of this report.

In September 2015, a 'strategic assessment' approval was granted by the Commonwealth Minister for the Environment under Part 10 of the EPBC Act. The approval applies to Transport activities being assessed under Division 5.1 of the EP&A Act with respect to potential impacts on nationally listed threatened species, ecological communities and migratory species.

As a result, Transport proposals assessed via REF:

- Must address and consider potential impacts on Commonwealth listed threatened species, populations, ecological communities and migratory species, including application of the "avoid, minimise, mitigate and offset" hierarchy
- Do not require referral to the Commonwealth Minister for the Environment for these matters, even if the activity is likely to have a significant impact.

Transport must consider impacts to Commonwealth listed threatened species, ecological communities and migratory species as part of the approval process under the strategic assessment. To assist with this, assessments are required in accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1* (DoE 2013) (see Section 4.0 and Appendix C).

Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) protects threatened flora and fauna species and ecological communities and their habitats within NSW. Particular attention has been given to potential impacts on threatened biota that occur or are likely to occur within the study area. Potential impacts are discussed in Section 4.0 of this report.

Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) protects threatened species, populations and ecological communities of fish and marine vegetation, and other living resources of Australian waters. Species listed under this Act are considered alongside those of the BC and EPBC Acts.

Under section 219, works within a waterway that may result in the temporary or permanent blockage of fish passage will require a permit from NSW DPI.

Section 199 of the FM Act requires a public authority provide the Minister for Primary Industries 21 days' notice of dredging or reclamation works, though clause 227 of the *Fisheries Management (General) Regulations 2019* provides an exemption from this requirement if the works are carried out in accordance with the Code of Practice for Minor Works in NSW Waterways.

Potential impacts to aquatic environments are discussed in Section 4.0 of this report.

Biosecurity Act 2015

Under the *Biosecurity Act 2015*, Transport as the landowner is required to prevent, eliminate or minimise the risk posed by a prohibited matter as outlined in Schedule 2 of this Act so far as is reasonably practicable. A priority weed is one matter that should be prevented, managed, controlled or eradicated in the region. Section 3.8 of this report considers weeds declared as priority weeds in the Georges River LGA that occur within the proposal area.

State Environmental Planning Policy (Coastal Management) 2018

This policy aims to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016*, including the management objectives for each coastal management area, as defined in the policy.

This policy is focused largely on development that needs consent, with certain provisions requiring consideration by consent authorities during determination. However, clause 10 applies to all development, including activities under Part 5. This clause also requires that such development or activities becomes 'designated development', hence requiring an EIS to be prepared.

The proposal has been designed to specifically avoid areas designated as 'coastal wetlands' under this policy. This includes both direct disturbance as well as off-site impacts. The implications of this policy are discussed in Section 4.0 of this report.

State Environmental Planning Policy (Infrastructure) 2007

The *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) aims to assist in the effective delivery of public infrastructure across the State by improving certainty and regulatory efficiency through a consistent planning assessment and approvals regime for public infrastructure and services and through the clear definition of environmental assessment and approval processes for public infrastructure and services facilities.

As the proposal is for a 'road or road infrastructure facility' and is to be carried out by Transport, it can be assessed under Part 5 of the EP&A Act as 'development that does not require consent'. Development consent for the proposal from council is not therefore required.

1.5 Study aims

The key aims of this study are to:

- Undertake a review of published documentation and a desktop study of flora and fauna relevant to the study area, identifying species and communities that may be present
- Conduct a field inspection of the proposal area, with particular attention to impacts on species, populations and ecological communities listed under the BC Act and the EPBC Act
- Identify and assess likely direct and indirect impacts to flora and fauna occurring within the proposal area
- Undertake assessments of significance under the BC Act and the EPBC Act for threatened biota, as required
- Identify measures for managing impacts on threatened biota during design, construction and operation of the proposal.

2.0 Methodology

2.1 Database searches and literature reviews

Desktop research was undertaken prior to the commencement of a site inspection for the proposal. This included database searches and a review of relevant literature to determine if targeted surveys for specific species were required. Additionally, these searches helped to identify threatened biota known or likely to occur within the proposal area.

The following databases and resources were reviewed:

- NSW DPIE BioNet Database within a 10 km x 10 km area centred on the proposal area (DPIE 2020a)
- Protected Matters Report that documents all Matters of National Environmental Significance (MNES) within a 5 km radius of the proposal area. MNES include threatened species, communities and migratory species which are listed under the EPBC Act (Department of Agriculture, Water and the Environment (DAWE) 2020)
- NSW Department of Primary Industries – Fisheries. Profiles for species, populations and ecological communities (DPI 2020a)
- NSW Department of Primary Industries, WeedWise Priority Weeds List (DPI 2020b)
- OEH, Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft) (DEC 2004) to develop survey methods for the study
- NSW Department of Primary Industries database for aquatic Threatened Ecological Communities (TECs): http://www.dpi.nsw.gov.au/fisheries/species-protection/conservation/what-current
- Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems (GDE): http://www.bom.gov.au/water/groundwater/gde/map.shtml
- The Native Vegetation of the Sydney Metropolitan Area - Version 3.1, VIS ID 4489 (OEH, 2016)
- Arboricultural Impact Report Henry Lawson Drive Upgrade, Georges Hall NSW, Landscape Matrix Pty Ltd January 2021.

2.1.1 NSW DPIE BioNet database – Threatened Flora and Fauna Records and Exotic Species

The DPIE BioNet Wildlife Atlas was searched for threatened flora and fauna records from 1980 onwards. This search was undertaken using a 10 km x 10 km area centred on the proposal area. This search returned 24 ecological communities, 38 threatened fauna species and 20 threatened flora species listed under the BC Act.

2.1.2 Commonwealth Department of Agriculture, Water and the Environment – Protected Matters Database

The Department of Agriculture, Water and the Environment (DAWE) Protected Matters Database was searched for MNES and other matters protected by the EPBC Act. This search utilised a 5 km radius search area of the proposal area. This search returned nine ecological communities, 69 threatened fauna species and 36 threatened flora species listed under the EPBC Act.

2.1.3 NSW Department of Primary Industries WeedWise List

Priority weeds are plants that post a potentially serious threat to primary production or the natural environment. Under the *Biosecurity Act 2015* public authorities have a responsibility to prevent, manage, control or eradicated priority weeds in the region.

2.1.4 NSW Department of Primary Industries key fish habitat

The DPI ‘Key Fish Habitat‘ (KFH) includes all marine and estuarine habitats up to highest astronomical tide level (that reached by 'king' tides) and most permanent and semi-permanent freshwater habitats

including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank.

The study area was reviewed for potential KFH. The Georges River adjacent to the proposal area is listed as KFH.

2.1.5 NSW Department of Primary Industries threatened aquatic species

The DPI report 'Fish communities and threatened species distributions of NSW' (DPI 2016) was reviewed for the purposes of establishing threatened fish species likely to be present and/or affected by this proposal. None of the threatened fish species listed was deemed likely to occur within the study area.

2.2 Field survey

Field survey was undertaken on 17 December 2020 by Jamie McMahon (CEnvP Impact Assessment), a qualified and experienced ecologist from AECOM Australia. The survey focused on the southern part of the proposal area, as well as its immediate surrounds. The surveys included assessment of vegetation present, as well as opportunistic fauna sightings. No detailed fauna survey was undertaken (such as trapping or bat detection), though an assessment of fauna habitat present within the proposal area was carried out.

Weather conditions during the field survey are summarised in Table 1. Data was drawn from the Bankstown Airport AMO (station 066137) (BoM, 2020).

Table 1 Field survey weather conditions

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)	Rainfall last 7 days (mm)
17 December 2020	21.7	33.9	1.8	20.6

The field survey was undertaken over approximately two hours, spent largely around the southern portion of the study area which contained the mapped TECs.

2.3 Limitations

Limitations to the flora and fauna surveys, which may affect survey results, include:

- The survey focused on particular areas where ecological risks were deemed to be greater. This included areas of existing vegetation through which the widened road is designed to pass, as well as the locations where the construction compound is proposed. Areas of greater sensitivity within the proposal area were also afforded greater attention, such as locations with greater coverage of existing vegetation or areas that may be more susceptible to off-site impacts
- Surveys did not extend into adjacent private properties
- While a fauna habitat assessment was undertaken, this technique is not an adequate substitute for full fauna surveys. Fauna are capable of inhabiting sub-optimal habitat, and fragmentation, isolation or species density can all influence the presence and distribution of a particular species. Species likelihood of occurrence was informed by considering habitat characteristics and opportunistic sightings
- No aquatic survey was undertaken
- Detailed Biodiversity Assessment Methodology (BAM) plot assessments were not undertaken, though relevant vegetation was inspected throughout the relevant parts of the proposal area.

3.0 Existing environment

3.1 Overview

Table 2 considers an overview of the proposal area, including relevant environmental controls and sensitivities. Photographs of the site are included in Figure 6 to Figure 11.

Table 2 Environmental controls and sensitivities

Environmental considerations	In the study area?
Is the Proposal located within a National Park?	No
Is the Proposal located within land reserved or dedicated for preservation of other environmental protection purposes?	No
Is the Proposal located within a World Heritage Area?	No
Is the Proposal located within an Environmental Protection Zone under an environmental planning instrument?	No
Is the Proposal located within land identified as a wilderness area?	No
Is the Proposal located within a wetland area dedicated under the Ramsar Wetlands Convention?	No
Does the site contain critical habitat?	No
Is the area mapped as Key Fish habitat?	Yes
Is the area mapped on the Biodiversity Values map?	No
Is the area mapped on the Native Vegetation Regulatory Map?	No, on land excluded from the *Local Land Services Act 2016*

3.2 Land use

Within the proposal area land use is dominated by the existing carriageway of Henry Lawson Drive. This includes the road pavement and verge on both sides throughout the length of the proposal. Footpaths are present in the northern section.

Land use around the proposal area is dominated by a mix of land uses including residential, commercial, recreational (golf course and Kentucky Reserve) and aviation (Bankstown Airport). Most development appears to originate from the mid-20th century with several properties being redeveloped over time.

On the western side of HLD, south of Rabaul Road is Kentucky Reserve. This is a developed park, with play facilities and a paved walking path along the river. Within the reserve and at the southern limits of the proposal area is a Sydney Water sewer pumping station.

On the eastern side of HLD, south of Rabaul Road are tennis courts and a soccer field within Coleman Park. To the south of this is the Georges River golf course driving range, with the main course being further to the south.

Commercial uses are present near the intersection with Rabaul Road, including a service station and a coffee shop.

North of the Rabaul Road intersection on the eastern and western sides of HLD are low density residential properties.

3.3 Vegetation communities and habitat

3.3.1 Terrestrial vegetation

Desktop results

Two native Plant Community Types (PCT) were identified within the proposal area having reference to *The Native Vegetation of the Sydney Metropolitan Area - Version 3.1 VIS ID 4489* (OEH 2018):

- PCT 835: Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion.
- PCT 1234: Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion.

The study area also contains significant areas of non-native vegetation due to the developed nature of the area and historic invasion by exotic species.

A summary of the total area of mapped vegetation identified within the study area is outlined in Table 3. Plant Community Types and potential Threatened Ecological Communities (TECs) mapped as being present within the study area are discussed in Table 3 and shown in Figure 5.

Table 3 Plant community types previously mapped within the study area

Plant Community Type	Community name	Potential Threatened Ecological Community (TEC)	Total within study area (ha)
PCT 835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	BC Act: **Endangered Ecological Community** - *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EPBC Act: **Critically Endangered Ecological Community** - *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria*	0.47
PCT 1234	Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion	BC Act: **Endangered Ecological Community** - *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EPBC Act: **Endangered Ecological Community** – *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*	0.02
N/A	Urban native and exotic	*Not part of a TEC*	0.71
		TOTAL	1.20

PCT 835: Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion

This EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney, *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain.

A layer of small trees may be present, including *Melaleuca decora*, *M. styphelioides* (Prickly-leaved Teatree), *Backhousia myrtifolia* (Grey myrtle), *Melia azederach* (White cedar), *Casuarina cunninghamiana* (River oak) and *C. glauca* (Swamp oak).

Given its habitat, the community has an important role in maintaining river ecosystems and riverbank stability. Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m above sea level.

The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees. Typically forms mosaics with other floodplain forest communities and treeless wetlands, and often fringe treeless floodplain lagoons or wetlands with semi-permanent standing water.

PCT 1234: Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion

This community is found on the coastal floodplains of NSW. It has a dense to sparse tree layer in which *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui.

Other trees including *Acmena smithii* (lilly pilly), *Glochidion spp.* (cheese trees) and *Melaleuca spp.* (paperbarks) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford.

Associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Generally occurs below 20 m (rarely above 10 m) elevation. The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees.

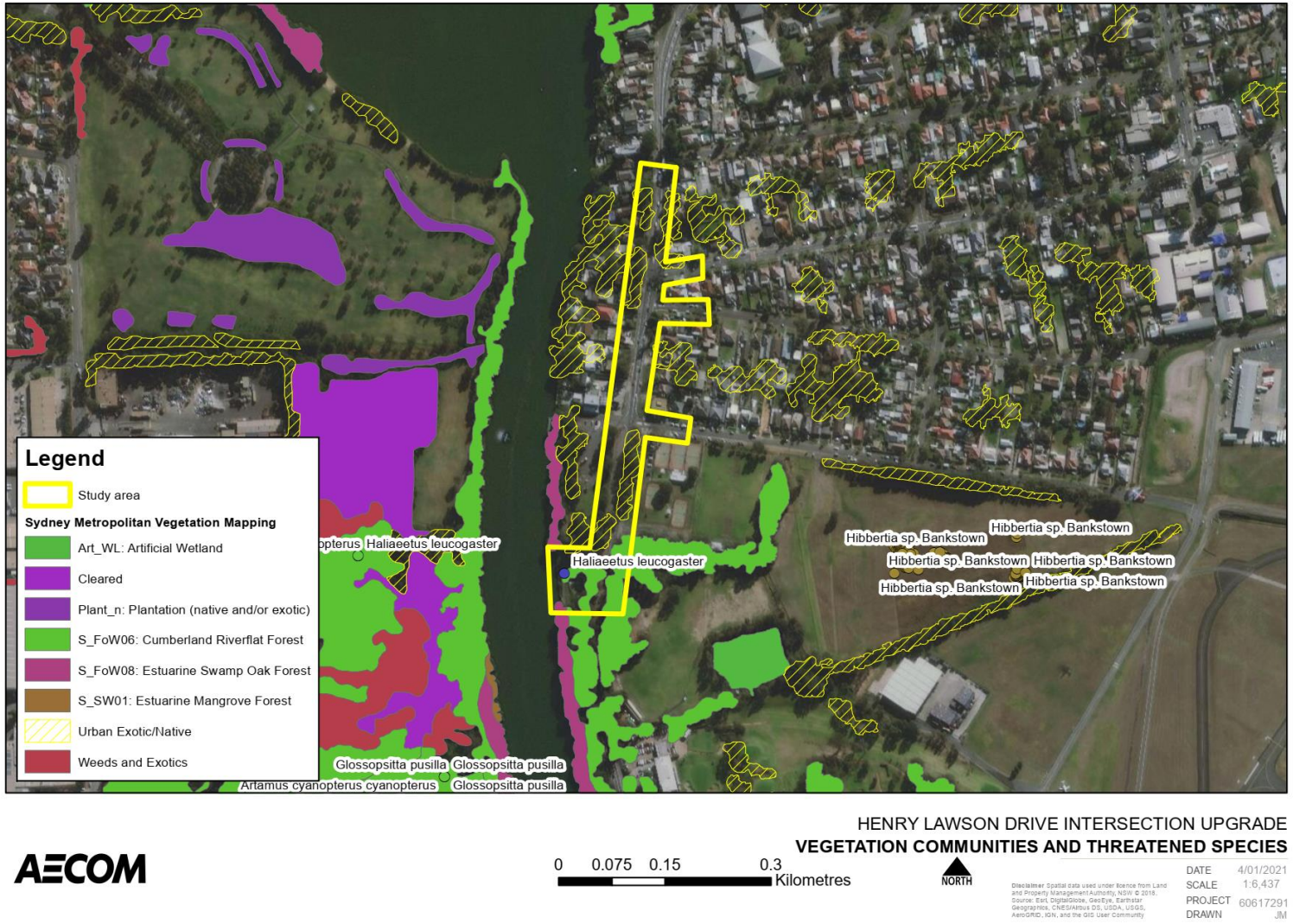


Figure 5 Vegetation mapped within the study area

Figure 6 Approximate line of proposed stormwater pipe. Photo taken from southwestern corner of the proposal area looking northwest

Figure 7 Headwall proposed to be replaced

Figure 8 Riverbank in vicinity of headwall

Figure 9 Southeastern extent of the proposal area, looking south

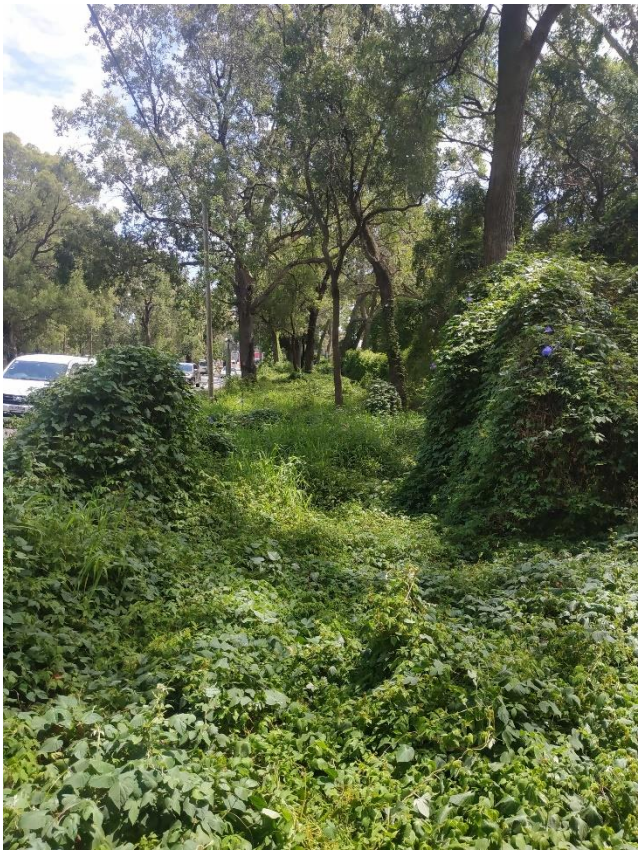


Figure 10 Southeastern extent of the proposal area, looking north

Figure 11 Eastern side of proposal area, immediately south of Rabaul Road intersection

Field inspection results

Within and adjacent to the proposal area, vegetation is generally characterised by three main forms:

- Recreation/environmental reserve – there are three main recreation facilities adjacent to the site, including Kentucky Reserve, the tennis courts and soccer field complex (within Coleman Park), and Georges River Golf Course. These lands are all highly managed, with regular mowing and vegetation management. Vegetation within these areas is a mix of planted, remnant and naturally regenerated.
- Residential landscaping, including of a wide variety of native and exotic species. These areas contain a mixture of mature and juvenile vegetation, though it is noted that the majority of vegetation is more mature in this location given the age of the properties.
- Riparian fringe, including *Casuarina*, *Avicenna* and *Phragmites* vegetation along the edge of the waterway. This area is only managed on the land-side, where this vegetation is adjacent to the recreational areas of Kentucky Reserve.
- Unmanaged land, including road verges and the fringes of recreational lands. Vegetation within these areas is generally comprised of remnant trees in the canopy layer and environmental weeds in the mid and ground layers.

The quality of vegetation in the area varies substantially, with some areas containing higher quality vegetation with little weed infestation and other areas being highly dominated by weeds.

Within the road reserve itself vegetation is generally comprised of native canopy (*Eucalyptus baueriana*, *Angophora floribunda*, *E. tereticornis*, *E. microcorys*, *Casuarina glauca*), with no midstorey. The groundlayer is mainly exposed dirt with a small scattering of *E. baueriana* and *A. floribunda* on the western side of HLD.

In the northern part of the proposal area are several planted street trees, including *Callistemon viminalis*, *E. tereticornis*, *E. microcorys* and *Tristaniopsis laurina*.

On the eastern side of HLD at southern end of the proposal area the road reserve includes several large *E. baueriana* and a small number of mature Camphor laurel (*Cinnamomum camphora*), with the no midstorey and a groundlayer that is heavily dominated by balloon vine and other environmental weeds such as Morning glory (*Ipomoea indica*) and Moth vine (*Araujia sericifera*).

Vegetation within the tennis courts complex is generally limited to several mature *Eucalyptus tereticornis* and *Corymbia citriodora*, all of which appear to be historically planted.

In the southeastern corner of the proposal area, where drainage works are proposed to connect the upgraded road to the river, vegetation is characterised by a mix of native and exotic species. This area appears to be subject to a degree of vegetation management (in addition to mowing), with small patches of unmowed areas dominated by regenerating native plants and shrubs. It is possible that these areas have been historically planted given the even age spread of most of the plants present, though this could not be confirmed. Vegetation in this location includes *Casuarina glauca*, *E. tereticornis*, *E. baueriana*, *Melaleuca styphelioides*, *M. linariifolia* and *Acacia falcata*. Outside of these patches are several large remnant *E. baueriana* and one *E. microcorys*. Minor weed infestation is present, including wandering jew (*Tradescantia fluminensis*), Cobbler's pegs (*Bidens pilosa*), Balloon vine (*Cardiospermum grandiflorum*) and several exotic grasses.

Based on the results of the field inspection, the mapped areas of Riverflat Eucalypt Forest are deemed to be of such poor condition as to not meet the relevant threshold to constitute this ecological community. This is largely due to the near total absence of any native species within the understorey. Despite this, this community has been assessed within this report as if it is present, as a conservative measure.

An assessment of the impact of the loss of vegetation within the proposal area as a result of the project is provided in Section 4.1.

3.3.2 Fauna habitat

The nature of terrestrial fauna habitat throughout the broader region varies substantially, due to the region being generally characterised by urban development. Fauna habitat value within these areas is

highly variable depending on the density of development and the nature of remnant or landscape planting.

Fauna habitat value within each of the three general land use types is generally low to moderate. This is based upon the high incidence of exotic species which, while providing structural habitat value, do not generally support the invertebrate assemblage that would comprise optimal foraging resources for native animals, in particular birds.

Canopy vegetation in this area is heavily dominated by *E. baueriana*, and to a lesser extent *E. tereticornis*. Whilst both trees produce hollows, the former appears produces hollows at a greater rate due to the growth form of the tree. This was observed on site, with the largely mature *E. tereticornis* exhibiting only minor hollows, and *E. baueriana* individuals showing some well-developed hollows.

The broad suite of exotic vegetation present has the potential to provide a degree of habitat value for some species, particularly urban adapted native species such as brush-tailed possums, certain honeyeaters (such as the noisy miner) and flying foxes.

Fauna recorded on site included Willie wagtail, Noisy miner, Indian myna, Australian magpie and Bell miner.

3.3.3 Riparian habitat

The proposal is located adjacent to the Georges River. The catchment for this river extends to around Appin south of Sydney, taking in the Campbelltown and Liverpool areas and then flowing through to Sutherland, Kogarah and Botany as it enters Botany Bay. The river is tidal at this point, and upstream to the weir at Liverpool. The river is approximately 85 metres wide in this location, with the Chipping Norton Lakes (comprised up of abandoned sand mining quarries) located several hundred metres upstream.

Vegetation along this stretch of the river is generally dominated by *Casuarina glauca* and Grey mangrove (*Avicennia marina*), with the remaining vegetation comprised of a mixture of native and exotic canopy and understorey vegetation. Adjacent to the proposed headwall reconstruction area is a small patch of *Phragmites australis*, which is generally limited in this area to narrow bands adjacent to riverbank areas where larger canopy species are not present.

The specific nature of the waterway is outlined in further detail in (Table 5).

3.4 Threatened ecological communities

As outlined previously, a search of the NSW BioNet database and EPBC Act Protected Matters Search Tool (PMST) identified 24 TECs with potential to occur within five kilometres of the proposal area (Appendix A). Existing vegetation mapping narrowed this down to two TECs:

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (River-Flat Eucalypt Forest)
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Swamp Oak Floodplain Forest)

During the survey carried out for the project, particular attention was paid to areas that have been mapped as comprising part of this TEC, particularly in the southern extent of the proposal area.

Field inspection of the areas mapped as River-Flat Eucalypt Forest indicated a mix of conditions. On the eastern side of the road the community is highly degraded, with only canopy species of *E. baueriana* and *A. floribunda* remaining. No diagnostic midstorey or ground layer vegetation was present.

On the western side of the road this community was also degraded, but not as severely as the eastern side. Areas mapped to the south of the Sydney Water sewer pumping station were generally devoid of midstorey, with the groundlayer being subject to mowing. Some areas appeared to have been historically planted, though the species in these areas generally do not accord with the community description. Remnant *E. baueriana* were present, alongside a seemingly planted *E. microcorys*.

Field inspection of the areas mapped as Swamp Oak Floodplain Forest confirmed the presence of this community. Whilst the part of this community present in this location was small, it appeared to be in reasonable condition.

3.5 Threatened species

Flora

Twenty flora species listed under the BC Act have been recorded in or have potential habitat within five kilometres of the proposal area (DPIE 2020a). Ten of these species are also listed as threatened under the EPBC Act (denoted by an asterisk):

- *Marsdenia viridiflora* subsp*. viridiflora*
- *Wahlenbergia multicaulis*
- *Wilsonia backhousei*
- *Hibbertia fumana*
- *Hibbertia puberula*
- *Hibbertia sp. Bankstown**
- *Epacris purpurascens var. purpurascens*
- *Leucopogon exolasius**
- *Pultenaea parviflora**
- *Pultenaea pedunculata*
- *Acacia bynoeana**
- *Acacia pubescens**
- *Callistemon linearifolius*
- *Eucalyptus nicholii**
- *Rhodamnia rubescens*
- *Syzygium paniculatum**
- *Grevillea parviflora* subsp*. parviflora**
- *Persoonia nutans**
- *Pomaderris prunifolia*
- *Pimelea spicata**

Targeted surveys were undertaken for these species though none were recorded. Specific effort was applied for *Hibbertia sp. Bankstown*, of which the entire world population is present approximately 330 metres to the east of the proposal area, though none were recorded.

Fauna

Thirty eight threatened species were returned by the BioNet search as having been recorded previously within the vicinity of the proposal area. Of these, four have records within the immediate area (around two kilometre radius) (Figure 5). Species also listed as threatened under the EPBC Act are denoted by an asterisk:

- Grey-headed Flying Fox (*Pteropus poliocephalus*)*
- White-bellied sea eagle (*Haliaeetus leucogaster*)
- Dusky Woodswallow (*Artamus cyanopterus*)
- Little lorikeet (*Glossopsitta pusilla*)

No threatened fauna species were recorded in the study area during the site inspection, though suitable potential habitat for all of the above species was present.

Tests of significance have been prepared for these species (Appendix B and C).

3.6 Areas of Outstanding Biodiversity Value

None of the land in or around the proposal area is listed as an Area of Outstanding Biodiversity Value for any species.

3.7 Wildlife connectivity corridors

The proposal is in an area largely surrounded by urban development and the Georges River. Wildlife habitat connectivity within these urban areas highly is fragmented, with substantial areas of land that is completely, or nearly completely, absent of remnant vegetation (such as the airport). Patches of better quality native vegetation are still present on some lands in the region, with the reminder of native vegetation stands generally limited to waterways and other public land.

Connectivity along the river is generally good, despite the narrow nature of the undeveloped/vegetated riparian area.

In the immediate vicinity of the proposal area, wildlife connectivity is largely facilitated by landscaping vegetation and some remnant canopy species. This includes several large *Eucalyptus* and *Angophora* species within and adjacent to the HLD road reserve. The golf course to the east is generally cleared of vegetation, with a variety of large remnant trees (particularly *E. baueriana*) present between fairways.

Vegetation on the opposite bank of the Georges River was not inspected though appears to be largely contiguous up to the perimeter of the industrial area to the west.

3.8 Priority weeds

Priority weeds are plants classified under the *Biosecurity Act 2015* as presenting a biosecurity risk to the State or a particular region. Of those listed for the Georges River LGA, the following have been previously recorded within the proposal area:

- African olive (*Olea europaea* subsp. *cuspidata*) - the plant or parts of the plant are not to be traded, carried, grown or released into the environment
- Bridal veil creeper (*Asparagus declinatus*) - must not be imported into the State or sold
- Green cestrum (*Cestrum parqui*) - plant should not be bought, sold, grown, carried or released into the environment.
- Ground asparagus (*Asparagus aethiopicus*) - must not be imported into the State or sold

- Madeira vine (*Anredera cordifolia*) - must not be imported into the State or sold.

3.9 EPBC Matters of National Environmental Significance

The PMST identified the following TECs as potentially occurring within the proposal area:

- Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion - Endangered
- Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community - Endangered
- Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion - Critically Endangered
- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest - Critically Endangered
- Shale Sandstone Transition Forest of the Sydney Basin Bioregion - Critically Endangered
- Subtropical and Temperate Coastal Saltmarsh - Vulnerable
- Turpentine-Ironbark Forest of the Sydney Basin Bioregion - Critically Endangered
- Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion - Endangered
- Western Sydney Dry Rainforest and Moist Woodland on Shale - Critically Endangered.

Observations made during surveys carried out for the project indicated the potential presence of Coastal Swamp Oak Forest, as well as River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (not returned by the PMST search).

No threatened or migratory species listed under the EPBC Act were recorded during the surveys. Some threatened and/or migratory species may utilise habitat within the study area for foraging or movement on occasion, however, it is noted that the quality of habitat in the broader locality is generally low.

4.0 Potential impacts

Potential impacts associated with the proposal have been assessed on the basis of both direct and indirect effects, and the resulting change to the biophysical and ecological processes that establish and support the biodiversity values of the proposal area. For this proposal, these potential direct and indirect impacts are a result of changes to the biophysical environment that ultimately result in changes to biodiversity, i.e. vegetation, landform and soils.

The potential impacts identified in this chapter consider:

- Direct and indirect impacts to biodiversity
- The scale (local and regional), timing, frequency and duration of activities that may result in impacts during construction and operational phases of the proposal
- The significance of the impact, including reasoning from the assessments of significance
- Other anthropogenic activities that influence cumulative impacts to biodiversity in the area.

4.1 Vegetation removal

Construction of the proposal would require the removal of a range of vegetation within the proposal area. Based on field surveys, the majority of this vegetation is generally comprised of remanent canopy trees, planted midstorey and exotic groundlayer vegetation within private properties and public open space, with some naturally propagated species. Within this, the affected vegetation varies considerably from environmental weeds through to large remnant trees and riparian fringe vegetation, including juvenile regenerating mangroves.

The total area of all vegetation to be removed for the construction of the proposal has been estimated conservatively as approximately 1.2 ha, including 0.49 ha of TEC vegetation. This vegetation includes species throughout the study area, ranging from juvenile through to mature, and native and exotic in origin. It is noted that this represents a worst-case scenario, and that some of these areas will not ultimately require removal. In particular, the design would seek to retain large mature trees where possible, with a preference for native species over exotics.

The removal of this planted landscaping vegetation would comprise a minor ecological impact based on the small degree of overall coverage and the abundance of similar vegetation in the surrounding area.

4.2 Terrestrial fauna and habitat

As outlined previously, the proposal would involve the loss of mature and juvenile vegetation, primarily comprised of remnant native vegetation and exotic (weed) species. In general, this vegetation lacks a clear groundcover-midstorey-canopy structure, though some elements of this structure are present in places. For example, both the managed area alongside the Georges River contains a reasonable coverage of mature canopy vegetation, with some midstorey in areas that are not actively managed (mowed). Groundcovers in these areas are however generally absent or limited to exotic species.

Whilst many species may typically occupy only one or two strata, most will rely on resources provided by other levels, such as the provision of prey. The absence of one or more of these levels can disrupt ecological relationships and distort species compositions. In disturbed environments, such as urban areas, this typically leads to a reduction in diversity and a skewing towards a narrow list of highly adaptable or aggressive species. This holds true in most Australian urban areas, where species such as noisy miners, Australian magpies and brush-tailed possums are common, and whole categories, such as small insectivorous birds, ground-dwelling native mammals or diurnally-active raptors are rare.

The proposal area is a typical example of an ecologically impoverished urban environment. Areas of fauna habitat, mostly within residential gardens and public parks, contain large swathes of non-native vegetation or other native vegetation not naturally occurring in the Sydney basin. Whilst there is a greater proportion of flowering plants in these areas, the nature of the vegetation assemblage results in a poor replacement for the habitat provided by native vegetation prior to urbanisation.

As outlined above, this scenario favours a selection of urban-adapted species (e.g. noisy miner, Australian magpie, brush-tailed possum). The removal of this vegetation for the construction of the proposal would result in a loss of some habitat, though it is noted that there is abundant similar habitat throughout Sydney and therefore the overall impact on these species would be negligible.

Despite this, effort should be made to conserve areas of greater vegetation and fauna habitat value wherever possible. In particular mature *E. baueriana, E. tereticornis* and *A. floribunda* individuals should be retained wherever possible. *E. baueriana* individuals within the proposal area were observed to have the greatest propensity for hollows and therefore habitat value.

In addition to the loss of habitat, construction of the proposal would also result in the potential for some resident native fauna to temporarily avoid areas within and directly adjacent to the proposal area due to the presence of people, vehicles, noise and light. Given the heavy traffic volumes currently present on Henry Lawson Drive, however, the potential for additional disruption to native species due to construction activities would be minimal. Despite this, measures should be implemented to reduce the potential for adversely impacts upon native fauna. These measures are outlined in Section 5.0.

The use of machinery and other equipment during construction can increase the risk of accidental spills of fuels, lubricants or other substances which can affect the health of terrestrial and aquatic ecosystems. Construction machinery and vehicles can also disperse weeds throughout the proposal area and can transport aquatic weeds if used in wet areas prior to entering the site. These impacts can be managed through the implementation of sufficient safeguards and are therefore considered to be minor.

Provided that management measures outlined in Section 5.0 are adequately implemented, it is considered the proposal would not result in a significant impact on terrestrial or aquatic fauna or habitats.

4.3 Threatened species and ecological communities

No threatened species were recorded during the site visit. The general locality is likely to support a number threatened species, including Grey-headed flying fox and threatened microbats.

A number of threatened coastal, estuarine and woodland birds were returned by the Bionet search of this area. Given the nature of the proposal area and the river in this locality, being largely fringed by mangroves and Casuarinas, it is unlikely that these coastal birds are likely to utilise the area to any substantial degree. There is the potential for Eastern Osprey or White-bellied Sea Eagle to forage in this area, though the specific foraging habitat of these species (the waterway) would not be affected by the proposal.

The loss of mature canopy trees as part of the proposal would result in a direct loss of habitat for any woodland birds that may inhabit the area. This impact is not expected to be significant however given the highly urbanised nature of the area and the low likelihood of these woodland birds occurring within the proposal area (see Appendix B).

Database searches indicated the potential for eight species of threatened microbats to occur within the search area. Of these, four are cave-dwelling bats that are unlikely to be directly affected by the proposal. There is the potential that some tree-dwelling microbats would utilise mature trees within the proposal area for roosting.

It is noted that the design would be prepared in such a way so as to minimise the need for such tree removal, though some individuals would inevitably require removal. In such cases it is recommended that RMS biodiversity guidelines for tree removal are applied, including an inspection of all affected tree hollows by an ecologist prior to felling.

Whilst neither of the above species were recorded within the proposal area during the surveys carried out for the project there is the potential that they may make use of the habitat resources present. As such Tests of Significance (ToS) have been prepared in accordance with the s7.3 of the BC Act (see Appendix B). These ToS concluded the proposal would not have a significant impact on these species as the proposal is unlikely to place a local occurrence of either of these species at risk of extinction.

The proposal would affect two patches mapped as River Flat Eucalypt Forest. Site inspection confirmed the condition of both of these patches as being poor, being reduced to one or two diagnostic

canopy species only. A ToS was prepared for this ecological community, which indicated that the proposal would not result in a significant impact. Despite this it is recommended that the proposal seek to compensate for the loss of these mature trees through an offset planting program. It is recommended that *E. baueriana* is specifically planted in an area close to the proposal.

Providing mitigation measures are adequately implemented the proposal is not considered likely to result in a significant impact on threatened species or ecological communities.

4.4 Wildlife connectivity and habitat fragmentation

The proposal would potentially result in the clearing of approximately 0.49 ha of mainly exotic landscaping vegetation. The majority of vegetation affected by the proposal would be within the road reserve of Henry Lawson Drive.

Whilst vegetation present in the road corridor (native and exotic) may facilitate some degree of local habitat connectivity, this is likely to be mostly to the benefit of urban-adapted species. These species are typically highly mobile and adaptable and as such the removal of vegetation within the proposal area (up to 40 metres either side of the road) is not likely to substantially disrupt their movement.

On this basis and considering the extensive coverage of contiguous vegetation along the Georges River adjacent to the proposal, the loss of this vegetation is not likely to significantly fragment habitat or disrupt wildlife connectivity.

The proposal presents an opportunity to improve that degree of habitat connectivity in this area through rehabilitation of the road reserve once construction is completed. This would also act to mitigate any minor adverse connectivity impacts to native fauna in the long term. It is recommended that nearby open space is adequately revegetated using appropriate local native plants post-construction, with weed management focusing on suppression of the environmental weeds outlined in section 3.8.

Overall, the proposal would result in minimal ecological impact in terms of wildlife connectivity and habitat fragmentation.

4.5 Injury and mortality

During construction the proposal would involve the movement of plant and machinery. Although the existing road already poses a threat to native fauna through vehicle strike, it is likely that the risk would be elevated during construction, particularly during vegetation clearing when fauna utilising habitat features within vegetation, such as flaking bark, would be displaced. This would be somewhat mitigated by the generally slow speed of construction vehicles and machinery and roadwork speed limits placed on general traffic.

Given the generally low value of native fauna habitat in the proposal area, the highly urban-adapted suite of species likely to be present, and standard safeguards to be implemented, the potential for injury and mortality is considered minimal.

During operation, the upgraded Henry Lawson Drive would facilitate greater average traffic speeds compared to the current roadway on the basis that there would be an additional southbound lane on the eastern side of Henry Lawson Drive in this location. This has the potential to increase vehicle strike of fauna, however due to the generally poor habitat present in this heavily urbanised area, the incidence of native fauna crossing the road is likely to be low. Overall potential injury and mortality impacts are not expected to be significant.

4.6 Spread of weeds

The movement of vehicles and personnel into and throughout the proposal area has the potential to facilitate the spread of weeds. This is of a particular risk on this project due to the high incidence of environmental weeds within the proposal area. It will be particularly important during vegetation clearing to have contractors apply suitable protocols to ensure the separation of weed and native species and to prevent the potential spread of weeds further afield during disposal.

Providing appropriate weed management measures are implemented, the overall weed impact associated with the construction phase of this proposal is considered to be minimal.

The operation of the proposal would not present any ongoing risk in relation to the spread of weeds.

4.7 Pests and pathogens

The proposal area is likely to be utilised by a range of vertebrate pest species. Impacts from pest species are likely to include ongoing grazing and predation on small to medium native fauna. The proposal is unlikely to alter the occurrence of pest species in and around the site, either positively or negatively, due to the localised nature of the works.

The potential for the project to introduce pathogens may be managed through the application of relevant safeguards. As such the overall impact of pests and pathogens is considered to be neutral with respect to the existing situation.

4.8 Aquatic impacts

The proposal area is located adjacent to the Georges River, being separated from the waterway by an existing public reserve and Sydney Water sewer pump station. Proposal elements involving the river would be limited to the replacement of a headwall outlet to the west of the pump station, and minor increases in operational stormwater flows due to the increased area of hard surface associated with the upgraded road. This headwall would connect to the existing road drainage system (which would be upgraded as part of the proposal) via underground pipe.

To consider the consequences of the proposal's aquatic impacts NSW DPI's *Policy and guidelines for fish habitat conservation and management* (the fish habitat guideline) was consulted. This document outlines the general approach to assessing impacts to fish habitat arising from development.

Based on a review of the waterway habitat type, the Georges River is considered to be 'Type 1 - highly sensitive' habitat as well as 'Class 1 – major key fish habitat' (Table 4).

Table 4 Habitat and waterway classification – Georges River

Characteristic	Classification	Reasoning
Habitat sensitivity	TYPE 1 - Highly sensitive	Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in two dimensions, snags greater than 300 mm in diameter or 3 metres in length, or native aquatic plants
Waterway classification	CLASS 1 - Major key fish habitat	Marine or estuarine waterway or permanently flowing or flooded freshwater waterway (e.g. river or major creek), habitat of a threatened or protected fish species or 'critical habitat'.

As per the requirements of the fish habitat guideline an aquatic habitat assessment has been undertaken (Table 5).

Table 5 Aquatic habitat assessment

Question	Response
What are the geomorphic characteristics of the waterway?	The Georges River through this location is approximately 85 m wide, lying at a shallow gradient below the surrounding land. The river through this area meanders, with large parts of the river subject to historic sand mining, now forming lakes.
Is it a gully, intermittent stream or major river? Does is it have deep pools or in-stream gravel beds? Is it a wetland? Does the watercourse	The Georges River in this location is a major river. It is meandering, with large lakes formed by historic sand mining. The gradient is shallow,

Question	Response
connect with other watercourses upstream or downstream? What is the slope/gradient?	consistent with the relatively flat surrounding topography. The river is still tidal at this point. The majority of the banks of the river in this location are mapped as 'coastal wetland' under *State Environmental Planning Policy (Coastal Management) 2018*.
Is it mapped as key fish habitat?	Yes
What is the flow regime of the watercourse (e.g. is it an intermittent or permanently flowing stream? What is the range of water velocity of the flow? What are the maximum and minimum or percentile flows (in megalitres/day) for the watercourse?)	The river flows permanently. Water velocity is likely to significantly vary on a seasonal basis. During the site inspection it was observed to flow at approximately 1 metre per second. The total daily flow is not known.
What are the local wave and current regimes (in tidal areas)?	The river is tidal in this location.
Describe the water quality (e.g. discolouration, sedimentation, turbidity, pH, dissolved oxygen, nutrients)	The water was observed to be a dark tea colour during the inspection. Quantitative water quality data was not available.
What types of surrounding land use are present (e.g. agricultural, urban, aquaculture)?	Surrounding land uses are predominately urban, with isolated patches of remnant vegetation in parks and conservation reserves.
What is the condition of riparian vegetation (i.e. present or absent. Are the species native or exotic? Is the density of vegetation thick or sparse?)	In this stretch riparian vegetation consists mainly of Grey mangrove and *Casuarina glauca* along the very fringe of the water. Back from this is a linear park that runs for several kilometres. Vegetation on the opposite bank is similar, though is more extensive due the much lower density of urban development along the river. Vegetation along the riparian zone of the river is dominated by *E. baueriana, E. tereticornis* and *C. glauca*.
What is the condition of freshwater aquatic vegetation (i.e. present or absent. Are the species native or exotic? Is the density thick or sparse? Is it continuous or sparse in coverage? What is the aerial extent of major vegetation types? Is the vegetation healthy or degraded?)	It was not possible to inspect the nature of underwater freshwater vegetation during the site visit. No substantial vegetation was observed on the surface. It is expected that the river supports a degree of aquatic vegetation.
What is the condition of marine vegetation (i.e. information on type, species, shoot density and/or percentage cover, Is the vegetation continuous or sparse in coverage? What is the aerial extent? Is the vegetation healthy or degraded? Is wrack (dead seagrass or macroalgae) present?)	The site is not a marine location. No marine vegetation such as seagrass or seaweed was observed.
Are there wetlands nearby (including freshwater wetlands and saltmarsh) (i.e. are the wetlands protected under any legislation (e.g. SEPP 14 coastal wetlands, Ramsar wetlands)?, Are the wetlands in a healthy or degraded condition?)	No traditional wetlands were observed in the immediate vicinity of the subject stretch of river, with the waterway generally adjoining banks that are largely steep and dry. It is likely that large areas of the land adjacent to the river was

Question	Response
	historically wetland, though this has long been drained and filled for urban development. It should be noted that the majority of the banks of the river in this location are mapped as 'coastal wetland' under *State Environmental Planning Policy (Coastal Management) 2018*.
What is the substrate type (e.g. rock, sand, gravel, silt, coral reef)?	Whilst underwater survey was not undertaken the substrate is expected to be highly muddy and silty.
Are there refuge areas present (e.g. adjacent wetlands, upstream pools)?	No large refuge areas are present in this stretch of river, though vegetation such as mangroves and fallen Casuarina logs are likely to create small areas of refuge for aquatic species.
Are there spawning areas present (e.g. gravel beds, snags, reed beds, saltmarshes)?	The presence of spawning areas is unknown.
Are there natural or artificial barriers to fish passage upstream and downstream (e.g. waterfalls, cascades, weirs, dams, floodgates, road crossings)?	There are no apparent obstructions to fish passage in the general vicinity based on the localised site inspection. It is known that a weir is present at Liverpool, approximately 6.7 km upstream.
What types of migratory fish or other aquatic species likely to inhabit the areas (based on known distribution range within the scientific literature)?	The river is likely to host some degree of migratory aquatic species such as eels.
What is the timing of construction in relation to any fish migration seasons?	Construction will take place in 2021.
What is the timing of construction in relation to flow conditions relative to expected wet seasons?	Construction will take place in 2021.
Are there any listed threatened or protected aquatic species or 'critical habitat' under the FM Act and EPBC Act present?	A protected matters search and a search of NSW DPI fish distribution mapping was undertaken. This did not identify the Georges River as habitat for any threatened aquatic species.

Construction of the proposal would involve replacing the existing stormwater outlet headwall towards the southwest of the proposal area. This would include the temporary removal of up to 3 metres of the existing revetment (comprised of sandstone wall) to the north and south of the headwall. As part of the replacement the existing apron in front of the headwall would also be removed and replaced. One metre of mangroves either side of the existing headwall would require removal as part of this work.

Works would include the construction of a temporary coffer dam in front of the existing headwall to facilitate the replacement. The coffer dam would be constructed of sandbags or a similar inert material. Construction of the coffer dam would take place at low tide only, though once constructed headwall replacement works would occur across the full tidal cycles. Sheet piles would not be used for the coffer dam wall though timber formwork may be used to strengthen the wall. A silt curtain would be used during construction and decommissioning of the coffer dam to reduce the potential for sediment to enter the broader river environment.

Once the coffer dam is in place, water would be pumped out using a pump located on the bank, with water being transferred directly back into the river. A small scaffold or similar temporary structure would be placed inside the coffer dam to provide foot access for workers.

The existing apron and headwall would be broken up with a jack hammer and removed for disposal off site. The new headwall would be craned into place and secured. Concrete for the new apron would then be poured in situ.

Upon completion all construction elements, the temporary coffer dam would be removed and the existing sandstone block revetment replaced.

. The construction footprint for the headwall, including access, would be managed so as to avoid encroachment into areas mapped as 'coastal wetland' under *State Environmental Planning Policy (Coastal Management) 2018*.

The replacement of the existing stormwater outlet headwall would result in the following localised impacts:

- The direct loss of riparian and aquatic vegetation, habitat and habitat complexity in the immediate area of the headwall reconstruction (likely to be less than 40 m^2). This impact would occur during construction and would involve impacts to a stretch of Grey mangroves that appear to be regenerating from previous disturbance, possibly relating to the installation of the sandstone bloc revetment (which is likely to have been installed to facilitate the sewer pump station). A small patch (less than 2 m^2) of *Phragmites australis* and some small *Casuarina glauca* saplings would also be affected.
- Increased sediment loads within the waterway (to be managed by silt curtain). This impact would be only be prevalent during the establishment and decommissioning of the temporary coffer dam, with all other activities occurring within the dry environment of the coffer dam. This impact would be managed through the use of a silt curtain, which would remain in place throughout construction.
- Potential for spills entering the waterway during construction. The construction activities in and around the headwall would be generally limited in their use of materials that may cause harm if spilled. The construction itself is mostly comprised of concrete components, with sand bags, timber formwork and steel stair/scaffolding structures comprising the remainder. The water pump would be powered by petrol or diesel, though would be placed as far back from the waterway as possible to limit the potential for spills entering the waterway during refuelling. A spill kit will be available at all times.
- Temporary blockage of fish passage by the presence of the coffer dam. The presence of the coffer dam would inevitably occupy this section of riverbank for the duration of the works. Noting the river in this location is approximately 85 m wide, most pelagic and benthic species would not be affected. Species that use the intertidal and mudflats would be directly affected, though only for the small proportion of the bank occupied by the works. As outlined above, this is likely to be less than 40 m^2. Noting the currently regenerating nature of the mangroves in this area, habitat quality is not considered to be as high as adjacent areas of mature mangroves, hence reducing the relative impact.

The above construction impacts would result in localised and minor impacts to aquatic ecosystems in this location. While the waterway is considered key fish habitat, it is not identified as habitat for threatened fish species.

During operation the widened road has the potential to result in contaminated runoff into this waterway. This may occur as a result of accidental spills, or through normal road runoff, typically containing high amounts of sediment and heavy metals. As this risk exists during the existing operation of the roadway, this ongoing runoff should be managed through the application of standard safeguards to protect downstream water quality.

Overall, the proposal would result in a negligible impact upon aquatic habitats present in and downstream of the area.

Consultation with DPI Fisheries will be required in relation to a Part 7 permit under the Fisheries Management Act 1994. DPI Fisheries will advise the scope of the permit with respect to impacts relating to section 199, section 205 and section 219 of the Act.

4.9 Cumulative impacts

The proposal would form part of an ongoing program of works that would see Henry Lawson Drive through this area fully upgraded to two lanes in each direction through to Milperra Road. In addition to this, it is noted that Bankstown Airport are currently developing parts of their property for industrial warehousing and manufacturing. This includes the upgrade of the intersection of Tower Road and Henry Lawson Drive, approximately 1.2 km south of the proposal.

The road reserve of Henry Lawson Drive as it extends south of the proposal is generally well vegetated. The species present, being generally *E. tereticornis, E. baueriana* and *C. glauca*, are all typical of River Flat Eucalypt Forest and/or Swamp Oak Floodplain Forest. Noting the highly cleared nature of the land to the east of the road, there is the potential that when considered together, the loss of this vegetation may comprise a significant impact. Noting that there is no immediate program for the duplication of this road between the proposal and Tower Road, and that the vast majority of the cumulative impact to this vegetation would come from the duplication project (rather than from the subject proposal or the Tower Road proposal alone) the potential for cumulative impact is would be further assessed as part of the environmental assessment for the duplication project.

4.10 Key threatening processes

4.10.1 BC Act

The following key threatening processes listed under the BC Act are considered relevant to the proposal:

- *Clearing of native vegetation*

The proposal would result in the clearing of native vegetation to facilitate the widening of the road and drainage upgrades. The vegetation in this area ranges in quality from very low to moderate. Substantial parts of the proposal area are highly modified and/or are weed dominated, having been previously cleared for residential or other urban development.

- *Invasion of native plant communities by exotic perennial grasses*

Exotic perennial grasses and other environmental weeds exist within the study area and can benefit from disturbance to natural vegetation. Weed management during and post construction would help prevent these species from spreading within or between areas.

- *Invasion and establishment of exotic vines and scramblers*
- *Invasion of native plant communities by African Olive (Olea europaea* subsp. *cuspidata)*

The proposal has the potential to aid the spread of weeds into and out of the proposal area, mostly through the movement of people, plant and equipment, as well as through runoff from the area during construction and operation. As noted during the assessment the site is already infested with exotic vines (balloon vine and moth vine) and African Olive. This KTP would be managed through the implementation of a weed management plan and other relevant measures such as control of sediment and erosion.

4.10.2 EPBC Act

Relevant key threatening processes listed under the EPBC Act are:

- *Land clearance*
- *Novel biota and their impact on biodiversity.*

The impact of clearing of vegetation is outlined within this assessment. The scale of the proposed clearing is considered minor, and further opportunities would be investigated during subsequent stages of design development prior to construction to reduce this impact further.

The proposal has the potential to aid the spread of novel biota (weeds and pests) through the movement of people, plant and equipment, as well as through runoff from the area during construction and operation. This KTP would be managed through the implementation of a weed management plan and other relevant measures such as control of sediment and erosion.

5.0 Management measures

5.1 Avoidance and minimisation

Priority must always be given to the implementation of measures following the management hierarchy. That is:

1. **Avoid:**

- The proposal would be constructed in an existing urban area
- The proposal has been designed to avoid direct removal of large trees where possible
- The proposal has been designed to avoid nearby areas mapped as coastal wetlands
- All ancillary facilities are proposed to be located within areas already cleared of vegetation.

2. **Minimise:**

- The width of the widening has been reduced as far as possible to minimise its footprint and hence reduce the amount of vegetation removal required
- The road widening for the additional southbound lane utilises the existing road shoulder next to existing trafficable lanes on Henry Lawson Drive
- The headwall replacement would generally occur within the same footprint as the existing headwall structure
- The duration of construction and the physical extent of facilities required to support construction would both be reduced as far as practical as part of detailed design and pre-construction activities.

3. **Mitigate:**

- A comprehensive suite of mitigation measures is proposed for the proposal (Table 6).

4. **Offset:**

- Offset measures have not been proposed as part of the proposal.

5.2 Mitigation measures

Within the context of ongoing use of the proposal area as an active road, and to the extent that is safe and practicable, the following management measures described in Table 6 should be implemented to protect and enhance existing ecological assets and values.

The management measures provided are broadly listed in order of priority for managing ecological values.

Table 6 Proposed mitigation measures

Impact	Ref	Management measure
Vegetation removal	A1	All vegetation removal would be limited to the minimum extent necessary to construct the proposal.
	A2	Prior to the commencement of any works, a physical clearing boundary is to be demarcated and implemented in accordance with the vegetation management plan prepared for construction. The demarcation of the exclusion zone will be in accordance with Roads and Maritime's *Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects: Guide 2: exclusion zones* (RMS 2011).
	A3	As mature trees with a DBH >40 cm diameter are proposed to be cleared, an ecologist must be onsite to undertake a pre-clearance survey to inspect for fauna prior to and whilst the tree/s are being removed (see *Guide 1 Pre-clearing Process* and *Guide 4 Clearing of*

Impact	Ref	Management measure
		vegetation and removal of bushrock of Roads and Maritime *Biodiversity Guidelines*).
Protection of native flora	B1	If unexpected threatened flora species are discovered, stop works immediately in that location and follow the Roads and Maritime Services *Unexpected Threatened Species Find Procedure in the Roads and Maritime Services Biodiversity Guidelines 2011 – Guide 1 (Pre-clearing process).*
Protection of fauna and habitat	C1	Upon opening of the widened road, surrounding land should be rehabilitated. This should include landscaping as appropriate, particularly within the adjacent public reserve and Coleman Park in consultation with Council. This should be supported by a weeding program to maximise the success of the rehabilitation works.
	C2	If unexpected threatened fauna species are discovered, stop works immediately in that location and follow the Roads and Maritime Services *Unexpected Threatened Species Find Procedure in the Roads and Maritime Services Biodiversity Guidelines 2011 – Guide 1 (Pre-clearing process).*
	C3	WIRES should be consulted if any injured fauna are encountered.
	C4	If it is perceived by any site-based or other Transport staff that significant impacts are occurring to aquatic environments within the vicinity of the work area as a result of the project (e.g. spill of any chemicals), works at that location should cease and Transport environment branch contacted for further advice.
	C5	To minimise the risk of injury or mortality to fauna and their young, the following measures are recommended: • All clearing is to follow the RMS biodiversity guidelines with respect to the pre-clearing process, including the capture and relocation (by licenced wildlife carers or ecologists) of fauna that have the potential to be disturbed as a result of clearing activities • Vegetation removal is to be undertaken as per guide 4 of the RMS biodiversity guidelines, including the implementation of staged clearing.
	C6	A silt curtain should be installed during the reconstruction of the headwall to limit the potential for sedimentation impacts in the broader waterway.
	C7	The headwall replacement works shall avoid identified wetland areas..
	C8	The temporary coffer dam shall be designed to minimise the overall footprint and associated vegetation removal.
	C9	A spill kit shall be available at all times while work is being undertaken within and around the riverbank, including during all works within the temporary coffer dam.
	C10	The area around the headwall works area shall be reinstated upon completion, including the replacement of sandstone blocks.
	C11	The area shall be rehabilitated and/or revegetated in accordance with any conditions of the permit issued by DPI Fisheries.
Weeds and disease	D1	Control the movement of vehicles, machinery and human traffic to minimise the potential for spread of weeds within and outside the

Impact	Ref	Management measure
		proposal area. This may include the designation of no-go areas by fencing or other means.
	D2	During construction, all vehicles and footwear would be inspected and, if necessary, cleaned before entering and exiting vegetated parts of the proposal area to minimise spread of weeds and disease.
	D3	A weed management plan would be implemented with appropriate hygiene protocols to reduce the likelihood of new weed or disease infestations within the proposal area.
Offsite impacts	E1	Reduce the potential for off-site impacts to biodiversity values arising from sedimentation, dust, and noise through the implementation of a Construction Environment Management Plan (CEMP). The CEMP should seek to retain any mature native vegetation present within and around the proposal area wherever possible. The CEMP should include erosion and sediment controls in accordance with *Managing urban stormwater: soils and construction* (the Blue Book) to minimise potential impacts to downstream environments.
Waste	F1	All waste material and rubbish associated with the proposal, particularly chemicals, is to be removed from site and disposed of at an appropriately licensed facility.
Revegetation of land	G1	Ensure the adequate revegetation of areas where vegetation removal is required. Offsetting should be undertaken in accordance with Transport's *Vegetation Offset Guide 9TP-SD-087*. This requires the following: • Large tree (DBH >60 cm): Plant 8 trees for each tree removed • Medium tree (DBH >15 but <60 cm): Plant 4 trees for each tree removed • Small young tree (DBH <15 cm): Plant 2 trees for each tree removed All revegetation must incorporate appropriate local native plants (preferably *E. baueriana* and *E. tereticornis*) and have strict weed management practices in place to maximise the potential for long terms success.

6.0 Conclusion

6.1 Overview of key findings

The proposal would lead to the loss of up to 1.2 ha of native and exotic vegetation, including 0.49 ha of TEC vegetation, contained in the road reserve, parks and public open space. This vegetation includes areas mapped as Riverflat Eucalypt Forest threatened ecological community, however upon inspection these areas were deemed not to meet the relevant condition threshold. Despite this tests of significance were undertaken which demonstrated that the proposal would not result in a significant impact.

A large proportion of the banks the Georges River as it passes this location is mapped as 'coastal wetland' under *State Environmental Planning Policy (Coastal Management) 2018*. The proposal would however be conducted on land outside of these mapped areas, with relevant safeguards being implemented to avoid offsite impacts on these areas.

No threatened flora or fauna species were identified within the proposal area, though it is noted that the proposal area has the potential to provide foraging habitat for threatened microbats. A test of significance was prepared for both the BC Act and EPBC Act indicated that there would be no significant impact on these species.

Consultation with DPI Fisheries will be required to determine the need for a Part 7 permit under the *Fisheries Management Act 1994*. This would potentially be required for dredging and reclamation, harm to marine vegetation, and blockage of fish passage.

Based on the limited physical extent of the proposal and with the implementation of the recommended management measures, the overall impacts of the proposal upon threatened and non-threatened biodiversity is be considered to be low.

7.0 References

Bureau of Meteorology, 2020. Atlas of Groundwater Dependent Ecosystems. http://www.bom.gov.au/water/groundwater/gde/map.shtml

NSW Office of Environment and Heritage, 2018. *The Native Vegetation of the Sydney Metropolitan Area - Version 3.1 VIS ID 4489*

NSW DPIE, 2020a, BioNet database

NSW DPIE, 2020b, Vegetation Types Database and Threatened Species Profile Database

Department of Agriculture, Water and Environment (DAWE), 2020, Protected Matters Search Tool

Department of the Environment, 2013. Matters of National Environmental Significance: Significant impact guidelines 1.1

NSW Department of Primary Industries - Fisheries, 2020a. Profiles for species, populations and ecological communities NSW Department of Primary Industries 2020b. WeedWise Priority Weeds List

NSW Department of Primary Industries – Fisheries 2020c. Database for aquatic TECs

Royal Botanic Gardens and Domain Trust 2020. NSW Flora Online Search – Rare or Threatened Australian Plants

NSW Department of Environment and Conservation, 2004, Threatened Species Survey and Assessment: Guidelines for Developments and Activities (working draft)

Roads and Maritime Services, 2011. Biodiversity Guidelines.

Appendix A

Flora and fauna with the potential to occur within the study area

Appendix A Flora and fauna with the potential to occur within the study area

NOTE: The list of threatened species, populations, or ecological communities which may be affected directly or indirectly by the proposal is derived from searches of the following databases as well as on ground survey conducted:

1. NSW Office of Environment and Heritage Atlas of NSW Wildlife Database (OEH 2020)
2. NSW Office of Environment and Heritage Endangered Ecological Community and Threatened Species Profiles (OEH 2020)
3. NSW Flora Online Search – Rare or Threatened Australian Plants (ROTAP) species (The Royal Botanic Gardens and Domain Trust 2020)
4. NSW Department of Primary Industries: Fishing and Aquaculture – Profiles for species, populations and ecological communities (NSW Government 2005)
5. Protected Matters Report documenting all Matters of National Environmental Significance within 10 km of site (Commonwealth Department of the Environment 2020).

V = Vulnerable, **E** = Endangered, **CE** = Critically Endangered

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Amphibians					
Litoria aurea	Green and Golden Bell Frog	E	V	Large populations in NSW are located around coastal and near coastal areas of the metropolitan areas of Sydney, Shoalhaven and mid north coast. It inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.*) or spikerushes (*Eleocharis spp.*)	Low
Birds					
Hirundapus caudacutus	White-throated Needletail		M	Aerial space over a variety of habitat types, but prefers to forage over treed habitats as these would provide a greater abundance of insect prey; often forage on the edge of low pressure systems and may follow these systems; breeds in Asia.	Low
Ephippiorhynchus asiaticus	Black-necked Stork	E		Restricted to coastal and near-coastal habitat. Inhabits wetlands, floodplains and deeper permanent water bodies. Occurs in shallow, permanent freshwater terrestrial wetlands and surrounding marginal vegetation. Nest in tall, live isolated paddock trees near freshwater swamps and construct large nesting platform.	Low
Botaurus poiciloptilus	Australasian Bittern	E	E	Inhabits temperate freshwater wetlands and occasionally estuarine reedbeds, with a preference for permanent waterbodies with tall dense vegetation. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds. Freshwater is generally preferred, although dense saltmarsh vegetation in estuaries and flooded grasslands are also used by the species.	Low
Ixobrychus flavicollis	Black Bittern	V		Occurs below 200 m above sea level and inhabit both terrestrial and estuarine wetlands, with a preference for permanent water bodies and dense vegetation. Roosts in trees or amongst dense reeds.	Low
Circus assimilis	Spotted Harrier	V		Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Low
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	M	Coastlines, estuaries, large rivers and lakes; occasionally over adjacent habitats; builds a large stick nest in a tall tree, rarely on artificial structures.	Medium
Hieraaetus morphnoides	Little Eagle	V		Occupies habitats rich in prey (birds, reptiles and mammals) within open eucalypt forest, woodland or open woodland. Requires tall living trees for building a large stick nest and preys on birds, reptiles and mammals and occasionally carrion.	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Lophoictinia isura	Square-tailed Kite	V		Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Low
Pandion cristatus	Eastern Osprey	V	M	Requires clear estuarine and inshore marine waters and coastal rivers for foraging, and nests in tall (usually dead or dead-topped) trees in coastal habitats from open woodland to open forest, within 1-2 km of water.	Low
Burhinus grallarius	Bush Stone-curlew	E		Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	Low
Actitis hypoleucos	Common Sandpiper		M	Utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves.	Low
Gallinago hardwickii	Latham's Snipe		M	Soft wet ground, shallow water with tussocks, inundated parts of paddocks, seepage below dams, saltmarsh and mangrove fringes.	Low
Hydroprogne caspia	Caspian Tern		M	Coastal waters, beaches, mudflats, large rivers, dams and lakes.	Low
Callocephalon fimbriatum	Gang-gang Cockatoo	V		Occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests in winter and open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas in summer.	Low
Glossopsitta pusilla	Little Lorikeet	V		Mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Nest in small hollows (entrance approx. 3 cm) of Eucalyptus spp. between 2 - 15 m above the ground.	Medium
Lathamus discolor	Swift Parrot	E	CE	In NSW mostly occurs on the coast and south west slopes, occurring in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*), and White Box (*E. albens*).	Low
Neophema pulchella	Turquoise Parrot	V		Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Ninox strenua	Powerful Owl	V		Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. They require large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. Powerful Owls nest in large tree hollows (at least 0.5m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	Low
Anthochaera phrygia	Regent Honeyeater	CE	CE	Inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. In NSW the distribution is very patchy and mainly confined to the two main breeding areas at Capertee Valley and the Bundarra-Barraba region and surrounding fragmented woodlands. Birds are also found in drier coastal woodlands and forests. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. These habitats have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Nectar and fruit from the mistletoes are also eaten during the breeding season.	Low
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.	Low
Daphoenositta chrysoptera	Varied Sittella	V		Inhabits most of mainland Australia except the treeless deserts and open grasslands. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses.	Medium
Petroica boodang	Scarlet Robin	V		In NSW it occupies open forests and woodlands from the coast to the inland slopes. Breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat.	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Petroica phoenicea	Flame Robin	V		Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains).	Low
Mammals					
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Utilises a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	Low
Phascolarctos cinereus	Koala	V	V	Inhabits a range of eucalypt forest and woodland communities. Adequate floristic diversity, availability of feed trees (primarily *Eucalyptus tereticornis* and *E. viminalis*) and presence of mature trees very important. Preferred food tree species vary within locality and there are quite distinct regional preferences. They are able to persist in fragmented habitats, and even survive in isolated trees across a predominantly agricultural landscape.	Low
Cercartetus nanus	Eastern Pygmy-possum	V		In New South Wales the species is found in coastal areas and at higher elevations. Inhabit shrubby vegetation in a wide variety of habitats, from open heathland or shrubland to sclerophyll or rain forest. Require flowering plants and shrubs for foraging and access to hollows/nesting vegetation.	Low
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy. They travel up to 50 km to forage, on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.	Medium
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		Inhabits eucalypt rainforest, sclerophyll forest and open woodland vegetation. Availability of tree hollows is important for access to roosting sites.	Low
Micronomus norfolkensis	Eastern Freetail-bat	V		Habitat preference includes dry eucalypt forest and coastal woodlands but also include riparian zones in rainforest and wet sclerophyll forest. Forages above forest canopy or forest edge and requires roosts including tree hollows.	Low
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Roosts in disused mine shafts, caves, overhangs and disused Fairy Martin nests for shelter and to raise young. Also potentially roost in tree hollows. Occurs in low to	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
				mid-elevation dry open forest and woodlands, preferably with extensive cliffs, caves or gullies. Pied Bat is largely restricted to the interface of sandstone escarpment (for roost habitat) and relatively fertile valleys (for foraging habitat).	
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		This species occupies tall, mature, wet forest and the species have been recorded roosting in stem holes in Eucalyptus and in buildings. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Low
Myotis macropus	Southern Myotis	V		This species generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage. They forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Low
Scoteanax rueppellii	Greater Broad-nosed Bat	V		Occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland. Large hollow bearing trees required for roosting.	Low
Miniopterus australis	Little Bentwing-bat	V		This species occurs in moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bent-wing Bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Low
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Caves are the primary roosting habitat, but also use derelict mines, stormwater tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Low
Gastropod					
Meridolum corneovirens	Cumberland Plain Land Snail	E		Primarily inhabits Cumberland Plain Woodland. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Can dig several centimetres into soil to escape drought.	Low
Flora					
Acacia bynoeana	Bynoe's Wattle	E	V	Occurs mainly in heath and dry sclerophyll forest, open woodland with dense to sparse heath understorey; open woodlands with a sparse shrub cover and a	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
				grass/sedge ground cover; and heathlands with sparse overstorey. With sand or sandy clay substrate, often with ironstone gravel and usually well drained, infertile soil.	
Acacia pubescens	Downy Wattle	V	V	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area.	Low
Callistemon linearifolius	Netted Bottle Brush	V		Inhabits dry sclerophyll forest on the coast and adjacent ranges.	Low
Epacris purpurascens var. purpurascens		V		Found in a range of habitat types, most of which have a strong shale soil influence.	Low
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	Occurs in grassy sclerophyll woodland in association with other eucalyptus species.	Low
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Hunter occurrences are usually 30-70m ASL, while the southern Sydney occurrences are typically at 200-300m ASL. Often occurs in open, slightly disturbed sites such as along tracks.	Low
Hibbertia fumana		CE		Species is known to occur in a long intergrade between Castlereagh Scribbly Gum Woodland and Castlereagh Ironbark Forest. Also recently found associated with aeolian sand deposits. Species has been found to occur in a variety of structural habitats including open areas, disturbed sites and also within thick ground cover dominated by a heavy cover of sedges, rushes and grasses. Has the potential to occur in similar intergrade alluvial habitats rich in sands and laterite in other parts of western Sydney.	Low
Hibbertia puberula		E		Flowering time is October to December, sometimes into January. Occurs on sandy soil often associated with sandstone, or on clay. Habitats are typically dry sclerophyll	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
				woodland communities, although heaths are also occupied. One of the recently (2012) described subspecies also favours upland swamps.	
Hibbertia sp. Bankstown		CE	CE	Currently known to occur in only one population at Bankstown Airport.	Low
Leucopogon exolasius	Woronora Beard-heath	V	V	Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park. The plant occurs in woodland on sandstone.	Low
Marsdenia viridiflora subsp. viridiflora	Native Pear	E2		Grows in vine thickets and open shale woodland.	Low
Persoonia nutans	Nodding Geebung	E	E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. The species has a disjunct distribution, with the majority of populations (and 99% of individuals) occurring in the north of the species range in the Agnes Banks, Londonderry, Castlereagh, Berkshire Park and Windsor Downs areas. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities. The southern and northern populations have distinct habitat differences.	Low
Pimelea spicata	Spiked Rice-flower	E	E	Occurs on an undulating topography on well-structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark.	Low
Pomaderris prunifolia	Plum-leaf Pomaderris	EP		At Rydalmere it occurs along a road reserve near a creek, among grass species on sandstone. At Rookwood Cemetery it occurs in a small gully of degraded Cooks River / Castlereagh Ironbark Forest on shale soils.	Low
Pultenaea parviflora		E	V	Endemic to the Cumberland Plain. Core distribution is from Windsor to Penrith and east to Dean Park. May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays.	Low
Pultenaea pedunculata	Matted Bush-pea	E		NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area. In the Cumberland Plain the species favours sites in clay or sandy-clay soils (Blacktown Soil Landscape) on	Low

Scientific name	Common name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
				Wianamatta Shale-derived soils, usually close to patches of Tertiary Alluvium (Liverpool area) or at or near the Shale-Sandstone interface (Appin). All sites have a lateritic influence with ironstone gravel (nodules) present. In the Liverpool - Fairfield area the majority of occurrences are in lower-lying areas and often close to creek lines. Soils are moderately to poorly drained. By contrast, the Appin sites are on a plateau above the Nepean River, on soils that are not usually poorly drained.	
Rhodamnia rubescens	Scrub Turpentine	CE		Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Low
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Grows in subtropical and littoral rainforest on sandy soils or stabilized dunes near the sea. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	Low
Wahlenbergia multicaulis	Tadgell's Bluebell	EP		There are 13 known sites, two of which are in northern Sydney (Thornleigh and Mt Ku-Ring-Gai) with the remainder in western Sydney (Rookwood, Chullora, Bass Hill, Bankstown, Georges Hall, Campsie, South Granville and Greenacre). In Western Sydney most sites are closely aligned with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone (laterite). However, the sites in Hornsby LGA are on the 'Hawkesbury' soil landscape. Found in disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. Typically occurs in damp, disturbed sites (with natural or human disturbance of various forms), typically amongst other herbs rather than in the open.	Low
Wilsonia backhousei	Narrow-leafed Wilsonia	V		This is a species of the margins of salt marshes and lakes.	Low

Appendix B

BC Act Tests of Significance

Appendix B Assessments of Significance

Under the *Biodiversity Conservation Act 2016*, the threatened species 'test of significance' is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is sometimes also referred to as the 'five-part test'. A five-part test was carried out for the purposes of this assessment on River Flat Eucalypt Forest, Grey-headed Flying-fox, Dusky Woodswallow, Little Lorikeet and White-bellied sea eagle.

***River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* – endangered**

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
N/A
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: **i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or** **ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**
i. Impacts associated with the proposal would be localised to the footprint of the development area. The subject site has a long history of disturbance associated with urban development activities and is unlikely to meet the condition criteria for this ecological community given the only diagnostic species present are *E. baueriana* and *E. tereticornis*. ii. The proposal would not alter the composition of the ecological community, only its extent. The proposal would not directly or intentionally introduce any species that is not native to this community. It is recognised that the proposal may provide disturbance that could be exploited by weeds, however suitable safeguards are proposed to minimise this potential.
c) in relation to the habitat of a threatened species or ecological community: **i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and** **ii. whether an area of habitat is likely to become fragmented or isolated from other areas as a result of the proposed development or activity, and** **iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**
i. The proposal would remove approximately 0.49 ha of vegetation directly associated with this community. ii. The proposal would affect vegetation in a strip adjacent to the existing HLD carriageway. The nature of this community beyond this strip, and in the area generally, is highly fragmented by historic urban development. The removal of this strip of vegetation would increase the distance between patches on opposite sides of the road, though not to the extent that normal ecological processes (such as pollen and seed transport) would be substantially comprised in the long term. iii. The habitat that would be affected by this proposal – low lying river flats adjacent to brackish and freshwater waterways – is subject to long term clearing threat from urban development throughout Sydney. Within the locality, the community is proportionately better represented than in the Sydney basin generally, with elements of this community present throughout the adjacent golf course and south along the eastern banks for the river. The western bank of the river contains several hectares of habitat for this community. On this basis, and noting the highly degraded nature of the habitat that would be affected adjacent to HLD, the subject site is not considered to be critical to the long term survival of this community in the locality.

d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either direct of indirectly)
The proposal would not affect any Area of Outstanding Biodiversity Value.
e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process
As outlined in section 4.10, the proposal may contribute to the following KTPs: • Clearing of native vegetation • Invasion of native plant communities by exotic perennial grasses • Invasion and establishment of exotic vines and scramblers Safeguards are proposed to control each of these KTPs. Provided these are adequately implemented the effect of these KTPs is not expected to be significant.
Conclusion
The area of this potential community proposed to be cleared is highly degraded, being severely infested with weeds to the point that no midstorey or groundcover vegetation typical of the community is present. However, assuming the area still constitutes this community the impact is still not considered to be significant on the basis of the small degree of clearing proposed, the continuing potential for connectivity and the (relative) abundance of this community and its habitat within the locality, providing proposed safeguards are implemented including suitable offset planting.

***Pteropus poliocephalus* (Grey-headed Flying-fox) – vulnerable**

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
The proposal would remove approximately 1.2 ha of vegetation including, 0.49 ha of TEC vegetation along Henry Lawson Drive. The nearest national important camp of Grey-headed flying-fox is located at Macquarie Fields, approximately 12 km to the southwest. Another camp which is not considered nationally important is located approximately 3.2 km to the northeast. Given the abundance of similar urban vegetation in the vicinity of the proposal area, including fruit and nectar-bearing trees, it is not considered likely that the proposal would result in an adverse effect on the life cycle of this species such that it is placed at risk of extinction.
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: **iii. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or** **iv. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**
iii. N/A iv. N/A
c) in relation to the habitat of a threatened species or ecological community: **iv. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and** **v. whether an area of habitat is likely to become fragmented or isolated from other areas as a result of the proposed development or activity, and** **vi. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**
iv. The proposal would remove approximately 1.2 ha of vegetation including, 0.49 ha of TEC vegetation, a small proportion of which would be considered viable habitat for this species. v. Given their high degree of mobility, the foraging range of this species is particularly large and their food sources are diverse. The proposal would only affect vegetation in a

strip adjacent to the existing road. As such this is highly unlikely to fragment or isolate any populations or individuals. vi. The vegetation to be removed – scattered mature Eucalypts and Angophoras – is represented well throughout the Sydney basin. The habitat to be removed is not considered any more important than other similar vegetation in the region.
d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either direct of indirectly)
The proposal would not affect any Area of Outstanding Biodiversity Value.
e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process
As outlined in section 4.10, the proposal may contribute to the following KTPs: • Clearing of native vegetation • Invasion of native plant communities by exotic perennial grasses • Invasion and establishment of exotic vines and scramblers Mitigation measures are proposed to control each of these KTPs. Provided these are adequately implemented the effect of these KTPs is not expected to be significant.
Conclusion
The proposal would clear a small amount of the habitat present within the region. This impact is not considered to be significant in the context of the remaining foraging habitat within the surrounding area and the high mobility of this species.

***Artamus cyanopterus cyanopterus* (Dusky Woodswallow) – vulnerable**

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
The proposal would remove approximately 1.2 ha of vegetation including 0.49 ha of TEC vegetation along Henry Lawson Drive. This vegetation is dominated by *E. baueriana*, *E. tereticornis* and *A. floribunda*, all of which are well represented in the locality and across the Sydney basin. This species inhabits large swathes of NSW and as such is not likely to solely rely on foraging or breeding resources in this location. The removal of this vegetation is not likely to result in an adverse effect on the life cycle of this species such that it is placed at risk of extinction.
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: **v. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or** **vi. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**
v. N/A vi. N/A
c) in relation to the habitat of a threatened species or ecological community: **vii. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and** **viii. whether an area of habitat is likely to become fragmented or isolated from other areas as a result of the proposed development or activity, and** **ix. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**
vii. The proposal would remove approximately 1.2 ha of vegetation including 0.49 ha of TEC vegetation, a small proportion of which would be considered viable habitat for this species. viii. Given their high degree of mobility, the foraging range of this species is particularly large and their food sources are diverse. The proposal would only affect vegetation in a

strip adjacent to the existing road. As such this is highly unlikely to fragment or isolate any populations or individuals. ix. The strip of vegetation to be removed – scattered mature Eucalypts and Angophoras – is represented well throughout the Sydney basin. The habitat to be removed is not considered any more important than other similar vegetation in the region.
d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either direct of indirectly)
The proposal would not affect any Area of Outstanding Biodiversity Value.
e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process
As outlined in section 4.10, the proposal may contribute to the following KTPs: • Clearing of native vegetation • Invasion of native plant communities by exotic perennial grasses • Invasion and establishment of exotic vines and scramblers Mitigation measures are proposed to control each of these KTPs. Provided these are adequately implemented the effect of these KTPs is not expected to be significant.
Conclusion
The proposal would clear a small amount of the habitat present within the region. This impact is not considered to be significant in the context of the remaining foraging habitat within the surrounding area and the high mobility of this species.

***Glossopsitta pusilla* (Little Lorikeet) – vulnerable**

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
The proposal would remove approximately 1.2 ha of vegetation including 0.49 ha of TEC vegetation along Henry Lawson Drive. This vegetation is dominated by *E. baueriana*, *E. tereticornis* and *A. floribunda*, all of which are well represented in the locality and across the Sydney basin. This species inhabits large swathes of NSW and as such is not likely to solely rely on foraging or breeding resources in this location. The removal of this vegetation is not likely to result in an adverse effect on the life cycle of this species such that it is placed at risk of extinction.
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: **vii. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or** **viii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**
vii. N/A viii. N/A
c) in relation to the habitat of a threatened species or ecological community: **x. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and** **xi. whether an area of habitat is likely to become fragmented or isolated from other areas as a result of the proposed development or activity, and** **xii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**
x. The proposal would remove approximately 1.2 ha of vegetation including 0.49 ha of TEC vegetation, a small proportion of which would be considered viable habitat for this species. xi. Given their high degree of mobility, the foraging range of this species is particularly large and their food sources are diverse. The proposal would only affect vegetation in a

strip adjacent to the existing road. As such this is highly unlikely to fragment or isolate any populations or individuals. xii. The strip of vegetation to be removed – scattered mature Eucalypts and Angophoras – is represented well throughout the Sydney basin. The habitat to be removed is not considered any more important than other similar vegetation in the region.
d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either direct of indirectly)
The proposal would not affect any Area of Outstanding Biodiversity Value.
e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process
As outlined in section 4.10, the proposal may contribute to the following KTPs: • Clearing of native vegetation • Invasion of native plant communities by exotic perennial grasses • Invasion and establishment of exotic vines and scramblers Mitigation measures are proposed to control each of these KTPs. Provided these are adequately implemented the effect of these KTPs is not expected to be significant.
Conclusion
The proposal would clear a small amount of the habitat present within the region. This impact is not considered to be significant in the context of the remaining foraging habitat within the surrounding area and the high mobility of this species.

***Haliaeetus leucogaster* (White-bellied Sea-Eagle) – vulnerable**

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
The proposal would remove approximately 1.2 ha of vegetation, including 0.49 ha of TEC vegetation along Henry Lawson Drive. Impacts to aquatic vegetation would be limited to the area immediately around the headwall of the stormwater outlet. The broader foraging area for this species – the river itself – would be protected from impacts such erosion and sedimentation by suitable mitigation measures such as silt curtains and sediment fences. As such the proposal is not likely to result in an adverse effect on the life cycle of this species such that it is placed at risk of extinction.
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: **ix. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or** **x. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**
ix. N/A x. N/A
c) in relation to the habitat of a threatened species or ecological community: **xiii. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and** **xiv. whether an area of habitat is likely to become fragmented or isolated from other areas as a result of the proposed development or activity, and** **xv. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality**
xiii. The proposal would remove approximately 1.2 ha of vegetation, including 0.49 ha of TEC vegetation, a small proportion of which would be considered viable roosting or breeding habitat for this species. xiv. Given their high degree of mobility, the foraging range of this species is particularly large and their food sources are diverse. The proposal would only affect vegetation in a

strip adjacent to the existing road. As such this is highly unlikely to fragment or isolate any populations or individuals.

xv. The strip of vegetation to be removed – scattered mature Eucalypts and Angophoras – is represented well throughout the Sydney basin. The habitat to be removed is not considered any more important than other similar vegetation in the region.

d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either direct of indirectly)

The proposal would not affect any Area of Outstanding Biodiversity Value.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

As outlined in section 4.10, the proposal may contribute to the following KTPs:

- Clearing of native vegetation
- Invasion of native plant communities by exotic perennial grasses
- Invasion and establishment of exotic vines and scramblers

Mitigation measures are proposed to control each of these KTPs. Provided these are adequately implemented the effect of these KTPs is not expected to be significant.

Conclusion

The proposal would clear a small amount of the habitat present within the region. This impact is not considered to be significant in the context of the remaining foraging habitat within the surrounding area and the high mobility of this species.

Appendix C

EPBC Act Tests of significance

***River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria* – critically endangered**

	Critically endangered ecological community
Criterion	**An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:** **i. reduce the extent of an ecological community**
Response	Whilst the proposal would reduce the extent of native vegetation in the locality (notably up to 0.49 ha of canopy vegetation with little to no native understorey or groundcover), the specific area to be cleared is highly degraded by virtue of historic urban development and ongoing weed invasion. As such the area is not likely to meet the condition threshold for this community.
Conclusion	0.49 ha of native canopy vegetation with little to no native understorey or groundcover would be removed, though this vegetation is not considered to meet the condition threshold for this ecological community.
Criterion	**ii. fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines**
Response	The proposal would affect vegetation in a strip adjacent to the existing HLD carriageway. Vegetation beyond this strip, and in the area generally, is highly fragmented by historic urban development. The removal of this strip of vegetation would increase the distance between patches on opposite sides of the road, though not to the extent that normal ecological processes (such as pollen and seed transport) would be substantially comprised in the long term.
Conclusion	The proposed action would increase fragmentation of native vegetation locally through clearing to widen HLD.
Criterion	**iii. adversely affect habitat critical to the survival of an ecological community**
Response	The habitat that would be affected by this proposal – low lying river flats adjacent to brackish and freshwater waterways – is subject to long term clearing threat from urban development throughout Sydney. Within the locality, the community is proportionately better represented than in the Sydney basin generally, with elements of this community present throughout the adjacent golf course and south along the eastern banks for the river. The western bank of the river contains several hectares of habitat for this ecological community. On this basis, and noting the highly degraded nature of the vegetation that would be affected by the proposal, the subject site is not considered to be critical to the long term survival of this community.
Conclusion	The proposed action is unlikely to adversely affect habitat critical to the survival of this ecological community.
Criterion	**iv. modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns**

Response	The proposed action includes the widening of HLD, which would result in an increase in sealed surfaces. This would generally take place over an area occupied by a dense covering of weeds at the groundcover and midstorey levels, with a canopy comprised remnant Eucalyptus species. The proposed action also includes limited and localised upgrades to surface water management through the enhancement of existing stormwater drainage infrastructure. This upgrade would not differ from the existing regime, other than being enlarged to accommodate the expected increase in surface water runoff from the increase in sealed surface.
Conclusion	Overall, the changes to surface water management are not expected to be substantial or to the point that they would compromise the survival of any adjacent remnants of this ecological community.
Criterion	**v. cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting**
Response	The proposed action does not include any ongoing processes or associated activity, beyond the initial proposed clearing, that is likely to further threaten the occurrence of vegetation in this area that may comprise this ecological community.
Conclusion	The proposed action would not result in further changes to the composition of an occurrence of this community.
Criterion	**vi. cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:** **– assisting invasive species, that are harmful to the listed ecological community, to become established, or**
Response	The site currently includes numerous environmental weeds common to urban areas of the Sydney basin. The application of appropriate safeguards during construction would mean that the potential for further weeds to be introduced or existing weeds to increase their distribution by the proposed action is expected to be very limited.
Conclusion	The proposed action would not assist invasive species to become further established.
Criterion	**– causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or**
Response	The proposal would not substantially alter the existing stormwater drainage regime and hence would not place any potential nearby occurrences of this community at risk. A Site Erosion and Sediment Control Plan, in accordance with the Blue Book, is to be implemented for the proposed action in order to manage construction and operational surface water quality. No other potentially harmful sources of pollution would be expected.
Conclusion	The proposed action would not increase local pollution such that any potential nearby occurrences of this community are placed at risk.

Criterion	**viii. interfere with the recovery of an ecological community**
Response	There is currently no recovery plan for this ecological community. The proposed action would be limited to approximately 0.49 ha degraded vegetation that is unlikely to meet the condition threshold for this community. The proposed action would not prohibit other actions being implemented to assist the recovery of this community generally.
Conclusion	The proposed action would not affect the implementation of actions long term actions aimed at the recovery of this community.

Overall Conclusion

Vegetation in this location is not considered likely to meet the minimum threshold for consideration as this ecological community due to the near absence of any native vegetation within the understorey. Despite this the above assessment has been undertaken to better understand the potential for impacts upon this vegetation. Whilst the proposed action would result in localised changes to this vegetation, it is not likely to be substantial enough that any potential occurrences of this ecological community are placed at risk.

Referral to The Commonwealth Minister for the Environment is not required.

***Pteropus poliocephalus* (Grey-headed Flying-fox)**

	Vulnerable species
Criterion	**An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:** **i. lead to a long-term decrease in the size of an important population**
Response	The entire east coast population of this species is likely to be considered an 'important population'. On a more local level however an important population is better equated with a 'nationally important' flying fox camp. This is defined as one that has either • contained ≥10,000 GHFF in more than one year in the last 10 years, or • been occupied by more than 2,500 GHFF permanently or seasonally every year for the last 10 years Within the general region of the proposal there is one nationally important camp at Macquarie Fields, approximately 12 km to the southwest. Another camp which is not considered nationally important is located approximately 3.2 km to the northwest at Lansdowne. The proposal would be within nightly foraging distance of individuals from either of these camps. This species is well adapted to urban environments, foraging on a range of native and exotic fruit and nectar-bearing garden plants and native vegetation throughout Sydney. Given the general abundance of such plants in gardens and the relatively small degree of suitable foraging vegetation to be cleared for the proposal, it is considered unlikely that that project would lead to a decrease in the size of an important population (whether considered as the local or entire east coast populations).
Conclusion	The proposed action is not likely to lead to a long-term decrease in the size of an important population.
Criterion	**ii. reduce the area of occupancy of an important population**
Response	The proposal will have only minor impact upon the area of occupancy of this population through the removal of a relatively small degree of foraging vegetation along the road corridor.

Conclusion	The proposed action is not likely to reduce the area of occupancy of an important population of this species.
Criterion	**iii. fragment an existing important population into two or more populations**
Response	The proposal would lead to a small reduction in foraging habitat for this species. Given the abundance of high quality foraging habitat elsewhere in the region and the distance between the nearest nationally important population and the proposal area, it is considered unlikely that this would lead to any fragmentation of an important population.
Conclusion	The proposed activity is unlikely to fragment an important population into two or more populations.
Criterion	**iv. adversely affect habitat critical to the survival of a species**
Response	The proposal area does not contain habitat critical to the survival of this species.
Conclusion	The proposed activity is unlikely to adversely affect habitat critical to the survival of the species.
Criterion	**v. disrupt the breeding cycle of an important population**
Response	The proposal area contains only minor direct foraging habitat for this species. The proposal would not affect any maternity camps for this species, which are at least 3.2 km away.
Conclusion	The proposal is unlikely to disrupt the breeding cycle of an important population of this species.
Criterion	**vi. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**
Response	The proposal would result in only limited impacts to habitat for this species. Direct impacts would be negligible in the context of alternative foraging habitat available, and indirect impacts would be managed through the application of suitable management measures.
Conclusion	The proposal is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Criterion	**vii. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat**
Response	The site currently includes numerous environmental weeds common to urban areas of the Sydney basin. The application of appropriate mitigation measures during construction would mean that the potential for further weeds to be introduced or existing weeds to increase their distribution by the proposal is expected to be very limited. A Site Erosion and Sediment Control Plan or Soil Water Management Plan, in accordance with the Blue Book, is to be implemented for the proposal. Weed, stormwater and pest management activities would be implemented as part of the environmental management framework for the site.
Conclusion	It is unlikely that the proposed action will result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat.
Criterion	**viii. introduce disease that may cause the species to decline**

Response	Controls on the movement of vehicles, and human traffic will be implemented through the use of fencing or other measures to prevent movement into designated no-go areas. This would also limit the potential for other disease to be introduced that may affect this species.
Conclusion	It is unlikely that the proposed action will introduce disease that may cause this species to decline.
Criterion	**ix. interfere substantially with the recovery of the species**
Response	The impacts associated with the proposal are of a scale that are very unlikely to significantly affect any local populations of this species. It follows from this that these impacts are unlikely to interfere with the recovery of this species.
Conclusion	The proposed activity is unlikely to interfere with the recovery of this species.

Overall Conclusion

Providing recommended management measures are implemented the proposed activity would likely result in minor impacts that would not significantly affect the viability or recovery of this species locally or generally. As such it is considered that the proposed activity is unlikely to result in a significant impact upon this species.

Referral to The Commonwealth Minister for the Environment is not required.

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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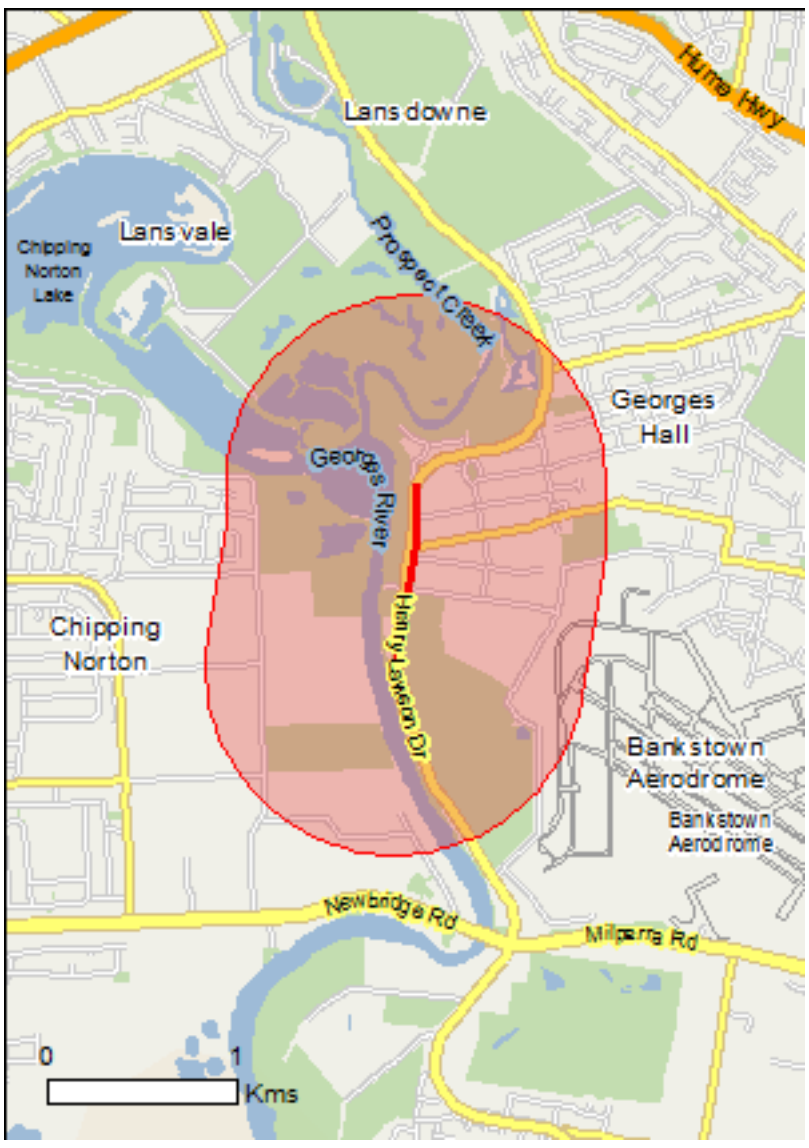
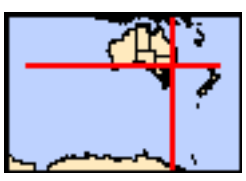


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	39
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	1
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	49
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thinornis cucullatus cucullatus		
Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Fish		
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola		
[21932]	Endangered	Species or species habitat may occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat may occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat likely to occur within area
Hibbertia puberula subsp. glabrescens [86645]	Critically Endangered	Species or species habitat known to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat may occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Bankstown Airport Air Traffic Control Tower	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardea alba](#) Great Egret, White Egret [59541]		Species or species habitat known to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Chrysococcyx osculans](#) Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine,		Species or species

Name	Status	Type of Presence
Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] Asparagus aethiopicus		habitat likely to occur within area
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425] Asparagus asparagoides		Species or species habitat likely to occur within area
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead		Species or species

Name	Status	Type of Presence
[68483]		habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.911576 150.975797,-33.91382 150.975754,-33.918663 150.97481

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.87 West: 150.93 East: 151.03 South: -33.97] returned a total of 6,788 records of 62 species.
Report generated on 15/02/2021 8:23 AM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	23	Species Description PDF file
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	1	Species Description PDF file
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	5	Species Description PDF file
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		2	Species Description PDF file
Animalia	Aves	Ardeidae	0197	*Botaurus poiciloptilus*		Australasian Bittern	E1,P	E	1	Species Description PDF file
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		8	Species Description PDF file
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		5	Species Description PDF file
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		20	Species Description PDF file
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		13	Species Description PDF file
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*		Square-tailed Kite	V,P,3		2	Species Description PDF file
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		4	Species Description PDF file
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*		Bush Stone-curlew	E1,P		2	Species Description PDF file
Animalia	Aves	Cacatuidae	0268	*^^Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3		1	Species Description PDF file
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		5	Species Description PDF file
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		32	Species Description PDF file
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*		Swift Parrot	E1,P,3	CE	11	Species Description PDF file
Animalia	Aves	Psittacidae	0302	*^^Neophema pulchella*		Turquoise Parrot	V,P,3		1	Species Description PDF file
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*		Powerful Owl	V,P,3		11	Species Description PDF file
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*		Masked Owl	V,P,3		1	Species Description PDF file
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*		Sooty Owl	V,P,3		1	Species Description PDF file
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	6	Species Description PDF file
Animalia	Aves	Meliphagidae	8303	*Melithreptus gularis gularis*		Black-chinned Honeyeater (eastern subspecies)	V,P		3	Species Description PDF file
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		18	Species Description PDF file
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		20	Species Description PDF file
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		2	Species Description PDF file
Animalia	Aves	Petroicidae	0382	*Petroica phoenicea*		Flame Robin	V,P		3	Species Description PDF file
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	1	Species Description PDF file
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	21	Species Description PDF file
Animalia	Mammalia	Burramyidae	1150	*Cercartetus nanus*		Eastern Pygmy-possum	V,P		3	Species Description PDF file
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	326	Species Description PDF file

Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		7	Species Description PDF file
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P		7	Species Description PDF file
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	3	Species Description PDF file
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		12	Species Description PDF file
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		13	Species Description PDF file
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		13	Species Description PDF file
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		7	Species Description PDF file
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		15	Species Description PDF file
Animalia	Gastropoda	Camaenidae	I006	*Meridolum corneovirens*	Cumberland Plain Land Snail	E1		30	Species Description PDF file
Plantae	Flora	Apocynaceae	10896	*Marsdenia viridiflora subsp. viridiflora*	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2		460	Species Description PDF file
Plantae	Flora	Campanulaceae	1937	*Wahlenbergia multicaulis*	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		7	Species Description PDF file
Plantae	Flora	Casuarinaceae	9009	*Allocasuarina diminuta subsp. mimica*	Allocasuarina diminuta subsp. mimica population in the Sutherland Shire and Liverpool City local government areas	E2		1	Species Description PDF file
Plantae	Flora	Convolvulaceae	2234	*Wilsonia backhousei*	Narrow-leafed Wilsonia	V		4	Species Description PDF file
Plantae	Flora	Dilleniaceae	14735	*Hibbertia fumana*		E4A		14	Species Description PDF file
Plantae	Flora	Dilleniaceae	11422	*Hibbertia puberula*		E1		415	Species Description PDF file
Plantae	Flora	Dilleniaceae	13902	*Hibbertia sp. Bankstown*		E4A	CE	217	Species Description PDF file
Plantae	Flora	Ericaceae	7752	*Epacris purpurascens var. purpurascens*		V		5	Species Description PDF file
Plantae	Flora	Ericaceae	2618	*Leucopogon exolasius*	Woronora Beard-heath	V	V	2	Species Description PDF file
Plantae	Flora	Fabaceae (Faboideae)	3007	*Pultenaea parviflora*		E1	V	2	Species Description PDF file
Plantae	Flora	Fabaceae (Faboideae)	3008	*Pultenaea pedunculata*	Matted Bush-pea	E1		5	Species Description PDF file
Plantae	Flora	Fabaceae (Mimosoideae)	3728	*Acacia bynoeana*	Bynoe's Wattle	E1	V	1	Species Description PDF file
Plantae	Flora	Fabaceae (Mimosoideae)	3860	*Acacia pubescens*	Downy Wattle	V	V	4091	Species Description PDF file
Plantae	Flora	Myrtaceae	4007	*^^Callistemon linearifolius*	Netted Bottle Brush	V,3		31	Species Description PDF file
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A		1	Species Description PDF file
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	1	Species Description PDF file
Plantae	Flora	Poaceae	4875	*Deyeuxia appressa*		E1	E	1	Species Description PDF file
Plantae	Flora	Proteaceae	10009	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V	429	Species Description PDF file

Plantae	Flora	Proteaceae	5458	^^*Persoonia hirsuta*	Hairy Geebung	E1,P,3	E	2	Species Description PDF file
Plantae	Flora	Proteaceae	5467	*Persoonia nutans*	Nodding Geebung	E1,P	E	112	Species Description PDF file
Plantae	Flora	Rhamnaceae	5573	*Pomaderris brunnea*	Brown Pomaderris	E1	V	5	Species Description PDF file
Plantae	Flora	Rhamnaceae	5591	*Pomaderris prunifolia*	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		3	Species Description PDF file
Plantae	Flora	Thymelaeaceae	6190	*Pimelea spicata*	Spiked Rice-flower	E1	E	320	Species Description PDF file

Appendix L

Soil Searches (Contamination and Acid Sulfate Soils)

Search results

Your search for:LGA: CANTERBURY-BANKSTOWN COUNCIL

Matched 59 notices relating to 17 sites.

Search Again

Refine Search

Suburb	Address	Site Name	Notices related to this site
BASS HILL	862 Hume HIGHWAY	Woolworths Caltex Bass Hill	1 current
CAMPSIE	403 Canterbury Road and 1 Una STREET	Budget Petroleum and adjacent property	1 current
CAMPSIE	60 Charlotte STREET	Former Sunbeam factory	4 former
CANTERBURY	13-19 Canterbury ROAD	Metro Petroleum Service Station	2 current
CHESTER HILL	127 Orchard ROAD	Former Orica, Chester Hill	4 former
EARLWOOD	3 Jackson PLACE	RTA Land	2 current
HURLSTONE PARK	610 - 618 New Canterbury ROAD	Former Speedway Petroleum Service Station	3 former
PADSTOW	55 Bryant STREET	Former Exide Battery Manufacturing & Recycling	2 current and 1 former
PUNCHBOWL	42-44 Belmore ROAD	Punchbowl Laundry	3 current
REVESBY	21 Marigold STREET	Mirotone Pty Ltd	3 former
REVESBY	33-35 Violet STREET	Thetis Pty Ltd - Bituminous Products	3 current and 6 former
VILLAWOOD	2A Birmingham AVENUE	Ettason Villawood Site	2 current
VILLAWOOD	66 Christina ROAD	Former Electrical Component Manufacturer	1 current and 6 former
VILLAWOOD	2 Christina ROAD	Former Orica Crop Care	2 current and 2 former
VILLAWOOD	49 Miowera ROAD	Former Siemens/Westinghouse	9 former
VILLAWOOD	110A Christina ROAD	Nepotian (Former Toll) Site	1 current
YAGOONA	117-153 Rookwood ROAD	Galsery Galvanising Services	1 current

15 February 2021

Appendix M

Non-Aboriginal Heritage Searches (National, State and Local)

Search Results

15 results found.

Bankstown Airport Airport Av	Bankstown Airport, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Bankstown Airport Air Traffic Control Tower Tower Rd	Bankstown, NSW, Australia	(Listed place) Commonwealth Heritage List
Bankstown Elevated Reservoir No 7 Rosedale Av	Greenacre, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Bankstown Urban Conservation Area	Bankstown, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Georges River Wetlands Henry Lawson Dr	Padstow Heights, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Pipehead to Potts Hill Water Supply Woodville Rd	Guildford, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Potts Hill Reservoirs Rookwood Rd	Potts Hill, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Punchbowl Urban Conservation Area	Punchbowl, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Sefton Urban Conservation Area	Sefton, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
The Homestead 1a Lionel St	Georges Hall, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)

The Pressure Tunnel		Potts Hill Waterloo, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Vietnamese Boat People Monument	Rickard Rd	Bankstown, NSW, Australia	(Nomination now ineligible for PPAL) National Heritage List
Villawood Immigration Centre	Miowera Rd	Villawood, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Villawood Immigration Centre	Miowera Rd	Villawood, NSW, Australia	(Listed place) Commonwealth Heritage List
Villawood Immigration Centre Revised Boundary	Miowera Rd	Villawood, NSW, Australia	(Nominated place) Commonwealth Heritage List

Report Produced: Mon Feb 15 08:35:18 2021

Heritage NSW

Search for NSW Heritage

Search for NSW heritage

Return to search page where you can refine/broaden your search.

Statutory listed items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into three sections.

- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by Heritage NSW.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the Heritage Act. This information is provided by Heritage NSW.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the Heritage Act.

Your search returned 1 record.

Item name	Address	Suburb	LGA	SHR
Homestead, The	1a Lionel Street	Georges Hall	Canterbury-Bankstown	00448

Section 3. Items listed by Local Government and State Agencies.

Your search returned 2 records.

Item name	Address	Suburb	LGA	Information source
Bankstown Aerodrome	345 Marion Street	Georges Hall	Canterbury-Bankstown	LGOV
The Homestead Building and Site	1a Lionel Street	Georges Hall	Canterbury-Bankstown	LGOV

There was a total of 3 records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant

Appendix N

Aboriginal Heritage Searches and PACHCI Assessment

9 February 2021

Jared Crossley
Project Manager
Transport for NSW

Dear Jared,

Preliminary assessment results for Intersection Improvements on Henry Lawson drive at Rabaul Road and Haig Avenue, Georges Hall including Sandstone Wall and Mangrove Removal based on Stage 1 of the *Procedure for Aboriginal cultural heritage consultation and investigation* (the procedure).

The project, as described in the Stage 1 assessment checklist (see attached), was assessed as being unlikely to have an impact on Aboriginal cultural heritage.

The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate moderate to high concentrations of Aboriginal objects or places in the study area. Previous PACHCI Stage assessment indicates that AHIMS sites 45-5-5124, 45-5-5121 and 45-5-5122 are located outside of the proposed project area.
- The study area does contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Transport for NSW procedure, however the cultural heritage potential of the study area appears to be reduced due to past disturbance in the form of the construction of Henry Lawson Drive.
- There is an absence of sandstone rock outcrops likely to contain Aboriginal art.

Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me and your regional Environment Officer Katie Round to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Transport for NSW *Unexpected Archaeological Finds Procedure*.

Transport for NSW

Level 3, 27 Argyle Street Parramatta NSW 2150
T 0428 683 845 **| E** lee.davison@transport.nsw.gov.au

For further assistance in this matter do not hesitate to contact me.

Yours sincerely

Lee Davison
Aboriginal Cultural Heritage Officer– Sydney

Stage 1 Roads and Maritime Services assessment

Procedure for Aboriginal cultural heritage consultation and investigation: Resource 3

Aim

The project manager (or their representative) must provide the information requested in this checklist to the regional Aboriginal cultural heritage adviser. This information will assist them in determining whether the project may affect Aboriginal cultural heritage in accordance with Stage 1 of the procedure.

Please **provide** this completed cover sheet, along with the required information, to your regional Aboriginal cultural heritage adviser.

Contact details for this project

Name of project:
Intersection Improvements on Henry Lawson Drive at Rabaul Road and Haig Avenue, Georges Hall

Project manager
Jared Crossley, ph: 0416 580 817, jared.crossley@transport.nsw.gov.au

Environmental officer undertaking/managing the environmental impact assessment
Katie Round, ph: 0449 181 635, katie.round@transport.nsw.gov.au

Corporate communications officer, if any

Date:
2 December 2020

Action	Status ☑
Item 1 Attach an overview of the project. The overview must include the known scope and extent of the proposed works; compound site requirements; access and movement of plant; re-location and/or provision of utilities; the location of noise walls, sedimentation basins, shared pathways, cycle ways, etc… Refer Design Drawings and Proposal Summary in Attachment A.	☑
Item 2 Attach a map/plan of the study area that clearly outlines the extent and scope of the project. The map/plan should also include topographical information where available. Refer Extent of Proposed Works Figure in Attachment B	☑

Item 3 If land acquisition is required, provide details about this. No land acquisition is required.	☐
Item 4 Attach a brief description of current and past land use, where known. For example, the study area land is currently used as a car park/road reserve/farming/etc. and was formally used for a car park/road reserve/farming/etc. The proposal area is located in Georges Hall within the Canterbury-Bankstown local government area (LGA). It includes land within the road reserve, Crown land and public recreational land under the care and control of Council. The built form in the surrounding area is variable with a variety of buildings varying from single to multi-storey. Street trees and vegetation are present along both the eastern and western verges of Henry Lawson Drive (HLD) as well as within private properties. Overhead powerlines and electricity posts line the road corridors with the HLD road verge. The topography of the land is relatively flat, gently sloping downwards in a southern direction. The primary land uses in the immediate surrounding area are low density residential and recreational uses, however there are also some businesses (restaurants) near the intersection of HLD and Rabaul Road. Notable land uses and features in the wider surrounding area include Georges River, Kentucky Reserve, Georges River Golf Course, Centre Court Tennis, Rabaul Road Boat Ramp, Coleman Park, Henry Lawson Reserve, Hope Point Church, Bankstown Airport, Dhurawal Bay, HopePoint Christian School, Ashcroft Reserve and Georges River Grammar School.	☑
Item 5 Describe the timeframe for the project along with key milestones and deliverables. A review of environmental factors (REF) is currently being prepared and is expected to be finalised in December 2020. In July to 3 August 2020 community consultation was carried out using mail and on-line platforms to gather feedback and comments about the proposed improvements for Georges Hall. Construction is proposed to commence in early to mid 2021.	☑
Item 6 Please attach the results of the Office of Environment and Heritage's Aboriginal Heritage Information Management System **(AHIMS) Basic Search** - http://www.environment.nsw.gov.au/licences/WhatInformationCanYouObtainFromAHIMS.htm If required, please include the results of an **AHIMS Extensive Search**. These results should be plotted on a map/plan covering the study area. Refer extensive AHIMS search results in Attachment C.	☑
Item 7 Attach the results of the following heritage searches relevant to the study area: • Native Title Register search • State Heritage Inventory search • Australian Heritage Database search Refer Attachment D for the results of the above database searches.	☑

Item 8 Attach a copy of any heritage assessment (Aboriginal or non-Aboriginal) previously prepared for the study area/project? None previously prepared for the proposal location.	☐
Item 9 Attach a copy of any environmental impact assessment previously prepared for the study area/project? None previously prepared for the proposal location.	☐

Attachment A – Design Drawings and Proposal Overview

Proposal Overview

Intersection Improvements on Henry Lawson Drive at Rabaul Road and Haig Avenue, Georges Hall

Transport for NSW (TfNSW) proposes to undertake road improvements on Henry Lawson Drive (HLD) between Beale Street and just south of Rabaul Road in Georges Hall, in the City of Canterbury-Bankstown Council local government area (LGA), formerly Bankstown City Council LGA. The design of the proposal was developed by TfNSW in 2020 and is currently in the stages of detailed design.

The proposed road improvements are part of the NSW Government's investment to address pinch points across Sydney's road network. TfNSW's Pinch Points Program (PPP) aims to reduce traffic delays, manage congestion and improve travel times on Sydney's major roads, particularly during weekday periods.

The proposal is funded under the NSW Government's Urban Road Upgrade and Congestion Program. The Urban Roads Congestion Program focuses on highly congested points on the network where a traffic bottleneck exists which slows down the broader network. The Program is aimed at short term tactical measures for addressing congestion at key locations across the Sydney road network. The program improves journey time reliability for various road users including general traffic, freight, and buses.

This proposal would complement the NSW Government's separate $100 million commitment to upgrade the length of HLD to a four lane road in three stages, between Hume Highway and the M5 South Western Motorway, Milperra; a distance of about 7.5 kilometres. An early concept design for the first stage of this project (Stage 1A) was released for public consultation in February 2020. Stage 1A would see Henry Lawson Drive widened between Keys Parade, Milperra, and its intersection with Tower Road, adjacent Bankstown Airport. This proposal is at an early concept design stage and construction is expected to begin in 2024 (subject to necessary approvals and consultation).

HLD at its intersections with Rabaul Road and Haig Avenue in Georges Hall was identified as a pinch point location contributing to traffic congestion, travel delays and road safety issues. Investigations of the intersection have identified opportunities to improve intersection efficiency, safety and reduce the likelihood of the right turning vehicles impeding the movement of the through traffic. As part of the PPP, TfNSW is proposing to undertake improvements to HLD between Beale Street and Rabaul Road to reduce travel delays and improve the operational efficiency of the surrounding road network.

HLD is a State road connecting the M5 South Western Motorway and the Hume Highway. The road is subject to northbound and southbound traffic congestion from both general traffic and heavy vehicles in both directions during peak hours. More than 6,100 vehicles travel along this section of Henry Lawson Drive in the morning and evening peak periods and experiences heavy congestion. The road carries a large volume of heavy vehicles and serves as an important north/south freight route, as well as servicing nearby Bankstown Airport. The intersection of HLD and Haig Avenue in Georges Hall is the only signalised intersection along the 5.4 kilometre section on Henry Lawson Drive between Hume Highway, Lansvale, and the Milperra/Newbridge roads' intersection, at Milperra.

Delays and lengthy queues are common during peak hours and generally extend to Milperra Road (the A34) in the south (about 1.4 kilometres from the proposal) and Flinders Road in the north (about one kilometre from the proposal). A traffic analysis by TfNSW's Urban Road

Congestion Program (URCP) also revealed that rear end motorist collisions were a significant crash analysis trend in the area, which could be reduced through banning right turning traffic into Rabaul Road which currently causes queues on northbound traffic on HLD.

The primary purpose of the proposal is to ease congestion and improve travel reliability along the road corridor. The proposal seeks to reduce travel delays and improve the operational efficiency of HLD by introducing a number of elements aimed at reducing northbound and southbound congestion and improving travel times in both directions. A key feature of the proposal is increasing the through movement capacity of the southbound carriageway of HLD from one lane to two lanes between Beale Street and about 100 metres south of Rabaul Road. To improve traffic movement in the area and road safety issues, the proposal also seeks to restrict motorists turning right off HLD into Rabaul Road to limit motorist accidents that occur from queues for northbound traffic on HLD. Other proposed safety and amenity improvements include a new pedestrian footpath along the eastern verge of HLD, upgrades to the road's stormwater drainage system, road re-surfacing and improvements to the road design layout. Approximately 39,000 vehicles travel on Henry Lawson Drive every day will benefit from the proposal.

The regional context and location of the proposal is shown in Figure 1. The proposal's total construction extent would be about 600 metres, north to south, with some work for short distances along Beale Street, Haig Avenue, Endeavour Road and Rabaul Road. Works would also be required at a treatment facility at 256 HLD (south of Kentucky Reserve) for the headwall works at the southern extent of the proposal area as part of the proposed stormwater infrastructure upgrades.

Key features of the proposal would include:

- Establishing an additional southbound through lane on HLD between Beale Street and just south of Rabaul Road.
- Converting the existing HLD left turn slip lane between Beale Street and Haig Avenue from left turn only to a shared left and through lane.
- Constructing a merge lane along HLD south from Rabaul Road for a length of about 140 metres
- Banning right turns from HLD northbound onto Rabaul Road eastbound and encouraging road users to use the signalised intersections at Tower Road, to the south, and Haig Avenue, immediately to the north.
- Banning left turns for large vehicles over nine metres in length from HLD southbound onto Haig Avenue eastbound in order to convert the left-only turning lane approaching Haig Avenue into a second southbound through traffic lane on HLD (a shared left and through lane).
- Installing a new pedestrian footpath on the eastern verge of HLD between Haig Avenue and Rabaul Road.
- Installing new stormwater drainage pits and pipes on the eastern verge of HLD between Beale Street and just south of Rabaul Road to improve stormwater drainage functionality which is currently under capacity.

- Installing a new kerb and gutter system along the eastern verge of HLD between Beale Street and just south of Rabaul Road which are currently in poor condition or non-existent causing localised stormwater ponding
- Replacing the existing stormwater pipe and headwall near the treatment facility at 256 HLD to accommodate for the deficiencies of the existing stormwater drainage system in this location*.

  The following works would be required within the road corridor in order to accommodate the proposal:
- Widening into the existing eastern road verge and removal of the existing southbound road shoulder on HLD in the following locations to construct the additional southbound lane:
    - Between Endeavour Road and Rabaul Road
    - Between Beale Street and Haig Avenue
    - Just south of Rabaul Road over a length of about 100 metres
- Removal of up to 37 street trees on the eastern verge of HLD between Beale Street and about 200 metres south of Rabaul Road (including four trees within the western extent of Coleman Park).
- Removal of numerous small trees[1] within the treatment facility at 256 HLD for the construction of the replacement headwall and stormwater pipe including:
    - *Casuarina glauca* (Swamp Oak) x 8
    - *Eucalyptus robusta* (Swamp Mahogany) x 2
    - *Eucalyptus baueriana* (Blue Box) x 8
    - *Melaleuca styphelioides* (Prickly Paperbark) x 13
    - *Melaleuca linariifolia* (Budjur, Flax Leaved Paperbark) x 3
    - *Eucalyptus spp.* (Gum Tree, possibly Forest Red Gum) x 3
- Trimming of trees on private property fronting the proposed work area where tree branches are overhanging the road corridor.
- Modification and reinstatement of numerous driveway entrances adjacent to the proposal on the eastern verge of HLD between Beale Street and Rabaul Road.
- Removal of informal street kerbside parking spaces in the road shoulder adjacent to the HLD southbound carriageway between Beale Street and 100m south of Rabaul Road.
- Full depth pavement asphalt for the new southbound lane between Beale Street and just south of Rabaul Road.
- Line marking and signage changes within the road corridor to accommodate the new road layout.
- Utility readjustments (above and below ground), including relocation of gas, water, electrical and telecommunication utilities along the roadway.

A compound site would be required. One compound site has been nominated for potential use during the construction of the proposal at Coleman Park, immediately to the east and south east of the proposed works (refer Figure 2 for location/extent).

[1] Juvenile to semi-mature specimens planted in the last 10 years, up to 10 metres in height.

*As part of the headwall replacement works at Georges River, the following would be required from a constructability perspective (refer also to figures below):
- Some of the existing sandstone wall would need to be removed either side of the existing headwall (along with some mangroves) to facilitate construction of the replacement headwall
- Assumed that two metres of sandstone wall either side (ie. immediately north and south) of the existing headwall to be removed (can be reinstated once works are completed)
- Assumed that one metre of mangroves either side (ie. immediately north and south) of existing headwall would need to be removed
- Construction footprint on river bed would extend up to two metres westwards from the footprint of the existing headwall footprint for access/controls
- The sandstone wall pieces would be reinstated in their original position once the works are completed.

FIGURE 1: REGIONAL CONTEXT

AECOM

Figure 1: Location of the proposal in wider metropolitan Sydney

Figure 2: Construction Footprint and Surrounding Land Uses

PROPOSAL AREA - KEY FEATURES AND WORKS EXTENT
RABAUL ROAD TO BEALE ST

N

0 25 50 m

AECOM

Legend

- Road corridor
- Proposed new footpath
- Proposed new southbound lane
- Proposed new kerb and gutter system
- Construction proposal area buffer

Source: Imagery © Nearmap 2020.

PROPOSAL AREA - KEY FEATURES AND WORKS EXTENT
256 HENRY LAWSON DRIVE TO RABAUL ROAD

N

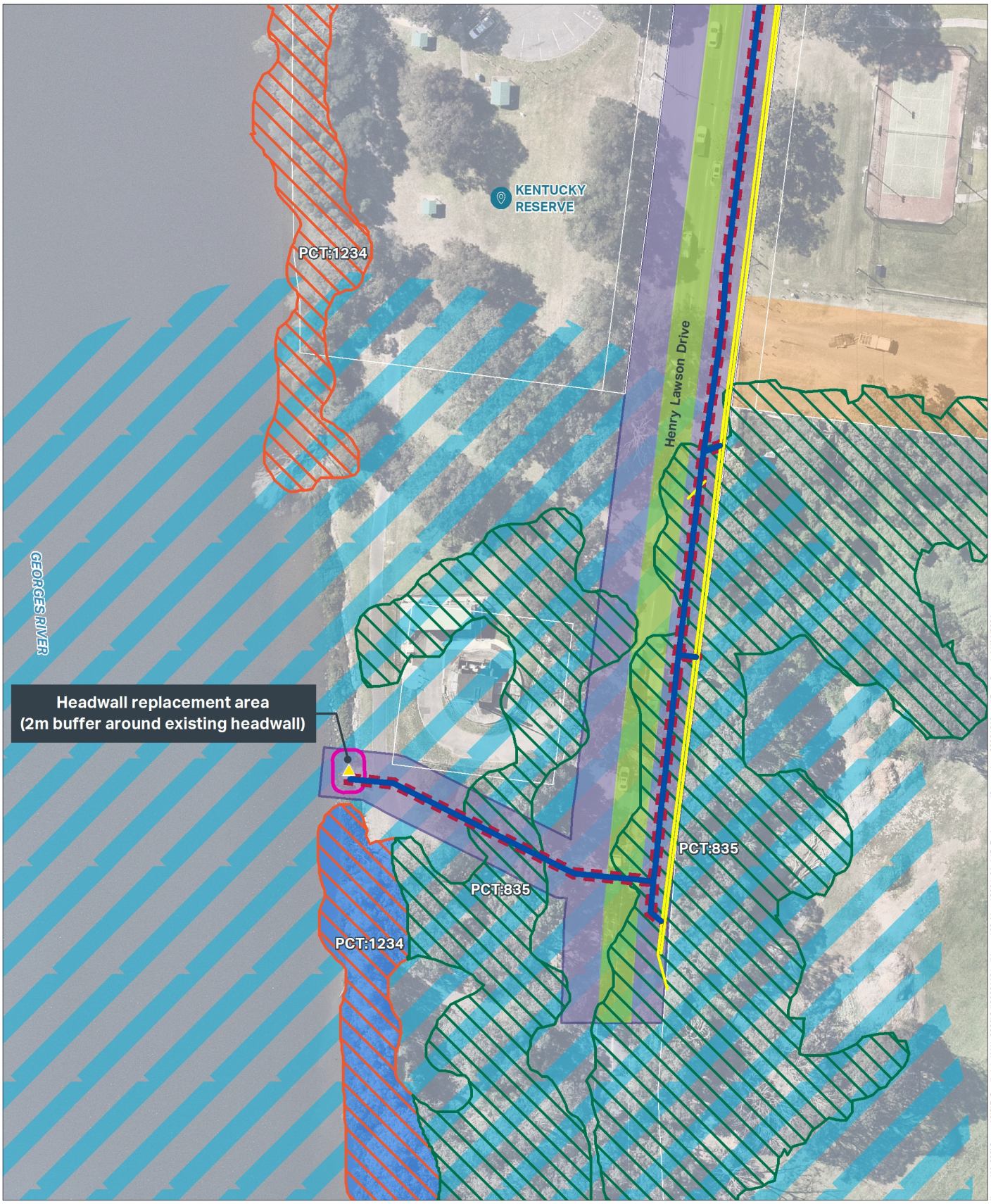
0 25 50 m

AECOM

Legend

- Road corridor
- Proposed new footpath
- Proposed new southbound lane
- Proposed new kerb and gutter system
- Construction proposal area buffer
- Headwall replacement works area
- Site compound
- Site access

Source: Imagery © Nearmap 2020.



EXISTING BIODIVERSITY FEATURES
PROPOSED WORKS SOUTH OF RABAUL ROAD

Legend

- Proposed drainage design
- Proposed overhead telecommunications and electrical alignment
- Road corridor
- Proposed construction/laydown access
- Site compound
- Proposed excavation footprint
- Proposed headwall replacement works area
- Existing headwall

Coastal Management SEPP

- Coastal Wetlands
- Coastal Wetlands Proximity Area

Native Vegetation

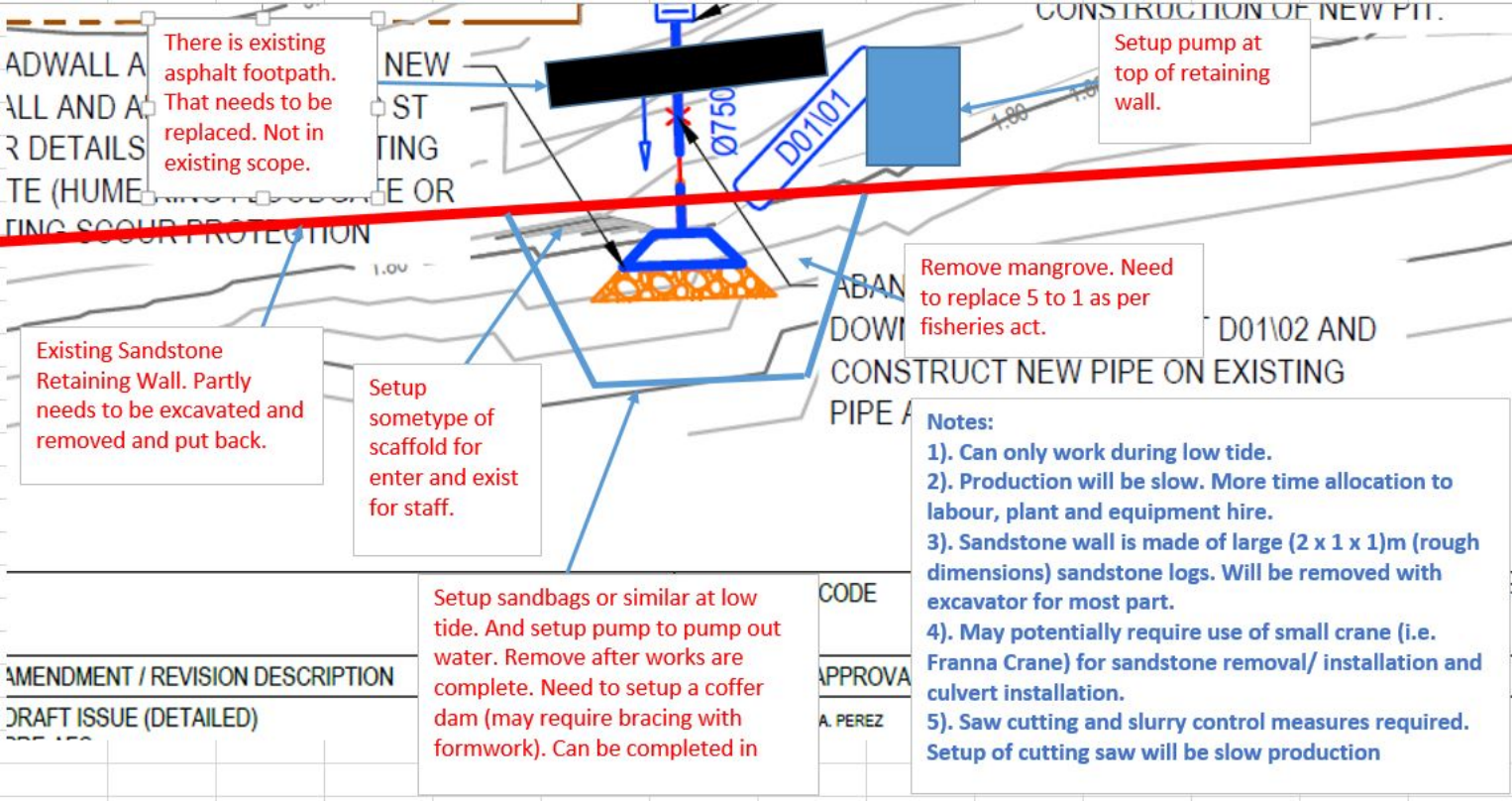
- PCT1234: Swamp Oak Floodplain Forest
- PCT835: River Flat Eucalypt Forest

Note: Proposed excavation footprint is an open trench 0.75m either side of proposed drainage design. A 5.5m wide construction laydown area would be required around excavation footprint (except for the headwall replacement and drainage line works on the western extent which would be smaller and shifted northwards to avoid encroachment into coastal wetlands area).

N 0 10 20 m

AECOM

Source: Imagery © Nearmap 2020.

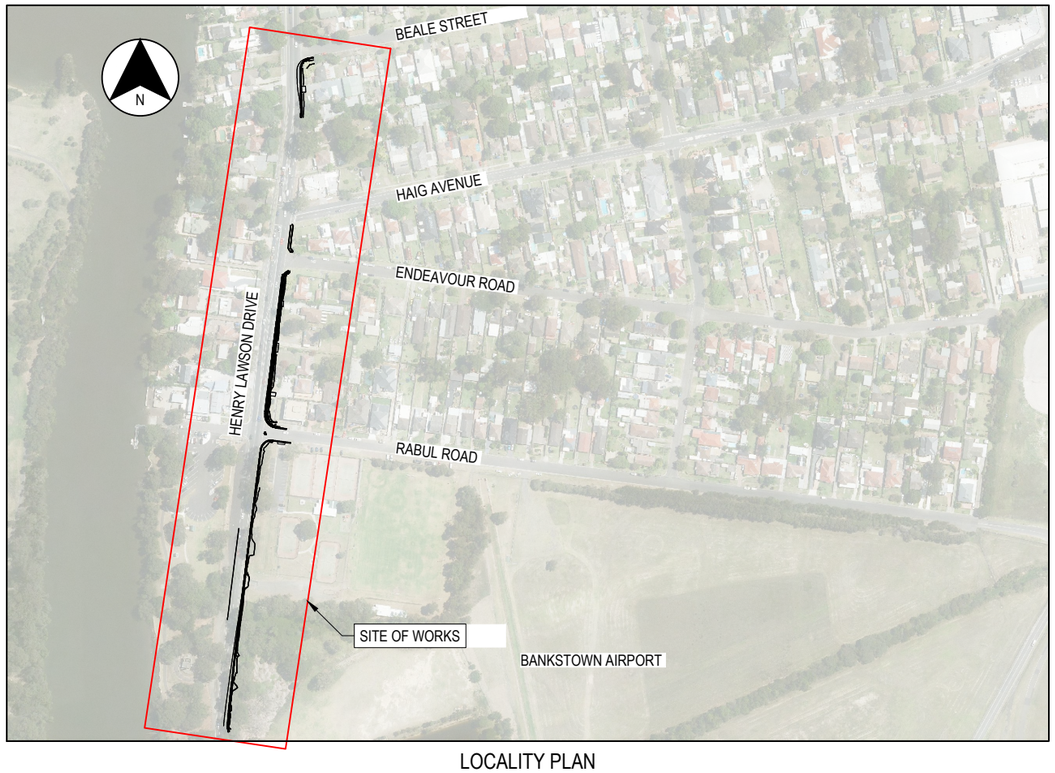

There is existing asphalt footpath. That needs to be replaced. Not in existing scope.
Setup pump at top of retaining wall.
Remove mangrove. Need to replace 5 to 1 as per fisheries act.
Existing Sandstone Retaining Wall. Partly needs to be excavated and removed and put back.
Setup sometype of scaffold for enter and exist for staff.
Setup sandbags or similar at low tide. And setup pump to pump out water. Remove after works are complete. Need to setup a coffer dam (may require bracing with formwork). Can be completed in
Notes:
1). Can only work during low tide.
2). Production will be slow. More time allocation to labour, plant and equipment hire.
3). Sandstone wall is made of large (2 x 1 x 1)m (rough dimensions) sandstone logs. Will be removed with excavator for most part.
4). May potentially require use of small crane (i.e. Franna Crane) for sandstone removal/ installation and culvert installation.
5). Saw cutting and slurry control measures required. Setup of cutting saw will be slow production
Ø750
D01\01
CONSTRUCTION OF NEW PIT.
CONSTRUCT NEW PIPE ON EXISTING
CODE
AMENDMENT / REVISION DESCRIPTION
DRAFT ISSUE (DETAILED)
A. PEREZ

CANTERBURY BANKSTOWN COUNCIL

MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL

DETAILED DESIGN



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PLOT BY
MEGHWARB

PREPARED BY
TRANSPORT FOR NSW
DESIGN TEAM
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

DESIGNED	REVIEWED	VERIFIED
SIGNED	SIGNED	SIGNED
NAME W. YUNG	NAME B. MEGHWAR	NAME J. MCDERMOTT
TITLE DESIGNER	TITLE DESIGN LEAD	TITLE VERIFIER
DATE 06.11.2020	DATE 06.11.2020	DATE 06.11.2020

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CLIENT
NSW GOVERNMENT Transport for NSW

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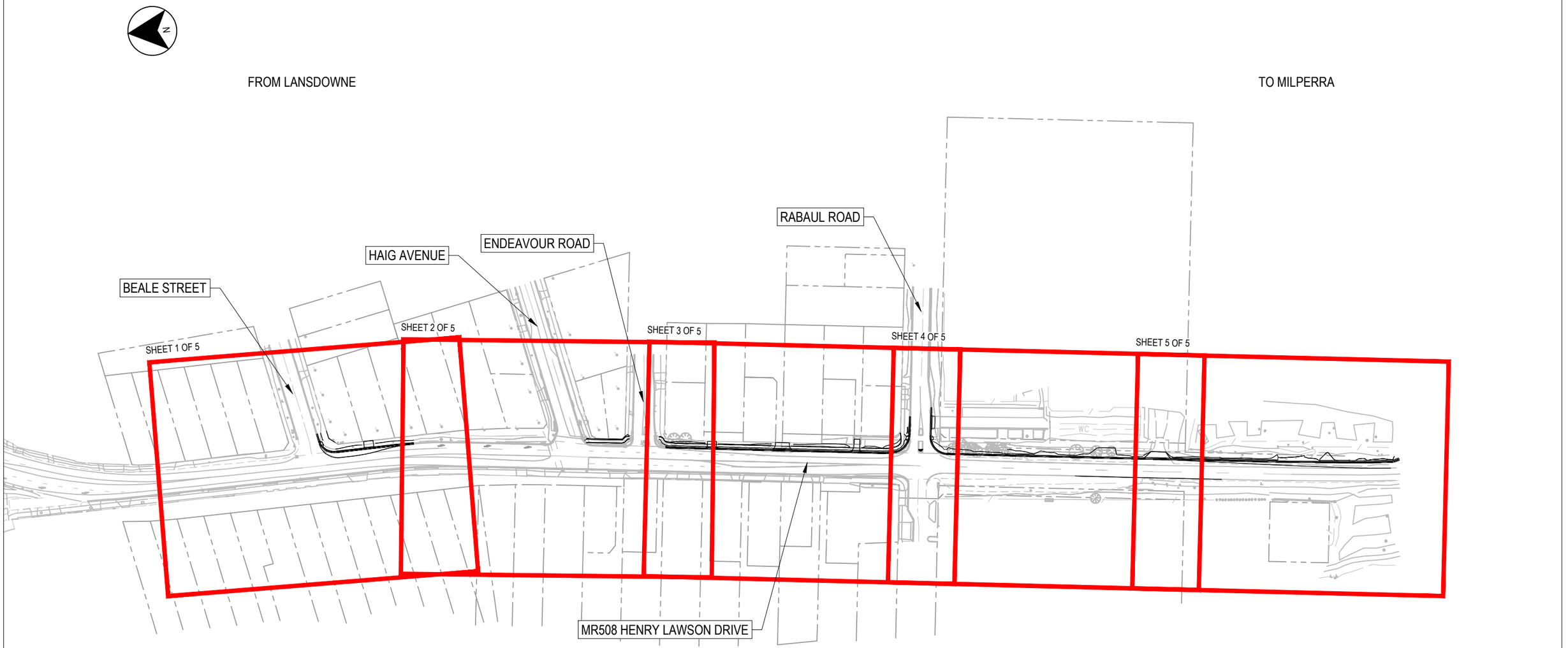
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL

A3

TfNSW PROJECT No. P0043031
DESIGN PROJECT No.
TfNSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS DETAILED DESIGN
EDMS No. -
SHEET No. SHT-GE-000001
ISSUE 1



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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
OVERALL LAYOUT PLAN

A3

SHEET 1 OF 1

TfNSW REGISTRATION No.	PART
DS2020/000130	1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-GE-000002	1

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DRAWING INDEX

CODE INDEX

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GE	GENERAL
RD	ROAD WORKS
RL	ROAD LONGITUDINAL SECTIONS
RC	ROAD CROSS SECTIONS
UT	UTILITIES
SM	STORMWATER MANAGEMENT
PV	PAVEMENT
LT	ROAD LIGHTING
IT	INTELLIGENT TRANSPORT SYSTEMS
SC	SITE CLEARING AND SPOIL SITE
LS	LANDSCAPING AND SIGHT ENVELOPES
ST	STRUCTURAL DETAILS
PW	PROPERTY WORKS
CS	CONSTRUCTION STAGING
MS	MISCELLANEOUS / SUPPLEMENTARY
GT	GEOTECHNICAL
SV	SURVEY
GI	GIS

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PLOT BY: MEGHWARB

CLIENT: NSW GOVERNMENT Transport for NSW

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PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
DRAWING INDEX

A3

SHEET 1 OF 2

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-GE-000011 | ISSUE: 1

DRAWING INDEX

SHT-PV-000502	PAVEMENT PROFILES SHEET 2 OF 2
PAVEMENT DETAILS	
SHT-PV-000521	PAVEMENT DETAILS SHEET 1 OF 2
SHT-PV-000522	PAVEMENT DETAILS SHEET 2 OF 2
PAVEMENT EDGE DETAILS	
SHT-PV-000531	PAVEMENT EDGE DETAILS SHEET 1 OF 3
SHT-PV-000532	PAVEMENT EDGE DETAILS SHEET 2 OF 3
SHT-PV-000533	PAVEMENT EDGE DETAILS SHEET 3 OF 3
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SHT-RF-001004	LINEMARKING AND SIGNAGE PLAN SHEET 4 OF 5
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ASSOCIATED DRAWINGS	
PLAN_GT0110	DETAILED SURVEY HENRY LAWSON DRIVE AND RABAUL ROAD
CADA_GT0110	CADASTRAL OVERLAY HENRY LAWSON DRIVE AND RABAUL ROAD

CODE INDEX	
	NAME
GE	GENERAL
RD	ROAD WORKS
RL	ROAD LONGITUDINAL SECTIONS
RC	ROAD CROSS SECTIONS
UT	UTILITIES
SM	STORMWATER MANAGEMENT
PV	PAVEMENT
LT	ROAD LIGHTING
IT	INTELLIGENT TRANSPORT SYSTEMS
SC	SITE CLEARING AND SPOIL SITE
LS	LANDSCAPING AND SIGHT ENVELOPES
ST	STRUCTURAL DETAILS
PW	PROPERTY WORKS
CS	CONSTRUCTION STAGING
MS	MISCELLANEOUS / SUPPLEMENTARY
GT	GEOTECHNICAL
SV	SURVEY
GI	GIS

CHECK PRINT

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CLIENT: NSW GOVERNMENT Transport for NSW

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
DRAWING INDEX

A3

SHEET 2 OF 2

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

DRAWINGS / DESIGN PREPARED BY: -

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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BACKDRAFTED/CORRECTED		
CONFIRMED		

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

TfNSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-GE-000012

ISSUE: 0

GENERAL NOTES

1. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RMS SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OR PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES WHERE APPLICABLE.
2. DRAWINGS TO BE READ IN CONJUNCTION WITH ALL OTHER SPECIFICATIONS FOR THE PROJECT.
3. LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
4. CO-ORDINATES ARE TO MAP GRID AUSTRALIA (MGA) CO-ORDINATE SYSTEM (ZONE 56).
5. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE (UNO). ALL LEVELS, CHAINAGES, STATIONS AND CO-ORDINATES ARE EXPRESSED IN METRES.
6. WHERE REFERENCE IS MADE TO PROPRIETARY COMPONENT NAMES ON THE DRAWINGS THE CONTRACTOR MAY PROPOSE AN ALTERNATIVE PRODUCT PROVIDED THE ALTERNATIVE IS EQUIVALENT AND SATISFIES THE REQUIREMENTS OF THE SPECIFICATION AND IS APPROVED BY THE PRINCIPAL.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE VERSION OF RMS STANDARDS LATEST AT THE TIME OF TENDER UNO.
9. WHERE AREAS ARE SHOWN AS BEING "ON HOLD" ON PLANS, ALL CORRESPONDING LONGITUDINAL SECTIONS, CROSS SECTIONS, DRAINAGE, PAVEMENTS AND OTHER DETAILS RELATING TO THAT AREA SHALL ALSO BE DEEMED TO BE "ON HOLD" UNO.
10. GEOTECHNICAL INVESTIGATIONS HAVE NOT BEEN UNDERTAKEN WITHIN THE PROPERTY BOUNDARY DUE TO NON AVAILABILITY OF PROPERTY ACCESS. A NOMINAL BATTER SLOPE OF 6 (H) TO 1 (V) HAS BEEN ADOPTED.
11. ALL PROPERTY WORKS WITHIN PROPERTY BOUNDARY SUBJECT TO AGREEMENT WITH PROPERTY OWNER AND THE PRINCIPAL.
12. DRAWING REFERENCES QUOTED ARE ONLY SHOWING THE LAST SIX DIGITS FOR SIMPLICITY.
13. FOR RMS STANDARD SUPPLEMENTARY DRAWING INDEX REFER DRAWING GE-000021.
14. ALL GRADING POINTS ARE RELATED TO FINISHED ROAD LEVEL. REFER TO TYPICAL CROSS-SECTIONS FOR STRING LABELLING CONVENTION (GE SERIES).
15. ALL LOCATIONS, ORIENTATION AND LEVELS SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING ANY WORK. REFER DISCREPANCIES TO THE PRINCIPAL. DO NOT OBTAIN DIMENSIONS FROM SCALING. EXISTING SURFACE LEVELS ON THE DRAWINGS ARE INDICATIVE ONLY.

SAFETY - IN - DESIGN INFORMATION

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH RMS SPECIFICATION G22. THIS DOCUMENT LISTS SOME DESIGN RELATED WORK HEALTH AND SAFETY HAZARDS ASSOCIATED WITH THE PROJECT DESIGN, CONSTRUCTION AND OPERATION. THERE MAY BE OTHER HAZARDS AND RISKS NOT STATED IN THIS DOCUMENT. THIS DOCUMENT DOES NOT RELIEVE THE CONTRACTOR OF ITS OBLIGATIONS UNDER THE CONTRACT AND RELEVANT LEGISLATION.
2. REFER TO SID REPORT AND DESIGN REPORT.

SIGNAGE AND LINE MARKING

1. TO ELIMINATE EXCESSIVE GLARE FROM THE SURFACE OF A SIGN IT IS TO BE TURNED APPROXIMATELY 5° AWAY FROM THE NORMAL TO THE HEADLIGHT BEAM / LINE OF SIGHT.
2. ALL SIGNAGE TO BE CLEAR OF ALL VEGETATION AND OBSTRUCTIONS.
3. SIGNS TO BE INSTALLED IN ACCORDANCE WITH AS1742.
4. THE LOCATION OF ALL EXISTING SIGNS TO BE CONFIRMED PRIOR TO COMMENCING WORK. ENSURE ADOPTED METHOD OF CONSTRUCTION WILL AVOID DAMAGE TO ALL SERVICES.
5. CONDITION ASSESSMENT TO BE UNDERTAKEN ON ALL EXISTING SIGN FACES TO BE RELOCATED PRIOR TO BEING REUSED IN ACCORDANCE WITH RELEVANT SPECIFICATIONS AND STANDARDS OR AS DIRECTED BY THE PRINCIPAL.
6. ALL EXISTING LINE MARKING EFFECTED BY THE NEW WORKS AND NOT OTHERWISE CONFLICTING WITH NEW LINE MARKING IS TO BE REINSTATED.
7. ALL LINE MARKING TO BE THERMOPLASTIC IN ACCORDANCE WITH RMS SPECIFICATION R141.
8. FOR NOTES ON PAVEMENTS REFER TO RMS DELINEATION GUIDELINE SECTION 9.
9. FOR REMOVAL OF LINE MARKING REFER TO RMS DELINEATION GUIDELINE SECTION 14.
10. RAISED PAVEMENT MARKERS SHALL BE PLACED ON ALL LANE, EDGE AND BARRIER LINES. SPACING OF RAISED PAVEMENT MARKERS SHALL BE IN ACCORDANCE WITH RMS DELINEATION GUIDE AND RMS SPECIFICATION R142.
11. SIGNAGE AND LINE MARKING PLANS TO BE READ IN CONJUNCTION WITH TCS PLANS.

RMS STANDARD DRAWINGS

1. RMS STANDARD DRAWINGS CAN BE FOUND AT THE FOLLOWING LOCATION:
   http://www.rms.nsw.gov.au/business-industry/partners-suppliers/document-types/standard-drawings/index.html

STRUCTURE TYPE (DENOTED ON SCHEDULE)	STANDARD DRAWING NUMBER	DESCRIPTION	LAST AMENDED
	R0200	STORMWATER DRAINAGE SERIES - GULLY PITS	
SA1, SA2,SA3	R0220-01	GULLT PIT TYPE SA PIPE DIAMETER UP TO 450 mm	JUN -17
	R0220-03	PRECAST CONCRETE LINTELS FOR TYPE SA GULLY PITS	JAN-17
	R0220-28	GULLY PIT TREATMENT FOR PIPES GREATER THAN 450 mm DIAMETER	JAN-17
	R0220-43	PIT TO PIPE CONNECTION	JAN-17
	R0220-45	INDIVIDUAL - RUNG LADDER (STEP IRONS) FOR DRAINAGE PITS	JAN-17
	R0220-49	GULLY PITS CONCRETE PIPE EXTENSION	JAN-17
RSG	R0220-36	INLET SUMP WITH RAISED STEEL GRATE	JAN-17
SB	R0220-51	STANDARD GULLY PIT TYPE SB	JAN-17
	R0240	STORMWATER DRAINAGE SERIES - PIPES	
	R0240-01	TYPE HS3 CONDITIONS	JAN-17
	R0300	KERB AND CHANNEL SERIES	
	R0300-01	STANDARD KERB AND GUTTER SHAPES	NOV-17
	R0300-04	STANDARD VEHICULAR CROSSING FOR USE WITH TYPE SA KERB AND CHANNEL	JAN-17
	R0300-10	KERB TRANSITION TYPE SM TO TYPE SF	JAN-17
	R0300-11	KERB RAMPS	OCT-17

CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWINGS		
STANDARD DRAWING NUMBER	TITLE	REVISION
S-008	STANDARD MEDIUM DUTY VEHICULAR FOOTWAY CROSSING (VFC)	01/05/2017
S-027	STANDARD FOOTPAVING RESIDENTIAL FOOTWAYS	01/05/2017

CHECK PRINT

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PLOT DATE / TIME: 23-Nov-20 / 9:26:53 PM
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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

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HEIGHT DATUM: AHD
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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

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CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL NOTES

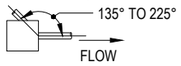
A3
SHEET 1 OF 3

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-GE-000021	1

DRAINAGE - GENERAL

1. THE DOCUMENTED DRAINAGE SYSTEM IS DETAILED ONLY FOR THE PERMANENT ROAD CONFIGURATION UNO. CONSTRUCTION REQUIREMENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
2. PIPES THROUGH PITS ARE TO BE ALIGNED WITH UPSTREAM PIPE CENTRELINE TO OUTLET PIPE CENTRELINE AT DOWNSTREAM PIT FACE AS SHOWN;



3. ANY PERMITS FOR DIVERSION WORKS REQUIRED DURING CONSTRUCTION SHALL BE OBTAINED PRIOR TO CONSTRUCTION WORKS BY THE CONTRACTOR FROM THE PRINCIPAL.
4. EXISTING STORMWATER DRAINAGE PITS, PIPES AND CULVERTS WITHIN THE LIMITS OF WORKS SHALL BE ABANDONED AS SPECIFIED IN THE DRAWINGS AND IN ACCORDANCE WITH RMS STANDARD SPECIFICATIONS, METHODS AND EXTENT OF ABANDONMENT TO BE CONFIRMED ON SITE BY THE CONTRACTOR AND APPROVED BY THE PRINCIPAL. ANY EXPOSED REINFORCEMENT TO BE PROTECTED IN ACCORDANCE WITH REQUIREMENTS FOR NEW CONSTRUCTION.
5. IN LOCATIONS WHERE NEW PAVEMENT OR ROAD WIDENING WORKS ARE PROPOSED, ANY NEW OR EXISTING PIPES WITH LESS THAN 300 mm COVER BELOW THE UNDERSIDE OF THE SELECTED MATERIAL ZONE SHALL BE CONCRETE ENCASED.
6. DURING CONSTRUCTION EXCAVATIONS SHALL BE SECURELY SHORED AND BENCHED TO PREVENT THE SIDES OF THE EXCAVATION FROM COLLAPSING. AS REQUIRED ON NSW WORK COVER EXCAVATIONS WORK CODE OF PRACTICE.

DRAINAGE - LONGITUDINAL AND TRANSVERSE DRAINAGE

1. ALL PIPES ARE TO BE STEEL REINFORCED SPUN CONCRETE UNO. ALL CONCRETE PIPES SHALL HAVE HS3 TYPE INSTALLATION AS PER RMS R0240-01.
2. BEDDING AND SUPPORT FILL MATERIAL FOR ALL NEW LONGITUDINAL DRAINAGE TRENCHES SHALL BE IN ACCORDANCE WITH RMS SPEFICATION R11 AND R44.
3. CONCRETE PIPE CLASSES HAVE BEEN DETERMINED BASED ON TYPE HS3 SUPPORT, FINISHED SURFACE LEVEL AND TRENCH OR EMBANKMENT CONDITION INSTALLATION TO AS3725 AND SPECIFICATION UNO. CONCRETE PIPES ARE TO BE RUBBER RING JOINTED SPIGOT AND SOCKET TYPE UNO. THERMAL ENVIRONMENT CONDITION OF TABLE 3.1 OF AS/NZS 4058:2007 APPLIES. MINIMUM COVER FOR REINFORCEMENT IS 10 mm.
4. MINIMUM COVER TO ALL NEW PIPES TO BE 300 mm BELOW THE UNDERSIDE OF THE SELECTED MATERIAL ZONE UNO.
5. CONNECTION BETWEEN PIPES AND STRUCTURES TO BE UNDERTAKEN IN ACCORDANCE WITH RMS SPECIFICATION AND DRAWINGS UNO.
6. PIPE LENGTHS PROVIDED IN DRAINAGE LONG SECTIONS ARE CALCULATED FROM PIT REFERENCE POINT TO PIT REFERENCE POINT.

DRAINAGE - EXISTING STORMWATER PIPES

1. EXISTING STORMWATER DRAINAGE PIPE AND PIT LAYOUT SHOWN IN THE DRAWINGS ARE INDICATIVE ONLY. ALL LOCATIONS, ORIENTATION AND LEVELS OF EXISTING SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING ANY WORK.
2. LAYOUTS OF EXISTING STORMWATER DRAINAGE HAVE BEEN PREPARED BASED ON A COMBINATION OF NEW SURVEY DATA OBTAINED DURING CURRENT DESIGN, PREVIOUSLY AVAILABLE SURVEY DATA, AND COUNCIL GIS DATA (WHERE SURVEY IS NOT AVAILABLE).
3. WHERE AN EXISTING PIT HAS ONLY ONE PIPE OUTLET, THE SETOUT / REFERENCE POINT OF THE EXISTING PIT IS BASED ON THE SURVEYED PIPE INVERT LEVEL.
4. WHERE EXISTING PIT HAS TWO OR MORE CONNECTION PIPES, THE SETOUT / REFERENCE OF THE EXISTING PIT IS BASED ON THE INTERSECTION POINT OF THE CENTERLINE OF EACH PIPE.
5. WHERE A CONNECTION IS MADE TO AN EXISTING DRAINAGE PIPE OR PIT, THEN THE LEVEL OF THAT ELEMENT MUST BE SURVEYED AND ANY DISCREPANCIES SUBMITTED TO THE PRINCIPAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.

DRAINAGE STRUCTURES (DRAINAGE PITS DESIGNED FOR 50 YEARS)

1. CONCRETE DRAINAGE STRUCTURES TO BE IN ACCORDANCE WITH RMS QA SPECIFICATION R53 UNO
2. DRAINAGE STRUCTURES HAVE BEEN DESIGNED IN ACCORDANCE WITH AS3600-2018 UNO
3. DESIGN LIFE OF NEW CONCRETE DRAINAGE STRUCTURES IS 50 YEARS UNO.
4. DESIGN LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS5100.2 – 2017.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND PROVISION OF ANY TEMPORARY BRACING, PROPPING, ETC. REQUIRED DURING CONSTRUCTION. STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED.
6. FOUNDATION SUPPORT FOR DRAINAGE STRUCTURES TO BE PROVIDED IN ACCORDANCE WITH RMS QA SPECIFICATION R11.
7. INADEQUATE FOUNDING MATERIAL FOR PIPES AND STRUCTURES SHALL BE REMOVED OR IMPROVED IN ACCORDANCE WITH RMS QA SPECIFICATION R11.
8. RMS STANDARD DETAILS TO BE ADOPTED ONLY WHERE REFERENCED.
9. ALL PITS DEEPER THAN 600 TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH RMS DRAWING R0220-45
10. STEEL GRATES AND FRAMES ARE TO BE FABRICATED FROM MILD STEEL AND HOT DIPPED GALVANISED. ALL GRATES AND FRAMES TO BE “MEDIUM / HEAVY TRAFFICABLE” CLASS D UNO. GRATES AND FRAMES WITHIN THE PAVEMENT SURFACE (INCLUDES ADJOINING SO GUTTER) ARE TO BE BICYCLE SAFE IN ACCORDANCE WITH AS 3996 UNO.
11. ALL WELDS TO COMPLY WITH AUSTRALIAN STANDARD AS 1554.1. FILLET WELDS TO BE NOT LESS THAN 6 mm UNO.
12. ALL EXPOSED STEEL TO BE GALVANISED IN ACCORDANCE WITH AS/NZS 2312 AND AS/NZS 4680. GALVANISING TO THREADED FASTENERS TO BE IN ACCORDANCE WITH AS 1214. MINIMUM GALVANISING 600 G / SQM OTHER THAN ON FASTENERS.
13. GRATE SUPPORT TO BE CONSTRUCTED LEVEL TO ENSURE THAT THE GRATE DOES NOT ROCK AFTER INSTALLATION.
14. FOR LOCATION AND LEVEL OF PITS AND HEADWALLS REFER TO DRAINAGE DRAWING LONG SECTIONS AND SCHEDULES.
15. CONSTRUCTION JOINT PREPARATION: EXISTING CONCRETE SURFACE TO BE CLEANED, SCABBLED AND ROUGHENED IN ACCORDANCE WITH RMS QA SPECIFICATION R53 PRIOR TO CASTING OF NEW PIT SECTION
16. CONCRETE EXPOSURE CLASSIFICATION B1 UNO.
17. MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH AND NOMINAL COVER TO REINFORCEMENT FOR DRAINAGE PITS UNO :
    - CAST IN-SITU – CAST AGAINST GROUND: 32 MPa / 75 mm
    - CAST IN-SITU – CAST ELSEWHERE: 32 MPa / 40 mm
18. EDGES SHALL BE CHAMFERED 20 x 20
19. EXPOSED SAWCUT REINFORCEMENT BARS TO BE TREATED WITH CORROSION INHIBITING COATING
20. DESIGN LIFE FOR NEW DRAINAGE CONCRETE STRUCTURES IS 50 YEARS UNO.
21. PIT BASE TO BE CLEANED, SCABBLED AND ROUGHENED IN ACCORDANCE WITH RMS QA SPECIFICATION R53 PRIOR TO PLACING MASS CONCRETE BENCHING.
22. MINIMUM 28 DAY CONCRETE COMPRESSIVE STRENGTH AND NOMINAL COVER TO REINFORCEMENT FOR CONCRETE CASING TO PIPES UNO. 25 MPa / 60 mm. CONCRETE TO BE PLACED USING MECHANICAL VIBRATION.

DRAINAGE - SUBSOIL

1. REFER TO PAVEMENT DRAWINGS FOR SUBSURFACE DRAINAGE LOCATIONS, PATHS AND DETAILS. SUBSURFACE DRAINAGE / TRENCH DRAINS SHALL CONFORM TO RMS R33.

DRAINAGE - SCOUR PROTECTION

1. THE THICKNESS OF THE RIP-RAP ROCK PROTECTION SHALL BE A MINIMUM OF TWICE THE D_{50} STONE SIZES SPECIFIED ON THE DRAWING D_{50}=150 mm UNO.
2. THE STONE SHALL BE REASONABLY WELL GRADED THROUGHOUT THE RIP-RAP LAYER. STONE SIZES SHALL BE DEPENDENT ON THE D_{50} VALUE SPECIFIED ON THE DRAWING D_{10} SHALL BE $0.5XD_{50}$ AND D_{90} SHALL BE $1.35XD_{50}$. STONES SMALLER THAN THE SPECIFIED D_{10} ARE NOT TO EXCEED 20% BY WEIGHT OF EACH LOAD.
3. RIP-RAP ROCK IS TO BE HARD, DENSE, DURABLE, RESISTANT TO WEATHERING AND ANGULAR IN SHAPE. IT SHALL BE FREE FROM OVERBURDEN, SPOIL, SHALE AND ORGANIC MATTER. ROCK THAT IS LAMINATED, FRACTURED, POROUS OR OTHERWISE PHYSICALLY WEAK WILL BE UNACCEPTABLE.
4. AN APPROXIMATE GUIDE TO STONE SHAPE IS THAT THE BREADTH OR THICKNESS OF A SINGLE STONE SHOULD BE NOT LESS THAN ONE-THIRD ITS LENGTH. ROUND MATERIAL CAN BE USED AS RIP-RAP ROCK PROVIDED IS NOT PLACED ON SLOPES GREATER THAN 3H:1V.
5. STONE SHOULD BE DARK IN COLOUR-EITHER GREY OR DARK BROWN SIMILAR TO SOIL PROFILE RIP-RAP ROCK MATERIAL TO BE SUBMITTED TO THE SUPERINTENDENT FOR APPROVAL.
6. GEOFABRIC UNDER RIP-RAP ROCK TO BE IN ACCORDANCE WITH RMS SPECIFICATION D&C R63 UNO.

PROPERTY STORMWATER DRAINAGE DISCHARGE

1. SURVEY OF EXISTING PROPERTY STORMWATER DRAINAGE DISCHARGE OUTLET LOCATIONS HAS NOT BEEN UNDERTAKEN AS PART OF THE DESIGN PROCESS.
2. LOCATION AND LEVEL OF ALL EXISTING PROPERTY STORMWATER DRAINAGE DISCHARGE OUTLETS INTO COUNCIL DRAINAGE SYSTEM OR TO ROAD KERB MUST BE OBTAINED BY CONTRACTOR PRIOR TO CONSTRUCTION.
3. ALL LEVELS MUST BE CHECKED FOR CONFLICT WITH ANY SERVICES AND TO ENSURE THE PROPERTY STORMWATER DRAINAGE CAN RE-CONNECT INTO THE NEW DRAINAGE SYSTEM OR NEW ROAD KERB, CONSISTENTLY WITH THE EXISTING CONNECTION.
4. uPVC PIPE CONNECTING EXISTING PROPERTY STORMWATER TO BE MINIMUM IPLEX 150 DIAMETER CLASS SN 8 OR APPROVED EQUIVALENT (DSME 150 RRJ).
5. PIPE BEDDING AND COVER REQUIREMENTS FOR uPVC PIPES SHALL COMPLY WITH THE RMS SPECIFICATION R23 AND AS/NZS 2032:2006.

UTILITIES

1. FOR UTILITIES THAT HAVE BEEN RELOCATED OR REQUIRE ADJUSTMENT FOR THE WORKS, REFER TO INDIVIDUAL UTILITY DIVERSION DRAWINGS AND DETAILS FROM THE RELEVANT UTILITY AUTHORITY.
2. IN ORDER TO AVOID DAMAGE TO THE UTILITIES THE CONTRACTOR SHALL BE RESPONSIBLE FOR CO-ORDINATING THE WORKS ADJACENT TO ANY UTILITY WITH THE RELEVANT UTILITY AUTHORITY IN ACCORDANCE WITH THE AUTHORITY REQUIREMENTS.
3. THE CONTRACTOR SHALL CO-ORDINATE WITH THE RELEVANT UTILITY AUTHORITIES AND THE PRINCIPAL WITH RESPECT TO ANY TEMPORARY DIVERSIONS NECESSARY FOR CONSTRUCTION STAGING WORKS.
4. FOR UTILITY INFORMATION REFER TO UT SERIES DRAWINGS.
5. POTHOLING OF ALL SERVICES SHOWN ON DRAWINGS HAS NOT BEEN UNDERTAKEN AS PART OF THE DESIGN PROCESS.
6. LOCATION AND LEVEL OF ALL SERVICES CROSSING NEW DRAINAGE MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ALL LEVELS MUST BE CHECKED FOR CONFLICT WITH ANY SERVICES, AND ANY CONFLICTS TO BE RESOLVED WITH THE PRINCIPAL.
7. THE LOCATION OF EXISTING PROPERTY CONNECTIONS TO UTILITIES LOCATED WITHIN THE ROAD RESERVE HAVE NOT BEEN LOCATED AND SURVEYED. IT WILL BE THE CONTRACTORS RESPONSIBILITY TO LOCATE EACH PROPERTY CONNECTION AND ARRANGE ANY REQUIREMENT FOR RECONNECTION TO NEW LINES. THE CONTRACTOR SHALL ALSO PROTECT ALL PROPERTY CONNECTIONS DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL MANAGE ANY DISRUPTION TO SUPPLY TO PRIVATE PROPERTY AND ENSURE THAT SUPPLY IS AVAILABLE AT THE END OF EACH DAYS ACTIVITIES.
8. SERVICES SHOWN ARE INDICATIVE ONLY AND IS NOT GUARANTEED COMPLETE NOR CORRECT. CONTRACTOR TO CONFIRM LOCATION OF ALL SERVICES PRIOR TO COMMENCING WORK. CONTRACTOR TO ENSURE ADOPTED METHOD OF CONSTRUCTION WILL AVOID DAMAGE TO ALL SERVICES.
9. SERVICE AUTHORITIES ARE TO BE CONTACTED PRIOR TO THE COMMENCEMENT OF WORKS FOR ARRANGEMENTS TO BE MADE REGARDING THE PROTECTION, ADJUSTMENT OR RELOCATION OF SERVICES IF NECESSARY. INFORMATION PROVIDED ON THE DRAWINGS WITH RESPECT TO SERVICES IS FOR GUIDANCE ONLY.
10. PRIOR TO THE START OF EXCAVATION, ALL NEW TEMPORARY EXCAVATIONS FOR UTILITIES NEAR CUT OR FILL BATTERS ARE TO BE ASSESSED ON SITE BY THE CONTRACTOR'S EXPERIENCED GEOTECHNICAL ENGINEER FOR THEIR POTENTIAL IMPACT ON BATTER STABILITY DURING CONSTRUCTION.

PROPERTY WORKS CONSTRUCTION

1. MAKE GOOD ANY DISTURBANCE TO EXISTING LAWNS AND TOP SOIL. TURF AND RESHAPE ALL DISTURBED AREAS INCLUDING REPLACEMENT OF EXISTING SHRUBS, HEDGES ETC. AS SHOWN ON DRAWINGS AND AGREED WITH THE PROPERTY OWNER AND THE PRINCIPAL.
2. CLEAN UP AND REMOVE CONTRACTOR'S WASTE FROM THE SITE CAUSED DURING THE ADJUSTMENT WORK.
3. RELOCATE / REMOVE AND REPLACE EXISTING FENCES, GATES, LETTERBOX AS SHOWN ON THE DRAWING. PRINCIPAL TO CONFIRM EXACT INSTRUCTION WITH PROPERTY OWNER.
4. EXISTING PRIVATE PROPERTY SERVICE CONNECTIONS AND DRAINAGE ARE NOT INDICATED ON THESE DRAWINGS. THESE NEED TO BE LOCATED AND ADJUSTED AS REQUIRED. MAINTAIN EXISTING ALIGNMENT WHERE POSSIBLE.
5. ACCESS TO PROPERTIES TO BE MAINTAINED BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION, OR AS OTHERWISE AGREED WITH THE PROPERTY OWNER AND THE PRINCIPAL.
6. ALL REDUNDANT FENCING TO BE REMOVED AND RECYCLED WHERE POSSIBLE.
7. THE CADASTRAL BOUNDARY IS SUBJECT TO CONFIRMATION ON SITE BY THE CONTRACTOR USING A REGISTERED LAND SURVEYOR.
8. SIGNIFICANT TREES HAVE BEEN IDENTIFIED ON THE DRAWINGS FOR REMOVAL WHERE REQUIRED, WHERE REMOVAL OF ADDITIONAL UNIDENTIFIED TREES ARE REQUIRED TO CONSTRUCT THE PROPERTY WORKS, OBTAIN APPROVAL FROM THE PRINCIPAL BEFORE REMOVING ADDITIONAL TREES.
9. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH RMS SPECIFICATION R204.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-GE-000022.DWG
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PLOT DATE / TIME: 23-Nov-20 / 9:26:08 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
GENERAL NOTES

A3
SHEET 2 OF 3

TINSW REGISTRATION No. DS2020/000130
PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-GE-000022	1

REINFORCEMENT NOTES

1. ALL REINFORCEMENT SHALL COMPLY WITH AS4671 AND BE GRADE 500N UNO.
2. COGS, HOOKS, SPLICES AND PIN DIAMETERS SHALL BE IN ACCORDANCE WITH AS3600-2018
3. REINFORCEMENT MAY BE DISPLACED SLIGHTLY WHERE NECESSARY TO CLEAR STEEL DOWELS, ANCHOR BOLTS, DRAINAGE PIPES, FORMED HOLES AND RECESSES
4. UNLESS NOTED OTHERWISE, THE MINIMUM DEVELOPMENT AND LAP LENGTHS OF BARS SHALL BE AS FOLLOWS:

BAR SIZE:		N12	N16	N20	N24	N28	N32	N36	N40
DEVELOPMENT LENGTH	HORIZONTAL BARS WITH >300 mm OF CONCRETE CAST BELOW THE BAR	550	750	950	1150	1400	1650	1950	2250
	OTHER BARS	400	550	750	900	1100	1300	1500	1750
LAP LENGTH	HORIZONTAL BARS WITH >300 mm OF CONCRETE CAST BELOW THE BAR	700	950	1200	1500	1750	2100	2500	2850
	OTHER BARS	500	700	950	1150	1400	1650	1900	2200

   WHERE MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION, THE TABULATED LAP LENGTHS INCREASE BY 30% UNLESS NOTED OTHERWISE
5. ALL LAPPED PORTIONS OF BARS TO BE IN CONTACT
6. WHERE LAPPED SPLICES ARE USED, THE SEPARATION BETWEEN LAPPED PORTIONS OF BARS SHALL NOT EXCEED 3 x BAR SIZE
7. LAP LENGTHS FOR UNEQUAL BAR SIZES TO BE BASED ON THE LARGER OF THE LAP LENGTH OF THE SMALLER BAR AND THE DEVELOPMENT LENGTH OF THE LARGER BAR
8. WHERE LAPS ARE NOT SHOWN THEY SHALL SATISFY THE REQUIREMENTS OF RMS QA SPECIFICATION R53 AND RMS QA SPECIFICATION B80 AS RELEVANT
9. WHERE REBATES OR RECESSES ARE REQUIRED, MINIMUM CLEAR COVER TO THE REINFORCEMENT SHALL BE MAINTAINED
10. MECHANIAL COUPLERS SHALL BE CAPABLE OF DEVELOPING A STRESS IN TENSION OR COMPRESSION OF NO LESS THAN 1.1FSY, AS APPROPRIATE TO THE WEAKER BAR AT THE SPLICE. THE COUPLER SHALL BE SUBMITTED TO THE PRINCIPAL FOR ACCEPTANCE
11. REINFORCEMENT IS SHOWN DIAGRAMMATICALLY. IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION
12. SPLICES OF REINFORCEMENT SHALL ONLY BE MADE IN POSITIONS SHOWN
13. WRITTEN APPROVAL OF THE PRINCIPAL SHALL BE OBTAINED FOR ANY OTHER SPLICES
14. DO NOT WELD REINFORCEMENT UNLESS SHOWN ON THE DRAWING

BAR MARKING LEGEND

THE METHOD USED TO DESCRIBE REINFORCEMENT ON THE DRAWINGS IS AS FOLLOWS:

N16-300 EF

- EF — INFORMATION FOR PLACING
- 300 — SPACING ALONG LIMIT LINE
- N16 — BAR SIZE / DIAMETER IN MILLIMETRES

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-GE-000023.DWG

DESIGN LOT CODE:

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:26:21 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

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A3

SHEET 3 OF 3

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-GE-000023 | ISSUE 1

LEGEND SHEET

LINEMARKING

LINEMARKING TAG

PAVEMENT ARROW TAG

SURVEY (EXISTING)

- CABLE JUNCTION BOX (PEJB)
- LARGE SIGN (SI)
- ELECTRICAL CABLE MANHOLE (PEMH)
- SIGN POST (PSIN)
- DRILL HOLE AND WING (PDHL)
- EXISTING VALVE BOX
- POLE LIGHT (PLPL)
- STOP VALVE (WATER)
- KERB INLET (KI)
- WATER HYDRANT
- SURVEY MARKS (BOLTS, PEGS, NAILS)
- TRAFFIC SIGNAL JUNCTION BOX (PSJX)
- TRAFFIC CONTROL SIGNAL (PSGL)
- RUBBISH BIN (PBIN)
- TELEPHONE SINGLE CONCRETE PIT (PTSP)
- TELEPHONE TWIN CONCRETE PIT (PTTP)
- PIER COLUMN POINT (PBPI)
- DRAINAGE JUNCTION MANHOLE (PDJM)
- TELEPHONE BOX POINT (PTBX)
- TELEPHONE DISTRIBUTION PILLAR (PTDP)
- TELEPHONE SUMP (TS)
- UNIDENTIFIED SERVICE
- DISTRIBUTION FUSE POINT (PEFP)
- TRAFFIC SIGNAL CONTROLLER (TCS)
- WATER HYDRANT (PWHY)
- POLE POWER (PPPL)
- LUMINAIRE
- MAIL BOX
- POWER POLE AND LIGHT (PPLP)
- MANHOLE COVER (PSMH)
- D 450 — EXISTING PIPE - 450 DIA (U4)
- EXISTING LIGHT WITH OUTREACH (LI)
- EXISTING ABOVE GROUND JOINING POST (PTJP)
- D 300 — EXISTING PIPE - 300 DIA (U2)
- EXISTING INLET TO SUMP (PILT)
- EXISTING METER (PWMR)
- EXISTING DISH DRAIN (DD)
- EXISTING PARKING METER (PKME)
- POWER SERVICE PILLAR UNDERGROUND (PEUP)
- G I PIPE (PGPI)
- FIRE HYDRANT (WATER)
- OPTICAL FIBRE PIT (POFP)
- BOLLARD (AC)
- TOP OF CONCRETE JUNCTION BOX
- UNIDENTIFIED POLE
- BUS STOP (PBUS)
- PETROL PUMP
- DRAINAGE PIPE INVERT
- OPTICAL FIBRE JUNCTION BOX (POFJ)
- SPEED ZONE LINEMARKING
- ARROW RIGHT TURN (AR)
- ARROW LEFT TURN (AL)
- ARROW STRAIGHT AHEAD (AS)
- EXISTING POST - DOUBLE SIDED (PSDS)
- TRANSFORMER CABINET CENTRE (PETC)
- FENCE POST OR GUIDE POST (POST)
- WM — WATER MAIN MARKER (PWMM)
- TSP — EXISTING STD 1.1m BY 1.1m MAIN PIT (PTMP)
- TM — EXISTING TRAFFIC MARKER (SILENT COP) (PTMX)
- EXISTING GULLY PIT (PGUL)
- D 375 — EXISTING PIPE - 375 DIA (U3)
- D 525 — EXISTING PIPE - 525 DIA (U5
- SLH — EXISTING LAMPHOLES (PSLH)
- SVP — EXISTING VENT PIPE (PSVP)
- AP — EXISITING ALIGNMENT PIN (PAPN)
- EGL — EXISTING GARDEN LIGHT (PLGN)
- SF — EXISTING DRAIN SUBSOIL FLUSH POINT (PSFP)
- EXISTING AIR VALVE (PWAV)
- FLASH — EXISTING CAMERA - FLASH UNIT (PCFU)
- CAM — EXISTING RED LIGHT-SPEED-TRAFFIC CAMERA (PCAM)
- IN 300 Dia — EXISTING INVERT - 300 DIA (PI02)
- EXISTING TOPO SPOT HEIGHT
- EXISTING DRAIN TABLE
- EXISTING SIGN WITH OUTREACH
- EXISTING TRAFFIC LIGHT WITH OUTREACH (TO)
- EXISTING HISTORICAL POINT OF INTEREST (PHIS)
- TREE TRUNK - 1200mm DIA PT11
- TREE TRUNK - 1000mm DIA PT10
- TREE TRUNK - 900mm DIA PT09
- TREE TRUNK - 800mm DIA PT08
- TREE TRUNK - 700mm DIA PT07
- TREE TRUNK - 600mm DIA PT06
- TREE TRUNK - 500mm DIA PT05
- TREE TRUNK - 400mm DIA PT04
- TREE TRUNK - 300mm DIA PT03
- TREE TRUNK - 200mm DIA PT02
- TREE TRUNK - 100mm DIA PT01
- TREE FOLIAGE - 1M SPREAD (PF01)
- TREE FOLIAGE - 2M SPREAD (PF02)
- TREE FOLIAGE - 4M SPREAD (PF03)
- TREE FOLIAGE - 6M SPREAD (PF04)
- TREE FOLIAGE - 7M SPREAD (PF05)
- TREE FOLIAGE - 8M SPREAD (PF06)
- TREE FOLIAGE - 10M SPREAD (PF07)
- TREE FOLIAGE - 12M SPREAD (PF08)
- TREE FOLIAGE - 15M SPREAD (PF09)

ABREVIATIONS

TCS	TRAFFIC CONTROL SIGNAL
DRG	DRAWING(S)
RCP	STEEL REINFORCED CONCRETE PIPE
STD	STANDARD

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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0 1	10.08.2020 06.11.2020	DRAFT ISSUE (DETAILED) PRE-AFC		A. PEREZ A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

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CLIENT: NSW GOVERNMENT Transport for NSW

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LEGEND

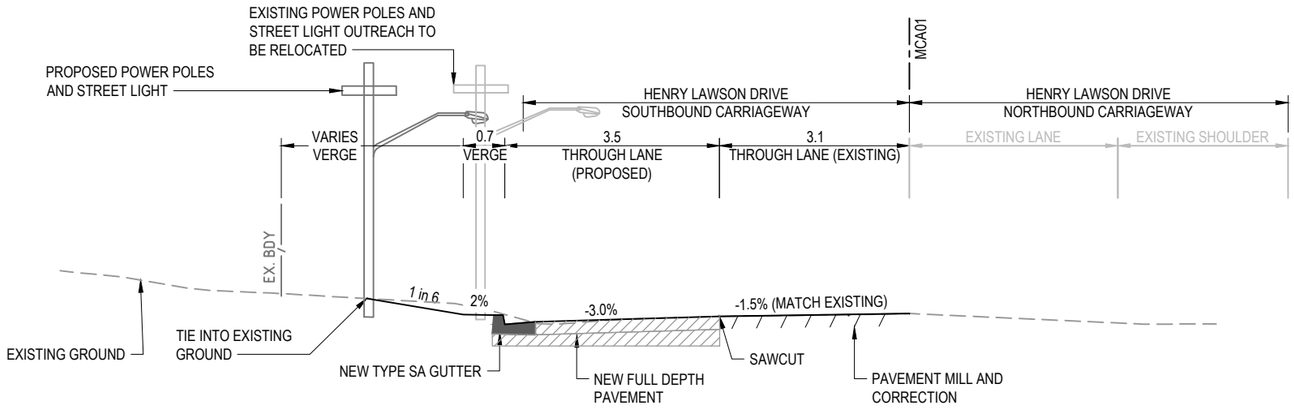
A3

SHEET 1 OF 1

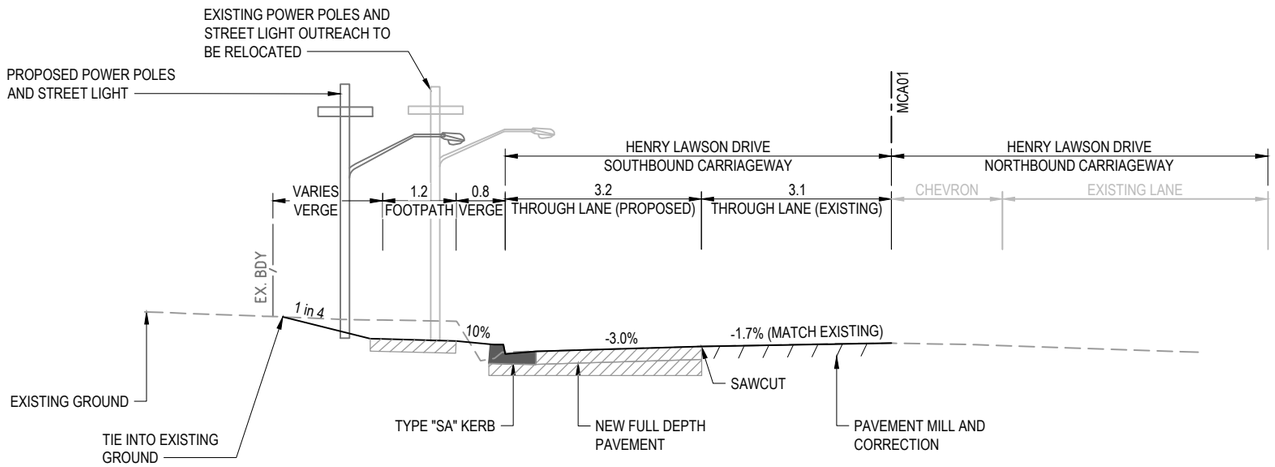
PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

TINSW REGISTRATION No. DS2020/000130 — PART 1

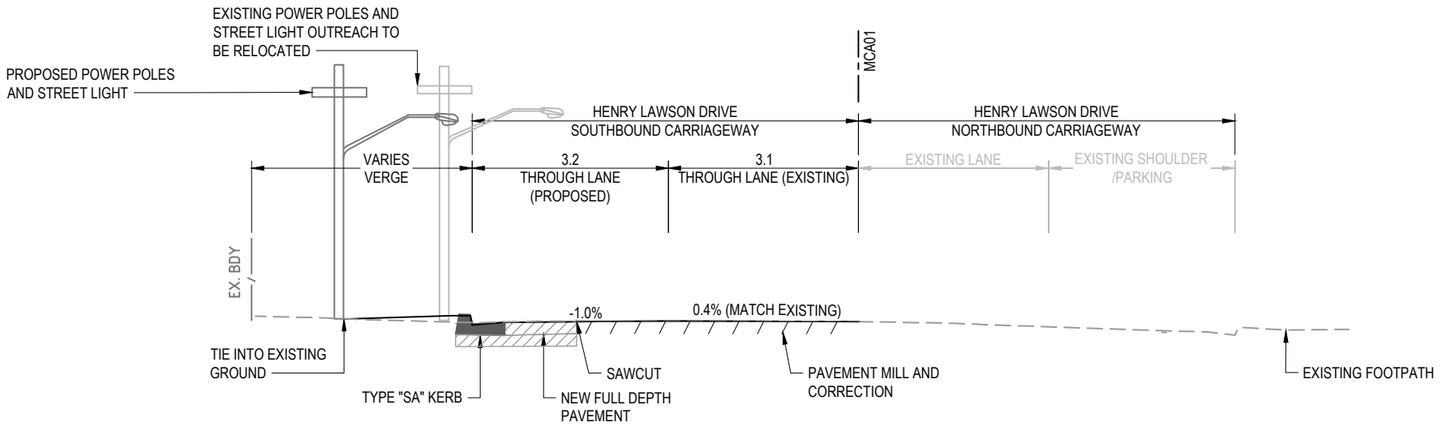
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-GE-000041	1



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH360 (APPROX.)
SCALE 1:100



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH260 (APPROX.)
SCALE 1:100



TYPICAL SECTION ON HENRY LAWSON DRIVE
MCA01-CH40 (APPROX.)
SCALE 1:100

LEGEND

- EXISTING SURFACE
- MILL AND CORRECTION
- NEW PAVEMENT (REFER NOTE 1)

NOTES

1. FOR PAVEMENT PROFILES REFER TO PAVEMENT DRAWINGS PV-000501 TO PV-000502, FOR PAVEMENT DETAILS REFER TO DRAWINGS PV-000521 TO PV-000533.
2. FOR GENERAL NOTES REFER TO DRAWINGS GE-000021 TO GE-000023.
3. FOR CROSS FALL DETAILS ON EXISTING AND PROPOSED ROADS REFER TO CROSS SECTION DRAWINGS RC-005001 TO RC-005012.

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-GE-000051.DWG
DESIGN LOT CODE: WVR
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ 06.11.2020
1	06.11.2020	PRE-AFC		

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SCALES ON A3 SIZE DRAWING: 0.5 0 0.5 1 1.5 2m — 1 : 100 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
TYPICAL CROSS SECTIONS

A3
SHEET 1 OF 1

TfNSW REGISTRATION No.: DS2020/000130 PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-GE-000051
ISSUE: 1

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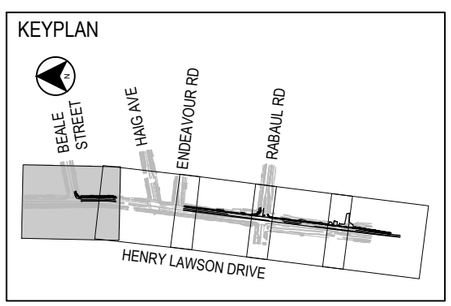
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

NOTES

1. FOR MEDIANS, KERB RETURNS, SETOUTS AND TABLES, REFER TO SHEETS RD-001101 TO RD-001201.
2. FOR ALIGNMENT CONTROL SETOUT TABLES, REFER TO SHEET RD-001005.
3. FOR KERB SCHEDULE, REFER TO SHEET RD-001101 TO RD-001103.
4. PURSUANT TO THE SURVEYING AND SPATIAL INFORMATION ACT, ANY CADASTRAL REFERENCE MARKS, SURVEY PMs OR SSMs THAT ARE ON KERBS, FOOTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED LAND SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED, PERSONAL FINES APPLY FOR BREACHES OF THE ACT



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:25:22 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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PINCH POINTS SOUTH WEST

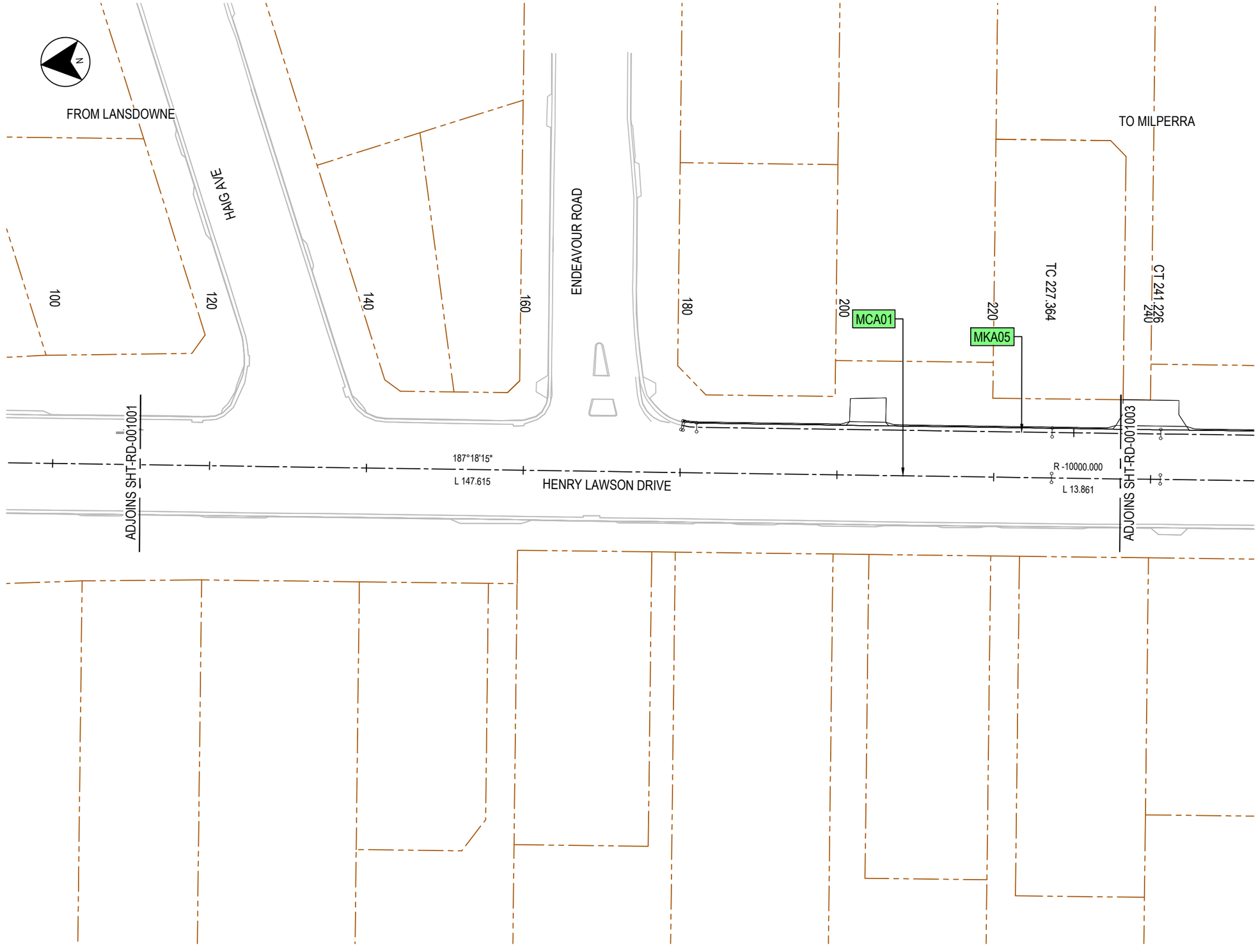
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

A3

SHEET 1 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001001	1



LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

NOTES

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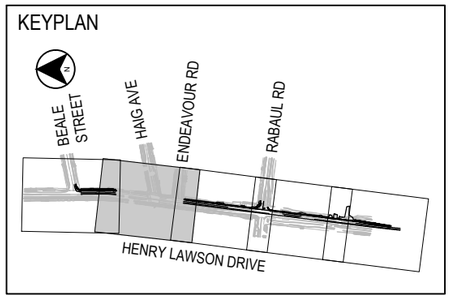
KEYPLAN



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50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	PW:/P0043031-SHT-RD-001002.DWG
EXTERNAL REFERENCE FILES	

REV	DATE	AMENDMENT / REVISION DESCRIPTION
0	10.08.2020	DRAFT ISSUE (DETAILED)
1	06.11.2020	PRE-AFC

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WVR No.	
APPROVAL	A. PEREZ A.PEREZ
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	-
SCALES ON A3 SIZE DRAWING	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM	MGA ZONE 56
HEIGHT DATUM	AHD
DRAWINGS / DESIGN PREPARED BY	-
PLOT DATE / TIME	23-Nov-20 / 9:25:36 PM
PLOT BY	MEGHWARB

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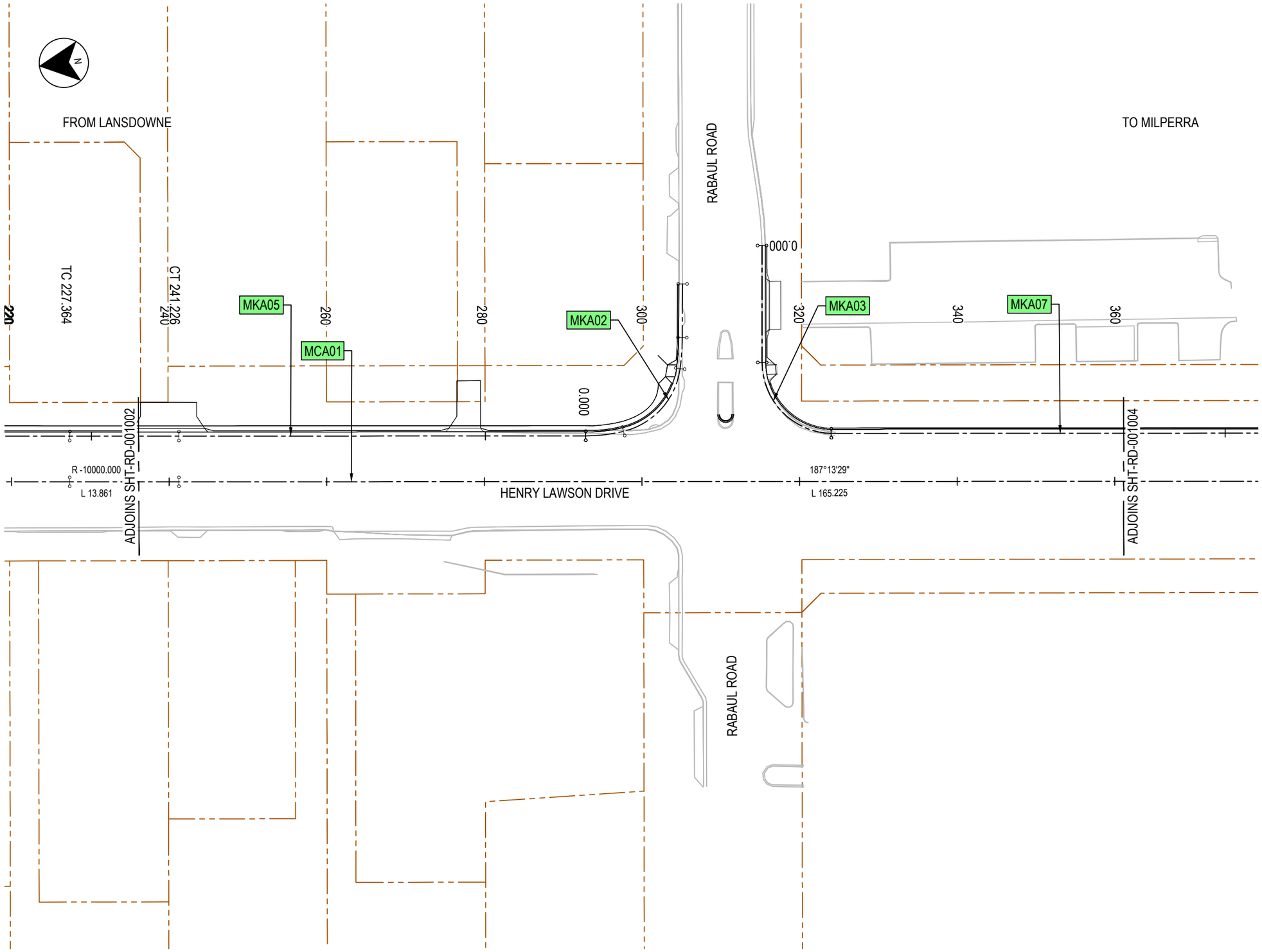
MR508 HENRY LAWSON DRIVE

A3

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

SHEET 2 OF 5

TfNSW REGISTRATION No. DS2020/000130			PART 1
ISSUE STATUS: DETAILED DESIGN	EDMS No.: -	SHEET No.: SHT-RD-001002	ISSUE 1



LEGEND

- 0`000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

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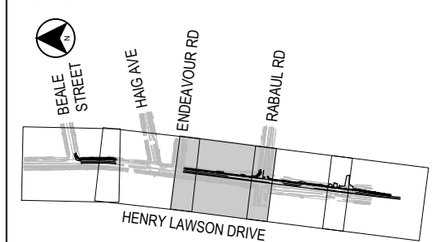
KEYPLAN



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50mm ON A3 SIZE ORIGINAL

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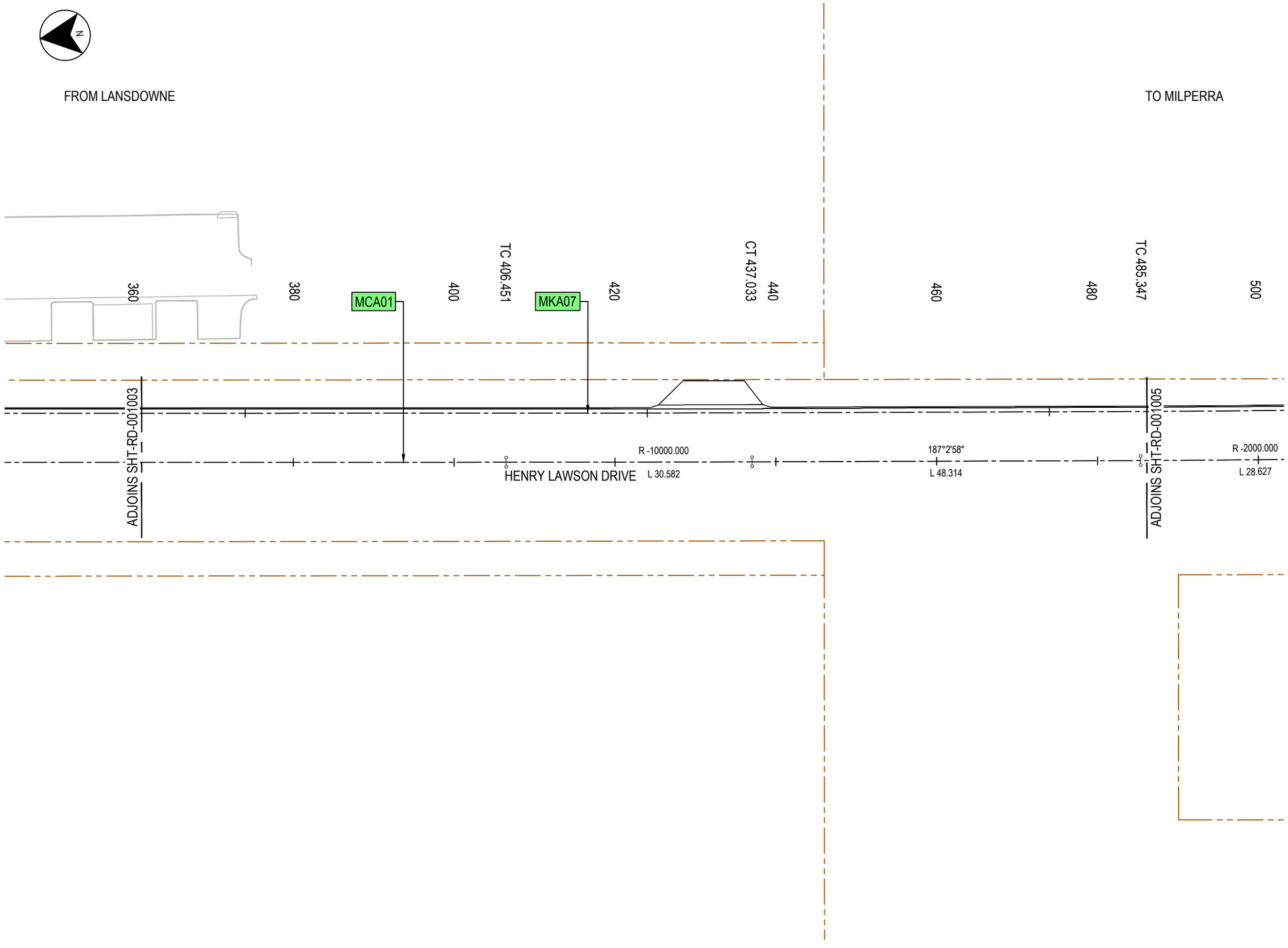
						CO-ORDINATE SYSTEM / HEIGHT DATUM					



LEGEND

0.000

- ROAD CONTROL LINE
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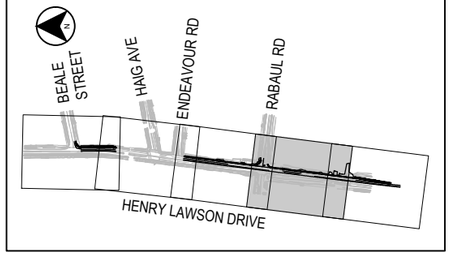
KEYPLAN



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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:21:36 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. / FINAL (INITIAL / DATE)

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

A3

SHEET 4 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

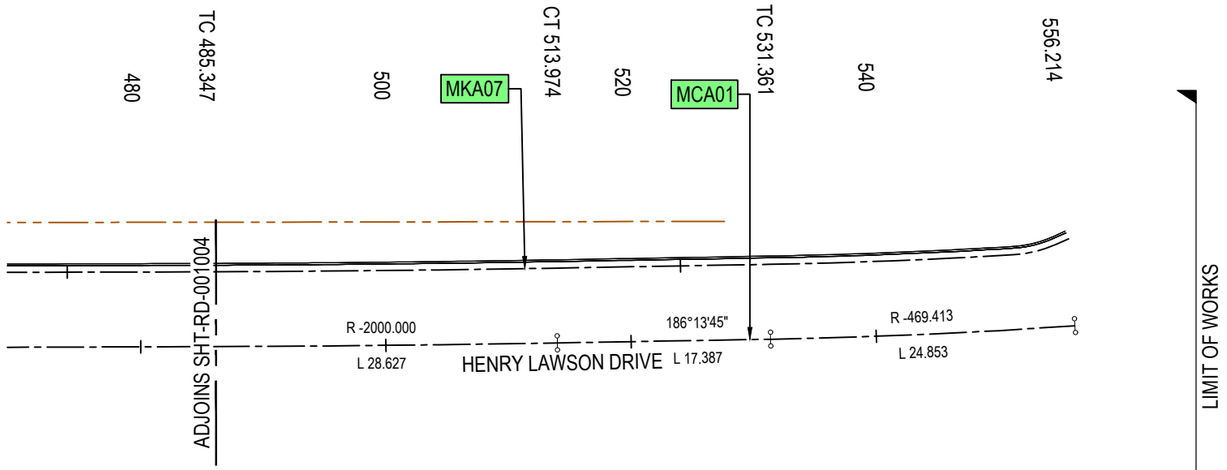
EDMS No.: -

SHEET No.: SHT-RD-001004

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA



LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL

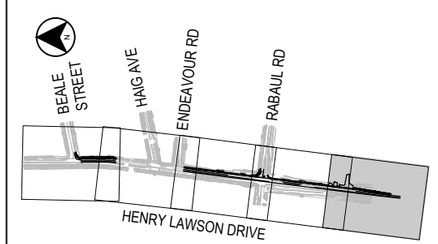
NOTES

1. FOR MEDIANS, KERB RETURNS, SETOUTS AND TABLES, REFER TO SHEETS RD-001101 TO RD-001201.
2. FOR ALIGNMENT CONTROL SETOUT TABLES, REFER TO SHEET RD-001005.
3. FOR KERB SCHEDULE, REFER TO SHEET RD-001101 TO RD-001103.
4. PURSUANT TO THE SURVEYING AND SPATIAL INFORMATION ACT, ANY CADASTRAL REFERENCE MARKS, SURVEY PMs OR SSMs THAT ARE ON KERBS, FOOTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED LAND SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED, PERSONAL FINES APPLY FOR BREACHES OF THE ACT

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MCA01

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312851.611	6245660.076	179°16'40.19"	LINE		
TC	41.226	312852.131	6245618.853	179°16'40.19"	ARC	275.000	38.523
CT	79.749	312849.921	6245580.424	187°18'14.63"	LINE		147.615
TC	227.364	312831.154	6245434.007	187°18'14.63"	ARC	-10000.000	13.861
CT	241.226	312829.402	6245420.257	187°13'28.72"	LINE		165.225
TC	406.451	312808.623	6245256.344	187°13'28.72"	ARC	-10000.000	30.582
CT	437.033	312804.823	6245225.999	187°02'57.91"	LINE		48.314
TC	485.347	312798.894	6245178.050	187°02'57.91"	ARC	-2000.000	28.627
CT	513.974	312795.584	6245149.615	186°13'45.49"	LINE		17.387
TC	531.361	312793.698	6245132.331	186°13'45.49"	ARC	-469.413	24.853
End	556.214	312791.656	6245107.565	183°11'44.92"			

KEYPLAN



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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
ALIGNMENT CONTROL PLAN AND SET-OUT TABLE

A3

SHEET 5 OF 5

TINSW REGISTRATION No.: DS2020/000130

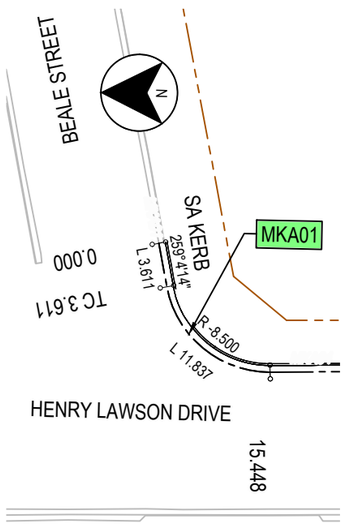
PART: 1

ISSUE STATUS: DETAILED DESIGN

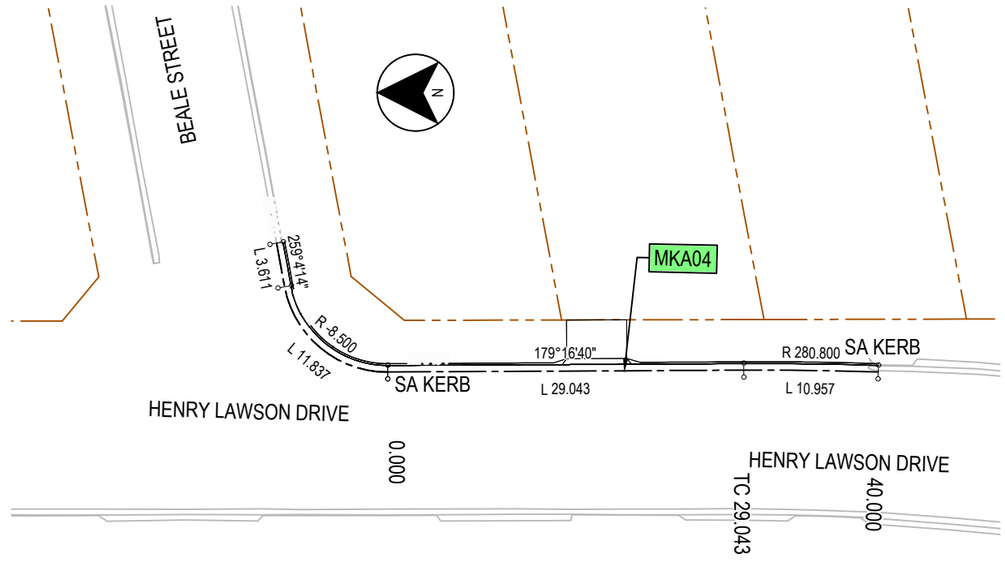
EDMS No.: -

SHEET No.: SHT-RD-001005

ISSUE: 1



CONTROL LINE MKA01
SCALE 1:500



CONTROL LINE MKA04
SCALE 1:500

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA01 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312867.998	6245657.104	259°04'13.99"	LINE		
TC	3.611	312864.452	6245656.420	259°04'13.99"	ARC	-8.500	11.837
End	15.448	312857.565	6245647.967	179°16'40.19"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA04 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312857.565	6245647.967	179°16'40.19"	LINE		
TC	29.043	312857.931	6245618.926	179°16'40.19"	ARC	280.800	10.957
End	40.000	312857.855	6245607.970	181°30'48.55"			

CHECK PRINT

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
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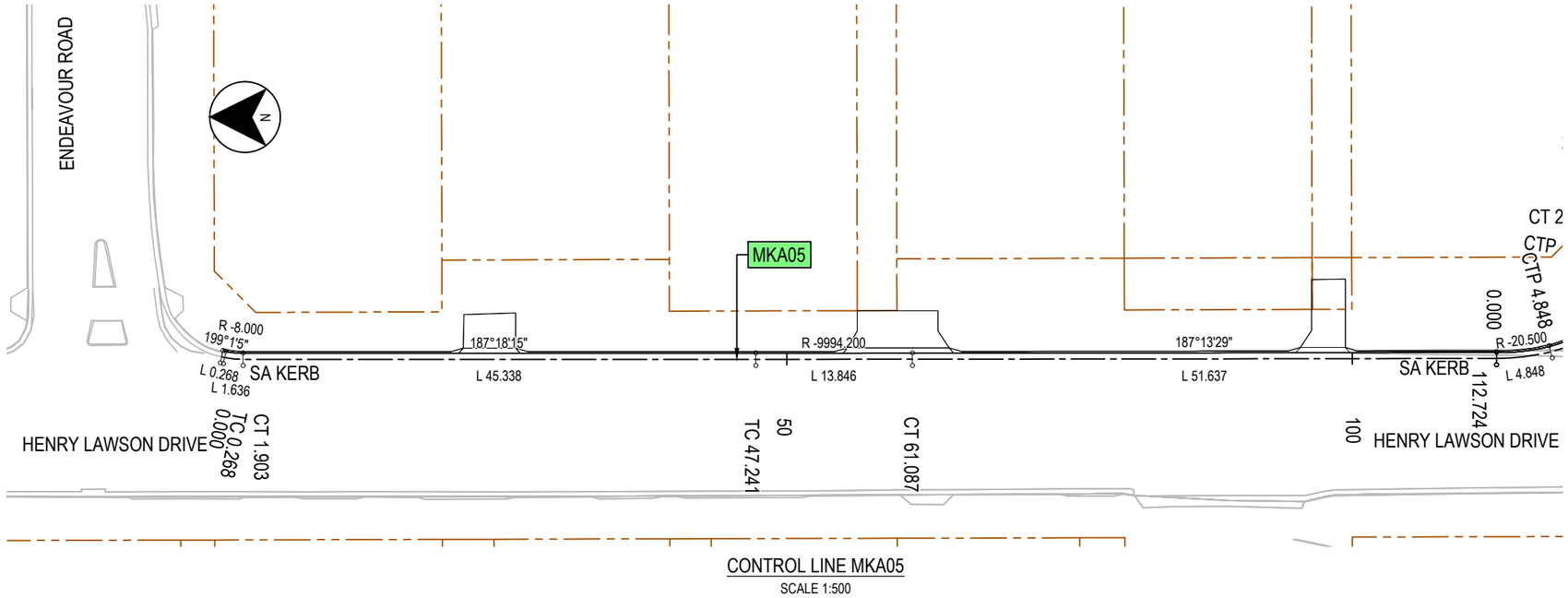
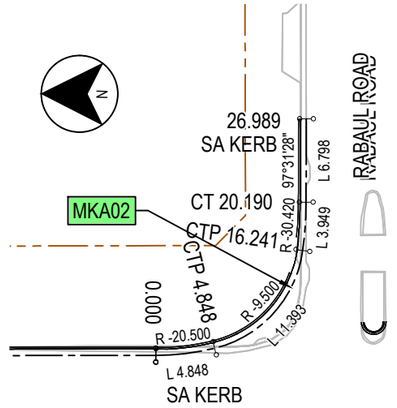
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
KERB CONTOL PLANS AND SET-OUT TABLES

A3
SHEET 1 OF 3

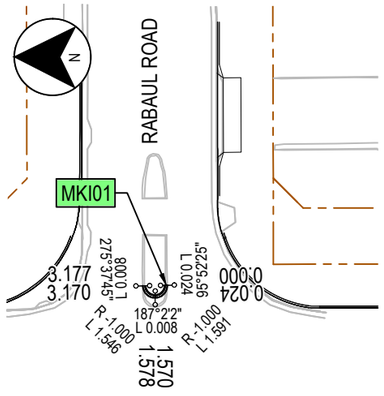
TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RD-001101
ISSUE: 1



CONTROL LINE MKA05
SCALE 1:500



CONTROL LINE MKA02
SCALE 1:500



CONTROL LINE MKI01
SCALE 1:500

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA05 - KERB TYPE - SA

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312843.130	6245480.083	199°01'05.09"	LINE		
TC	0.268	312843.043	6245479.830	199°01'05.09"	ARC	-8.000	1.636
CT	1.903	312842.671	6245478.240	187°18'14.63"	LINE		45.338
TC	47.241	312836.907	6245433.270	187°18'14.63"	ARC	-9994.200	13.846
CT	61.087	312835.157	6245419.535	187°13'28.87"	LINE		51.637
End	112.724	312828.663	6245368.308	187°13'28.87"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKI01 - KERB TYPE - SM

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312829.198	6245351.352	275°37'44.82"	LINE		
TC	0.024	312829.174	6245351.355	275°37'44.82"	ARC	-1.000	1.546
CT	1.570	312828.083	6245350.482	187°02'01.58"	LINE		0.008
TC	1.578	312828.082	6245350.474	187°02'01.58"	ARC	-1.000	1.591
CT	3.170	312828.973	6245349.357	95°52'24.79"	LINE		0.008
End	3.177	312828.980	6245349.356	95°52'24.79"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA02 - KERB TYPE - SA

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312828.663	6245368.308	187°13'28.72"	ARC		
CC	4.848	312828.625	6245363.471	173°40'25.71"	ARC	-9.500	11.393
CC	16.241	312835.614	6245355.340	104°57'45.75"	ARC	-30.420	3.949
CT	20.190	312839.485	6245354.571	97°31'28.11"	LINE		6.798
End	26.989	312846.225	6245353.681	97°31'28.11"			

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

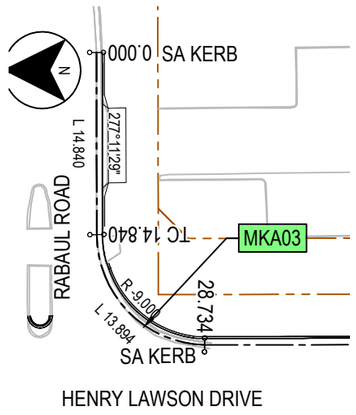
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
KERB CONTOL PLANS AND SET-OUT TABLES

A3
SHEET 2 OF 3

TINSW REGISTRATION No.: DS2020/000130
PART: 1

ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RD-001102
ISSUE: 1



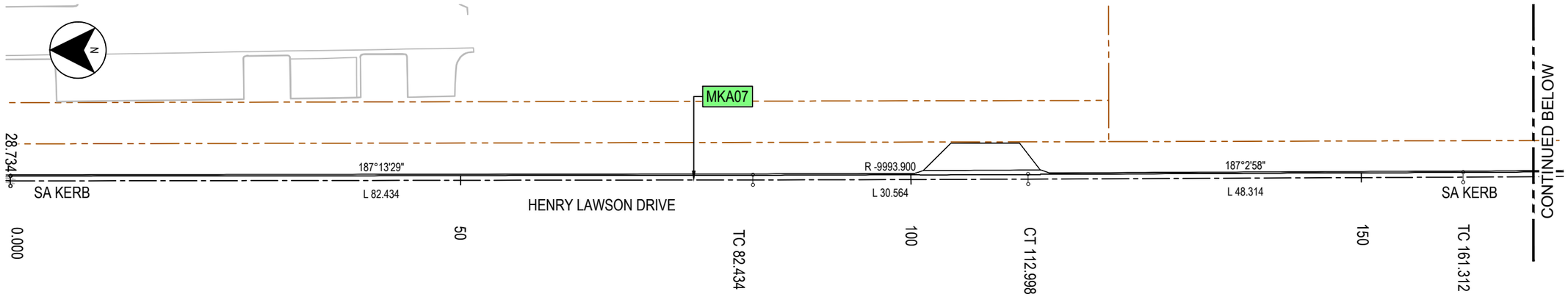
HENRY LAWSON DRIVE

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA03 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312849.787	6245343.061	277°11'29.17"	LINE		
TC	14.840	312835.064	6245344.919	277°11'29.17"	ARC	-9.000	13.894
End	28.734	312825.042	6245337.357	188°44'12.35"			

HORIZONTAL ALIGNMENT REPORT - CONTROL LINE MKA07 - KERB TYPE - SA							
PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
Start	0.000	312825.041	6245337.357	187°13'28.72"	LINE		
TC	82.434	312814.675	6245255.577	187°13'28.72"	ARC	-9993.900	30.564
CT	112.998	312810.877	6245225.250	187°02'57.91"	LINE		48.314
TC	161.312	312804.948	6245177.301	187°02'57.91"	ARC	-1993.900	28.540
CT	189.852	312801.648	6245148.953	186°13'45.49"	LINE		17.387
TC	207.238	312799.762	6245131.669	186°13'45.49"	ARC	-463.313	19.948
CC	227.186	312798.025	6245111.799	183°45'44.90"	ARC	-10.000	3.548
CT	230.734	312798.418	6245108.292	163°26'07.84"	LINE		1.171
End	231.905	312798.752	6245107.169	163°26'07.84"			

CONTROL LINE MKA03

SCALE 1:500



CONTROL LINE MKA07

SCALE 1:500

CONTROL LINE MKA07 DONTINUED

SCALE 1:500

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PLOT BY: MEGHWARB

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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

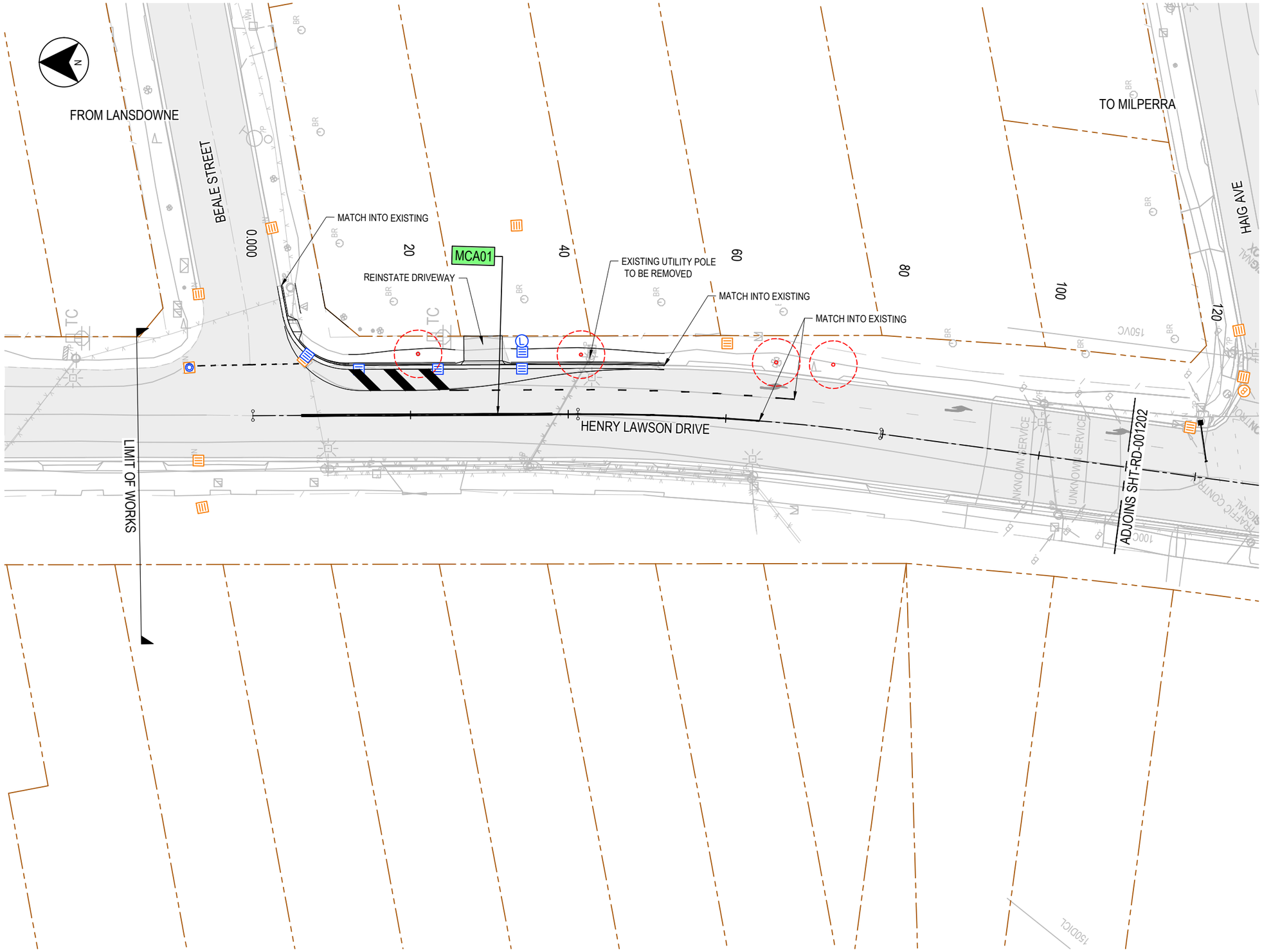
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
KERB CONTOL PLANS AND SET-OUT TABLES

A3

SHEET 3 OF 3

TfNSW REGISTRATION No.: DS2020/000130 PART: 1

ISSUE STATUS: DETAILED DESIGN EDMS No.: - SHEET No.: SHT-RD-001103 ISSUE: 1



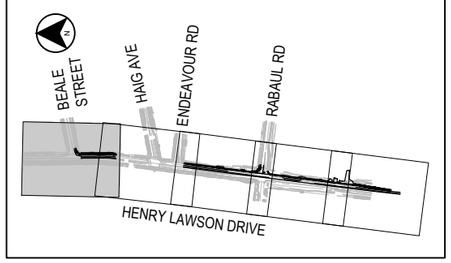
LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

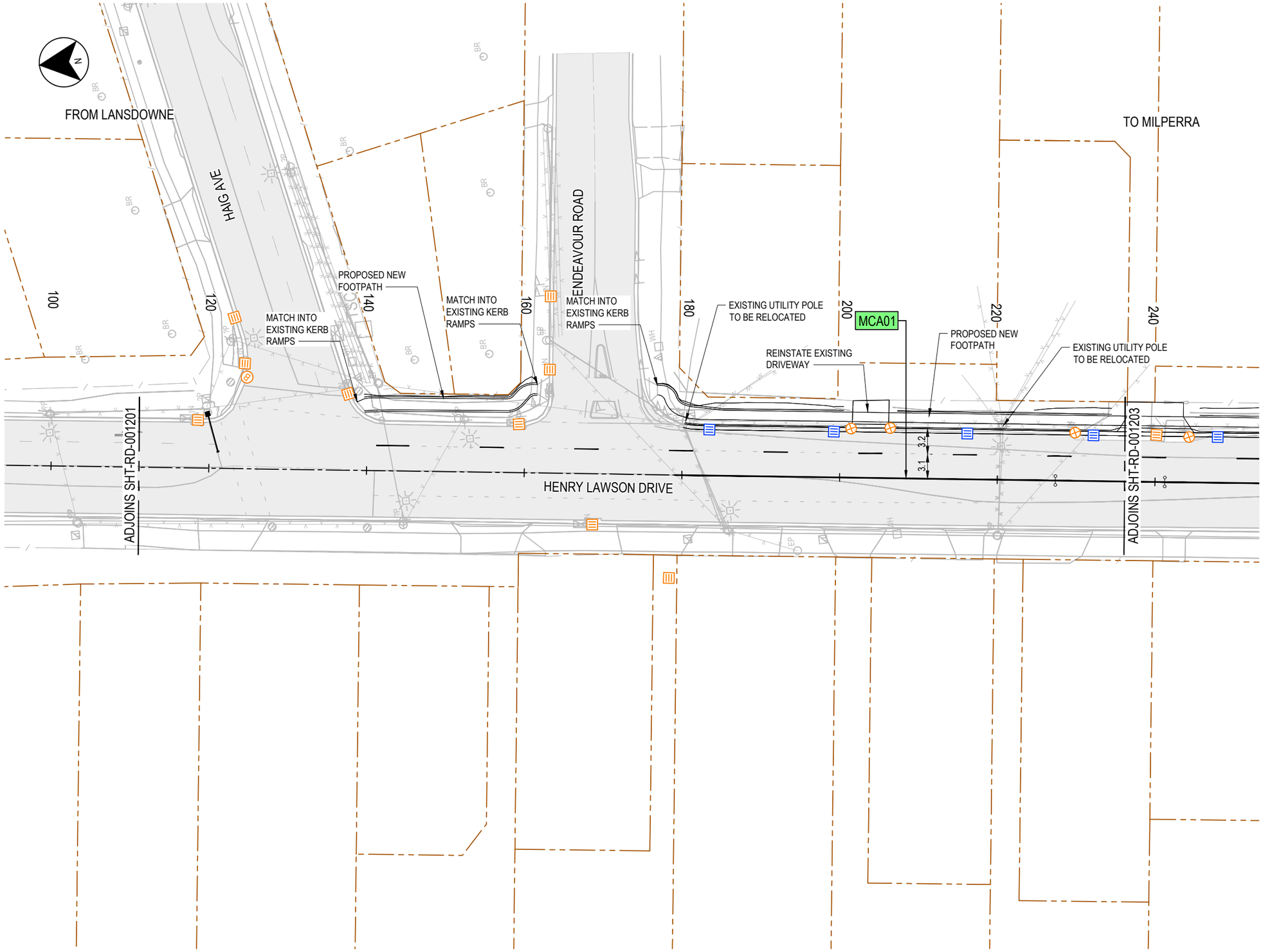
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3
SHEET 1 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001201	1



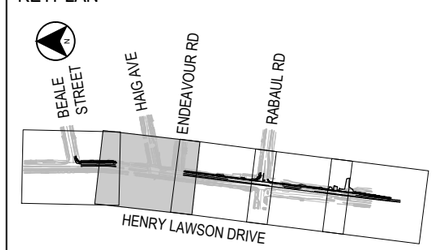
LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:28:33 PM	MEGHWARB

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	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

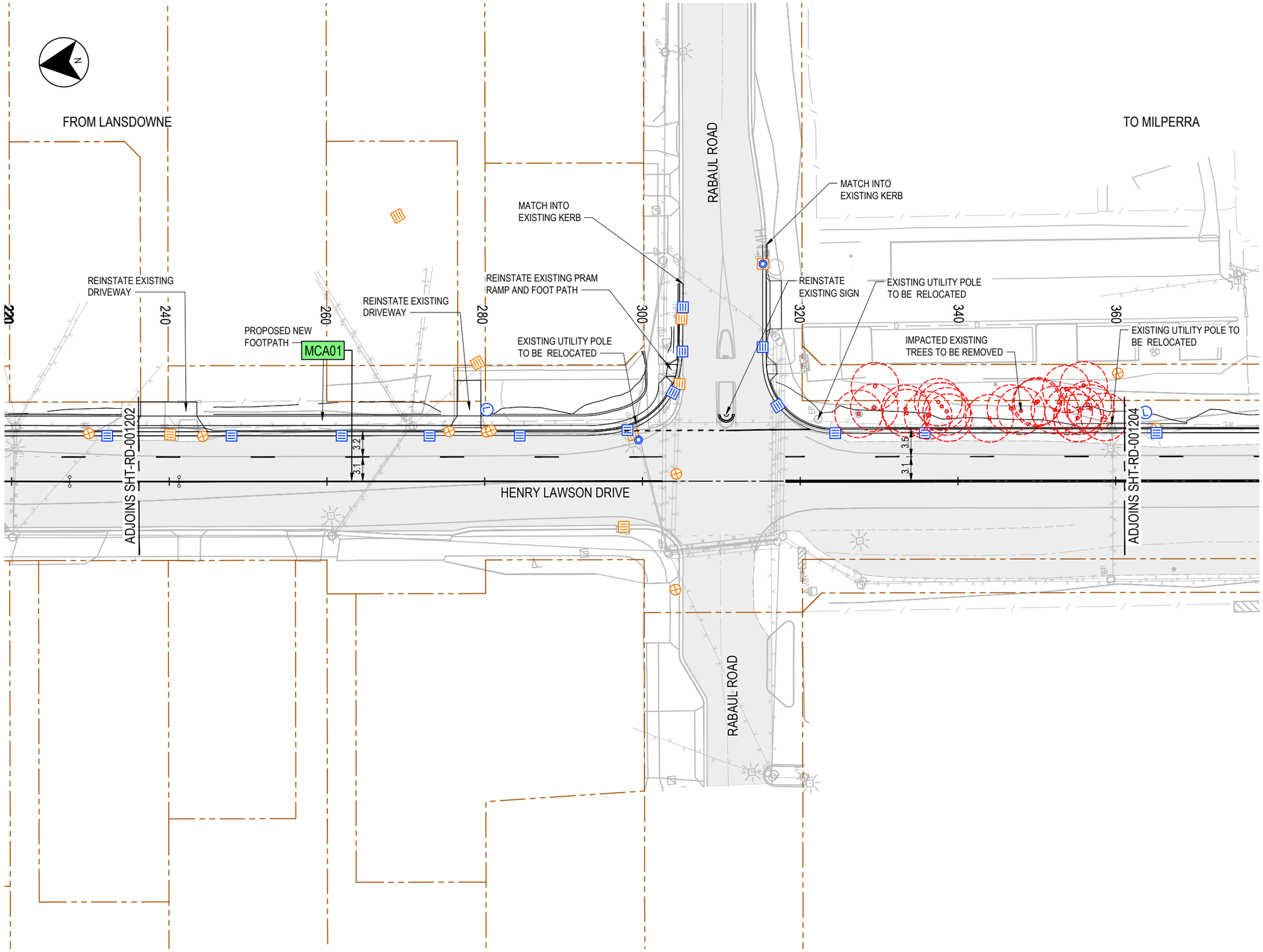
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL GENERAL ARRANGEMENT PLAN

A3

SHEET 2 OF 5

TINSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RD-001202 / 1



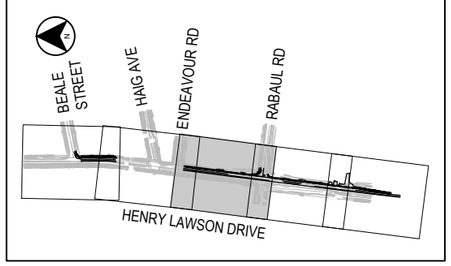
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3

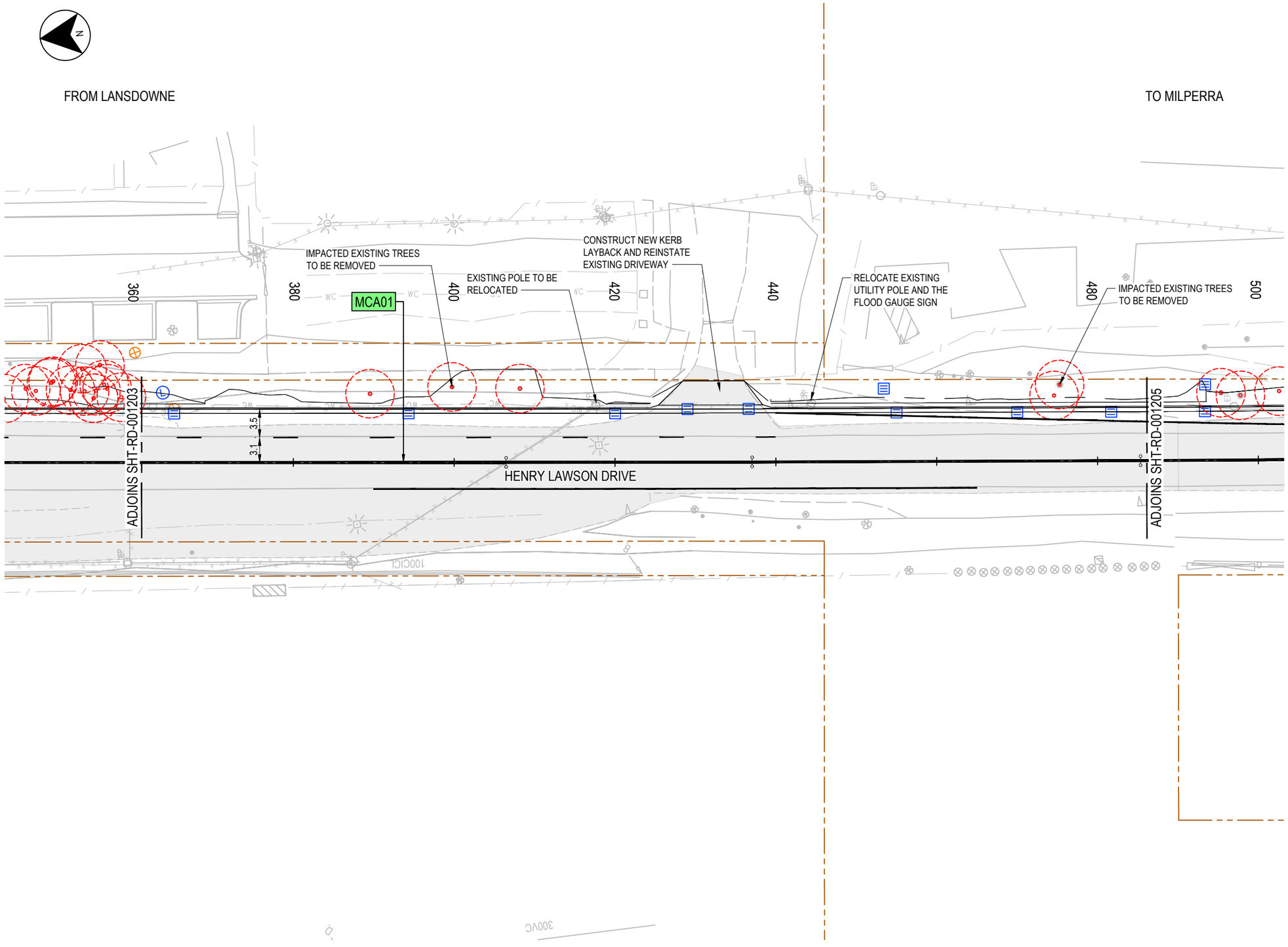
SHEET 3 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001203	1

FROM LANSDOWNE

TO MILPERRA



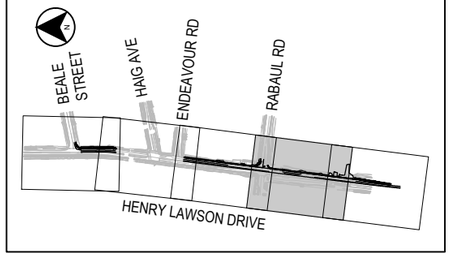
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:27:31 PM	MEGHWARB

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

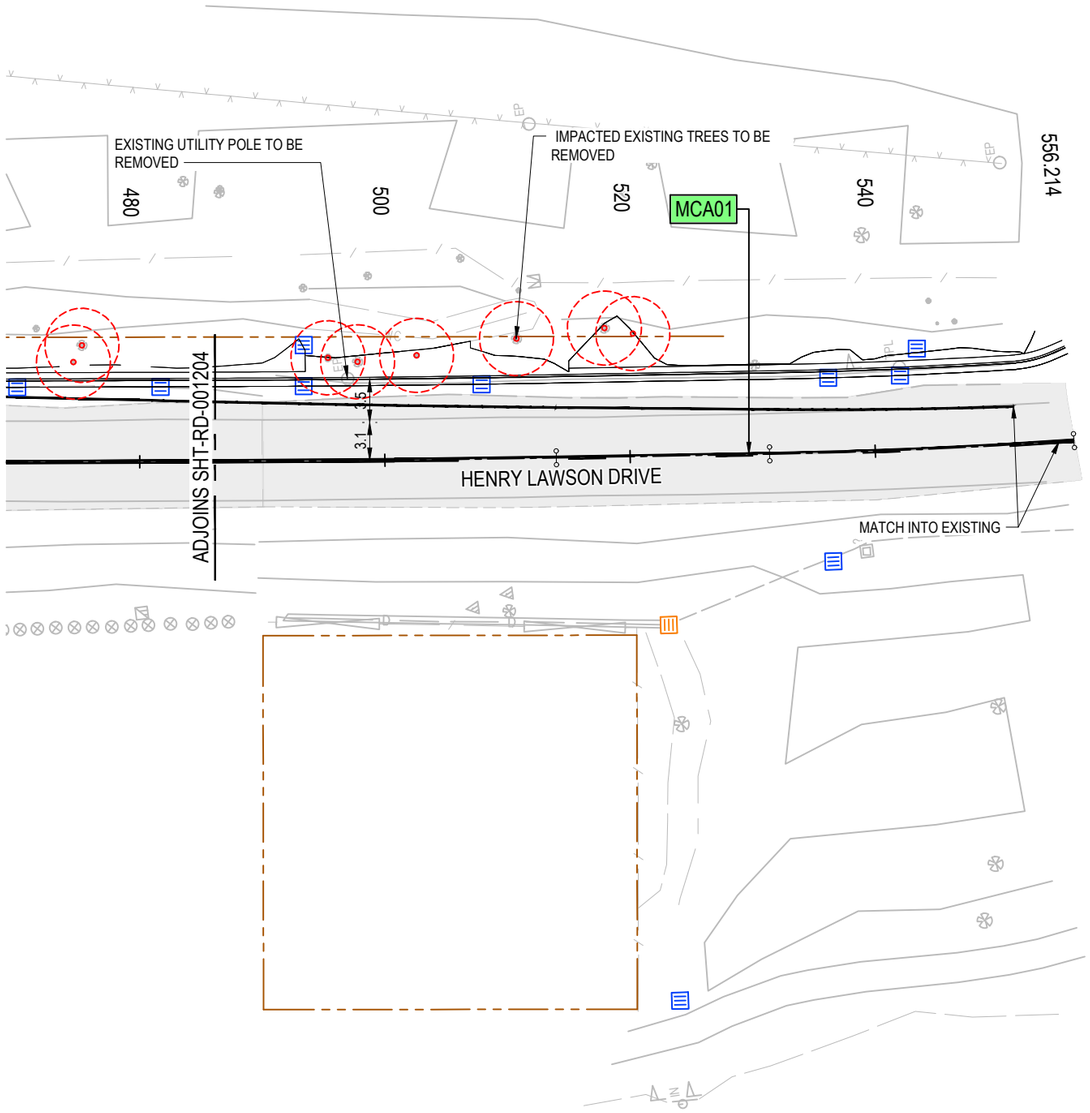
A3

SHEET 4 OF 5

TINSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RD-001204	1

FROM LANSDOWNE

TO MILPERRA



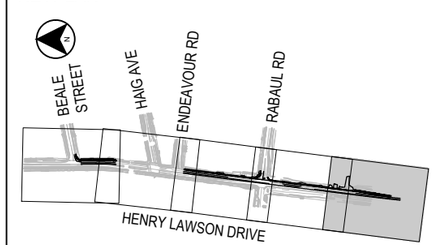
LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- NEW PROPERTY BOUNDARY / FENCE
- NEW RETAINING WALL
- NEW DRAIN CANAL AND HEADWALL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- NEW HAUNCHED PIT
- EXISTING TREES TO BE REMOVED
- NEW TCS POSTS & MAST ARMS
- EXISTING TCS POSTS & MAST ARMS (TO BE MAINTAINED)
- PROPERTY WORKS
- TCS 1225 — TCS NUMBER

NOTES

1. FOR CONTROL AND SETOUT TABLES REFER TO SHEETS RD-001001 TO RD-001005.
2. EXISTING PROPERTY ACCESSES ON HENRY LAWSON DRIVE ARE TO BE RETAINED OR REINSTATED

KEYPLAN



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	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:27:46 PM	MEGHWARB

CHECK PRINT — PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
GENERAL ARRANGEMENT PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RD-001205 / 1

FROM LANSDOWNE

TO MILPERRA

BEALE STREET

HAIG AVE

HENRY LAWSON DRIVE

LIMIT OF WORKS

ADJOINS SHT-SM-001002

MCA01

CONCRETE ENCASE NEW PIPE. REFER TO 'PV SERIES' FOR ENCASEMENT DETAIL.

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMPHOLE. POSITION OF LAMPHOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION.

CONNECT NEW PIPE INTO EXISTING GRATED PIT. CONFIRM INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW STORMWATER PIPE

CONTRACTOR TO ADJUST POSITION AND GRATE LEVEL OF PIT WITHIN VERGE TO SUIT LOW POINT, FLOW PATH AND LANDSCAPING.

SHALLOW PIPES BETWEEN C01\02 AND C01\05. REFER TO 'PV SERIES' FOR EDGE DETAIL.

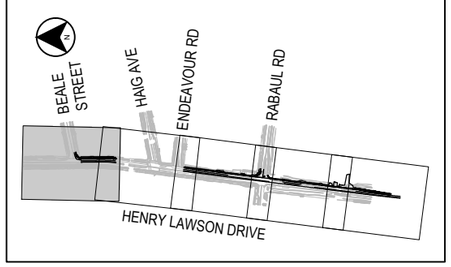
ABANDON EXISTING PIT. CONNECT EXISTING PIPE INTO NEW PIT. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT

RETAIN EXISTING PIPE BETWEEN C01\02 AND EX L16. C01\02 TO HAVE TWO OUTLET PIPES (EXISTING 300 mm PIPE AND PROPOSED 450 mm PIPE).

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- NEW STORMWATER PIPE
- EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:16:00 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER MANAGEMENT PLAN

A3

SHEET 1 OF 5

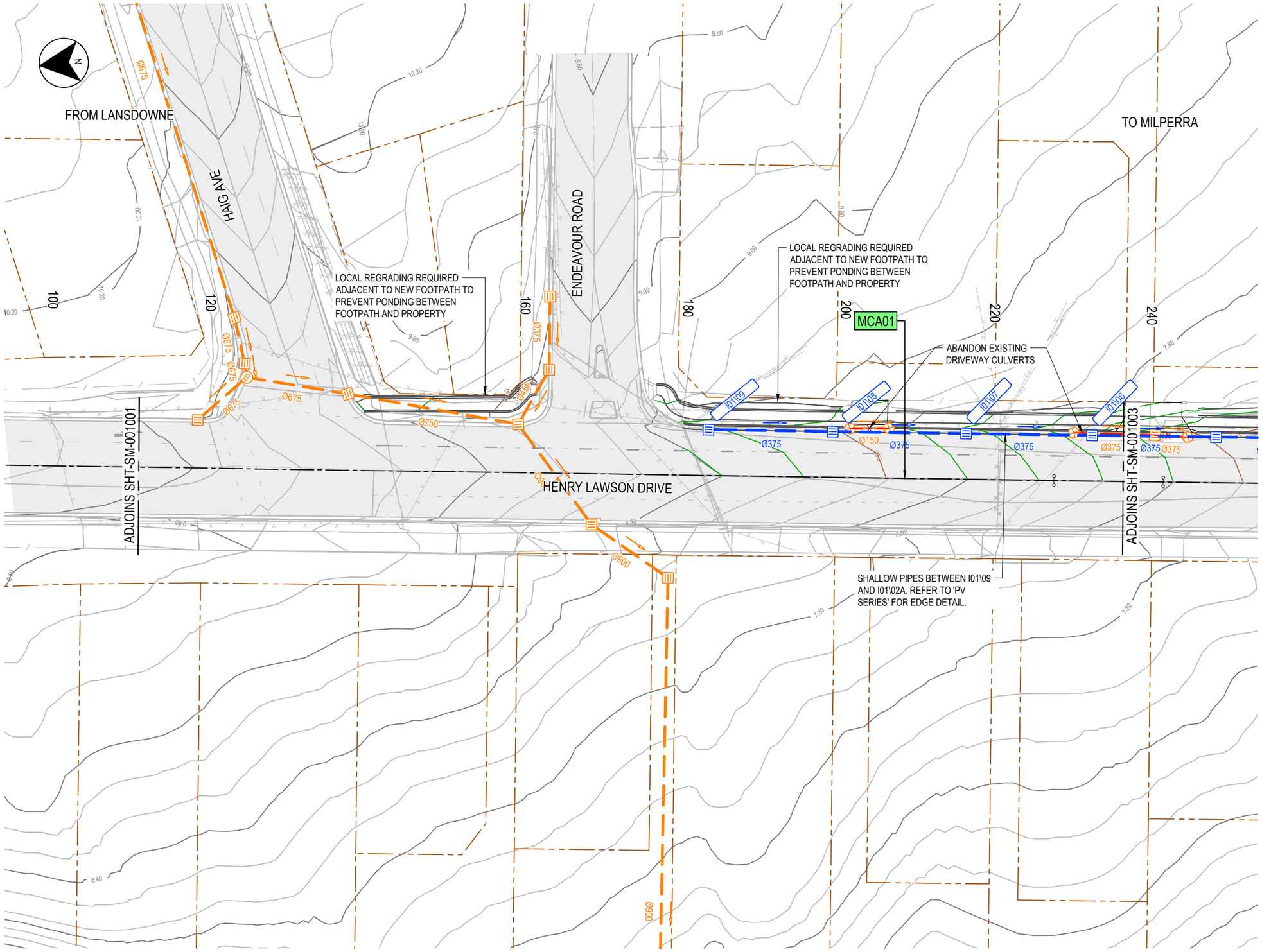
TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-001001

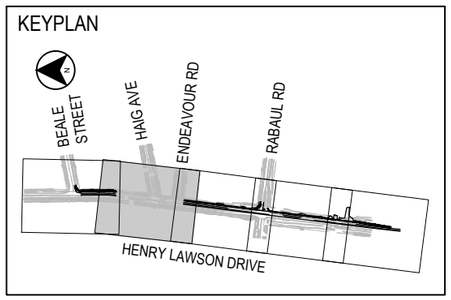
ISSUE: 1



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001002.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:16:25 PM	PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No. / APPROVAL	SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	DRAWINGS / DESIGN PREPARED BY	CHECK PRINT (PRELIM. / FINAL; INITIAL / DATE)
	0	10.08.2020	DRAFT ISSUE (DETAILED)	A. PEREZ			DISCIPLINE
	1	06.11.2020	PRE-AFC	A.PEREZ			DISCIPLINE
			REVISION IN PROGRESS				DISCIPLINE
							DISCIPLINE
					CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-	BACKDRAFTED/CORRECTED
							CONFIRMED

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3 | SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-001002	1

FROM LANSDOWNE

TO MILPERRA

RABAUL ROAD

HENRY LAWSON DRIVE

ADJOINS SHT-SM-001002

ADJOINS SHT-SM-001004

CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT

SHALLOW PIPE BETWEEN B01/03 AND B01/02. REFER TO 'PV SERIES' FOR EDGE DETAIL.

CONTRACTOR TO ADJUST POSITION OF PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND PIT B01\03.

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION

MCA01

ABANDON EXISTING PITS AND PIPE

ABANDON EXISTING PIT AND DRIVEWAY CULVERT

ABANDON EXISTING DRAINAGE PIPE

CONFIRM LOCATION AND INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW OUTLET PIPE. ADJUST EXISTING PIT LINTEL TO SUIT NEW KERB ALIGNMENT.

SHALLOW PIPE BETWEEN EX R7 AND D01/18. REFER TO 'PV SERIES' FOR EDGE DETAIL.

CONCRETE ENCASE NEW PIPE. REFER TO 'PV SERIES' FOR ENCASEMENT DETAIL.

EXISTING SEWER MAIN NEARBY

CONTRACTOR TO ADJUST POSITION OF 1.2 m PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND DRIVEWAY.

SHALLOW PIPES BETWEEN D01/18 AND D01/13. REFER TO 'PV SERIES' FOR EDGE DETAIL.

SHALLOW PIPE BETWEEN I01\09 AND I01\02A REFER TO 'PV' SERIES FOR DETAILS

ABANDON EXISTING DRIVEWAY CULVERT

ABANDON EXISTING PIT AND CONSTRUCT NEW INLET PIT.

REMOVE EXISTING 375 DIA PIPE BACK TO FIRST CLEAN AND SOUND JOINT. INSTALL NEW 375 DIA PIPE AND CONNECT INTO EXISTING 375 DIA PIPE.

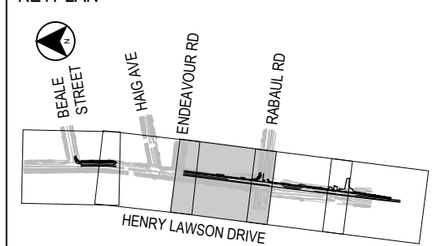
SHALLOW PIPE BETWEEN A01\02 AND I01\02A REFER TO 'PV' SERIES FOR DETAILS

CAUTION
NEW WATER MAIN NEARBY

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:18:11 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
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DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER MANAGEMENT PLAN

A3

SHEET 3 OF 5

TINSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-001003

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA

REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE TO BE BE CONFIRMED ON SITE DURING CONSTRUCTION

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

CAUTION
EXISTING SEWER MAIN NEARBY

PROTECT PROPOSED BATTER, LOW POINT AND 2 m FROM BACK OF KERB WITH ENKAMAT LINING. ENKAMAT LINING TO BE LAID AND PINNED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. REFER TO SM-SHT-000506 FOR DETAIL.

SHALLOW PIPES BETWEEN D01\18 AND D01\13. REFER TO 'PV SERIES' FOR EDGE DETAIL

ABANDON EXISTING DRAINAGE PIPE

CONTRACTOR TO CONFIRM DEPTH AND ALIGNMENT OF SEWER MAINS PRIOR TO CONSTRUCTION OF THE NEW DRAINAGE LINE TO ENSURE NO CLASH BETWEEN STORMWATER PIPE AND SEWER PIPE PROTECTION. STORMWATER PIPE WITHOUT SOCKET ACHIEVES APPROXIMATELY 25 mm CLEARANCE BELOW PROPOSED SEWER MAIN CONCRETE ENCASEMENT. THE STORMWATER PIPE SOCKETS/JOINTS SHOULD BE PLACED EITHER SIDE OF THE SEWER MAINS OR IN BETWEEN THE SEWER MAINS AND SHOULD NOT BE PLACED DIRECTLY UNDER EITHER SEWER MAIN.
CONTRACTOR TO CONFIRM NEW DRAINAGE PIPE HAS ADEQUATE CLEARANCE TO THE SEWER MAIN AND DESIGN PIPE GRADE CAN BE ACHIEVED

ADJOINS SHT-SM-001003

ADJOINS SHT-SM-001005

MCA01

EX.1.0

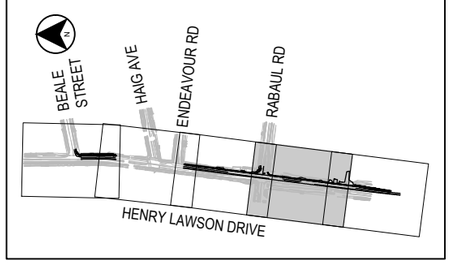
D01\02 D01\14 D01\13 D01\12 D01\11 D01\10 K01\02 D01\09 D01\08 D01\07

Ø600 Ø675 Ø750 Ø450 Ø375

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001004.DWG
EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION
0	10.08.2020	DRAFT ISSUE (DETAILED)
1	06.11.2020	PRE-AFC

REVISION IN PROGRESS

DESIGN LOT CODE: WVR No. | APPROVAL: A. PEREZ, A.PEREZ

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:16:54 PM | PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
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DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3

SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-SM-001004 | ISSUE 1

FROM LANSDOWNE

TO MILPERRA

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

MCA01

480 500 520 540

556.214

ADJOINS SHT-SM-001004

LIMIT OF WORKS

Ø750 Ø750 Ø750 Ø375 Ø375 Ø750 Ø450 Ø750

D01102 D01106 D01105 D01104 D01103 D01102 D01103 D01101

EX1.1

CAUTION
EXISTING COMMS NEARBY

CAUTION
EXISTING SEWER MAIN NEARBY

CAUTION
TREE PROTECTION ZONE (TPZ) NEARBY. PIPE ALIGNMENT ENSURES LESS THAN 10% OF TPZ IS AFFECTED. REFER TO 'REF' FOR FURTHER DETAILS.

CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.

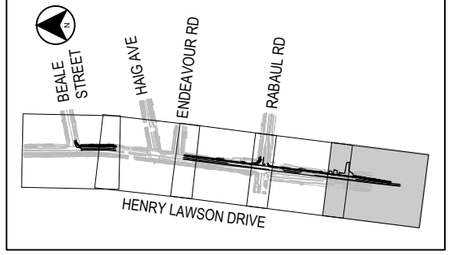
REPLACE EXISTING HEADWALL AND APRON WITH NEW LIKE-FOR-LIKE HEADWALL AND APRON. REFER TO ST SERIES DRAWINGS FOR DETAILS. INSTALL MOUNTING RING STYLE FLOOD GATE (HUME-KING FLOODGATE OR SIMILAR). RETAIN EXISTING SCOUR PROTECTION

ABANDON EXISTING PIPE DOWNSTREAM OF NEW PIT D01\02 AND CONSTRUCT NEW PIPE ON EXISTING PIPE ALIGNMENT.

LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING PAVEMENT
- EXISTING STORMWATER PIT
- NEW STORMWATER PIT
- PIPE CONNECTION TO EXISTING PIT
- ADJUST / MODIFY EXISTING PIT INLET
- LAMPHOLE
- EXISTING PIPE BEND
- EXISTING OUTLET
- Ø375 — NEW STORMWATER PIPE
- Ø375 — EXISTING STORMWATER PIPE
- MAJOR - CONTOURS
- MINOR - CONTOURS
- EXISTING MAJOR - CONTOURS
- EXISTING MINOR - CONTOURS
- ABANDON EXISTING PIPE / PIT
- FLOW PATH
- CONCRETE ENCASE NEW PIPE
- CONCRETE ENCASE EXISTING PIPE
- SEWER MAIN EXISTING PIPE
- NEW HEADWALL AND EXISTING SCOUR PROTECTION

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-001005.DWG

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

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EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER MANAGEMENT PLAN

A3

SHEET 5 OF 5

TINSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN EDMS No.: - SHEET No.: SHT-SM-001005 ISSUE: 1

LONGITUDINAL PAVEMENT DRAINAGE - STRUCTURES SCHEDULE

STRUCTURE NO.	STRUCTURE TYPE	COORDINATES		DETAIL DRAWING REFERENCE	DRAWING PLAN NO.	COMMENTS
		EASTING	NORTHING			
A01\02	SA1.2	312832.648	6245356.716	#N/A	SHT-SM-001003	
EX R1	SA2	312922.852	6245344.263	EXISTING	-	
B01\03	SA3.6	312842.383	6245354.188	SHT-SM-000503	SHT-SM-001003	CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.
B01\02	SA3.6	312837.756	6245354.850	SHT-SM-000503	SHT-SM-001003	CONTRACTOR TO ADJUST POSITION OF PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND PIT B01\03.
C01\07	LAMP HOLE	312861.326	6245626.029	SHT-SM-000502	SHT-SM-001001	REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION.
C01\06	Grated Pit 600x600	312860.346	6245625.977	SHT-SM-000501	SHT-SM-001001	CONTRACTOR TO ADJUST POSITION AND GRATE LEVEL OF PIT WITHIN VERGE TO SUIT LOW POINT, FLOW PATH AND LANDSCAPING.
C01\05	SA2	312857.842	6245625.983	R0220-01 Sheet 1	SHT-SM-001001	
C01\04	SA2	312857.707	6245636.651	R0220-01 Sheet 1	SHT-SM-001001	
C01\03	SA2	312857.581	6245646.677	R0220-01 Sheet 1	SHT-SM-001001	
C01\02	SA3-SP	312859.309	6245653.233	SHT-SM-000504	SHT-SM-001001	ABANDON EXISTING PIT. CONNECT EXISTING PIPE INTO NEW PIT. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT
EX R7	SA3-ADJ-CONN	312847.399	6245343.333	R0220-43 & SHT-SM-000507	SHT-SM-001003	CONFIRM LOCATION AND INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW OUTLET PIPE. ADJUST EXISTING PIT LINTEL TO SUIT NEW KERB ALIGNMENT.
D01\18	SA1.2	312836.943	6245344.682	SHT-SM-000503	SHT-SM-001003	CONTRACTOR TO ADJUST POSITION OF 1.2 M PIT LINTEL AND TRANSITION LENGTHS TO SUIT ADJACENT PRAM RAMP AND DRIVEWAY.
D01\17	SA1.2	312829.342	6245343.716	SHT-SM-000503	SHT-SM-001003	
D01\16	SA1.8	312824.988	6245336.932	SHT-SM-000503	SHT-SM-001003	
D01\15	SA2	312823.559	6245325.666	R0220-01 Sheet 1	SHT-SM-001003	
D01\14	SA2	312819.864	6245296.516	R0220-01 Sheet 1	SHT-SM-001004	
D01\13	SA2	312816.200	6245267.608	R0220-01 Sheet 1	SHT-SM-001004	
D01\12	SA2	312812.978	6245242.118	R0220-01 Sheet 1	SHT-SM-001004	
D01\11	SB2	312812.358	6245233.125	R0220-51	SHT-SM-001004	
D01\10	SB2	312811.422	6245225.578	R0220-51	SHT-SM-001004	
D01\09	SA2	312808.668	6245207.384	R0220-01 Sheet 1	SHT-SM-001004	
D01\08	SA2	312806.827	6245192.497	R0220-01 Sheet 1	SHT-SM-001004	
D01\07	SA2	312805.394	6245180.907	R0220-01 Sheet 1	SHT-SM-001004	
D01\06	SA2	312803.977	6245169.316	R0220-01 Sheet 1	SHT-SM-001005	
D01\05	SA2	312802.306	6245154.898	R0220-01 Sheet 1	SHT-SM-001005	
D01\04	SA2	312799.256	6245126.796	R0220-01 Sheet 1	SHT-SM-001005	
D01\03	Grated Pit 600x600	312784.365	6245128.263	SHT-SM-000501	SHT-SM-001005	
D01\02	Grated Pit 600x600-SP	312750.429	6245145.172	SHT-SM-000505	SHT-SM-001005	CONSTRUCT NEW PIT ON EXISTING PIPE. CONFIRM ALIGNMENT AND LEVEL OF EXISTING PIPE PRIOR TO CONSTRUCTION OF NEW PIT.
D01\01	HW-STRUCT	312742.130	6245145.974	ST SERIES DETAILS AND FLOODGATE MANUFACTURER DETAILS	SHT-SM-001005	REPLACE EXISTING HEADWALL AND APRON WITH NEW LIKE-FOR-LIKE HEADWALL AND APRON. REFER TO ST SERIES DRAWINGS FOR DETAILS. INSTALL MOUNTING RING STYLE FLOOD GATE (HUME-KING FLOODGATE OR SIMILAR). RETAIN EXISTING SCOUR PROTECTION.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-002001.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

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PLOT BY: MEGHWARB

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CONFIRMED		

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	FINAL ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER SCHEDULE

A3

SHEET 1 OF 2

TfNSW REGISTRATION No. DS2020/000130

PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-SM-002001

ISSUE 1

LONGITUDINAL PAVEMENT DRAINAGE - STRUCTURES SCHEDULE

STRUCTURE NO.	STRUCTURE TYPE	COORDINATES		DETAIL DRAWING REFERENCE	DRAWING PLAN NO.	COMMENTS
		EASTING	NORTHING			
EX L1	Grated Pit 600x400	312780.919	6245142.226	EXISTING	SHT-SM-001001	
E01\02	RSG 600x600	312806.950	6245169.018	R0220-36	SHT-SM-001005	LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT
EX L19	SA3	312866.981	6245667.071	EXISTING	SHT-SM-001001	
EX L18	Grated Pit 600x400-CONN	312857.650	6245668.180	R0220-43	SHT-SM-001001	CONNECT NEW PIPE INTO EXISTING GRATED PIT. CONFIRM INVERT LEVEL OF EXISTING PIT PRIOR TO CONSTRUCTION OF NEW STORMWATER PIPE
EX L16	SB	312845.869	6245666.932	EXISTING	SHT-SM-001001	
EX L17	Grated Pit 900x900	312839.939	6245666.392	EXISTING	SHT-SM-001001	
F01\02	LAMP HOLE	312822.598	6245297.586	SHT-SM-000502	SHT-SM-001004	REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION
G01\02	LAMP HOLE	312833.496	6245380.391	SHT-SM-000502	SHT-SM-001003	REDIRECT EXISTING PROPERTY DRAINAGE INTO LAMP HOLE. POSITION OF LAMP HOLE TO BE CONFIRMED ON SITE DURING CONSTRUCTION
I01\09	SA3	312842.521	6245476.862	R0220-01 Sheet1	SHT-SM-001002	
I01\08	SA3	312840.488	6245461.206	R0220-01 Sheet1	SHT-SM-001002	
I01\07	SA3	312838.337	6245444.420	R0220-01 Sheet1	SHT-SM-001002	
I01\06	SA2	312836.304	6245428.553	R0220-01 Sheet 1	SHT-SM-001002	
I01\05	SA2	312834.318	6245412.922	R0220-01 Sheet 1	SHT-SM-001003	
I01\04	SA2	312832.560	6245399.051	R0220-01 Sheet 1	SHT-SM-001003	
I01\03	SA2	312831.160	6245388.006	R0220-01 Sheet 1	SHT-SM-001003	
I01\02	SA3	312829.722	6245376.663	R0220-01 Sheet1	SHT-SM-001003	
I01\02A	SA1.8	312828.687	6245363.016	SHT-SM-000503	SHT-SM-001003	ABANDON EXISTING PIT AND CONSTRUCT NEW INLET PIT.
I01\02B	CONNP	312827.267	6245361.787	R0220-49	SHT-SM-001003	REMOVE EXISTING 375 DIA PIPE BACK TO FIRST CLEAN AND SOUND JOINT. INSTALL NEW 375 DIA PIPE AND CONNECT INTO EXISTING 375 DIA PIPE.
EX L4A	BP	312822.405	6245357.578	EXISTING	SHT-SM-001003	
J01\03	RSG 600x600	312800.389	6245119.405	R0220-36	SHT-SM-001005	LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT
J01\02	SA2	312798.718	6245120.958	R0220-01 Sheet 1	SHT-SM-001005	
K01\02	RSG 600x600	312811.788	6245208.685	R0220-36	SHT-SM-001004	LOCAL EARTHWORKS REQUIRED AROUND PROPOSED PIT TO ENSURE CATCHMENT RUNOFF DRAINS INTO PIT

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-002002.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	FINAL ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER SCHEDULE

A3

SHEET 2 OF 2

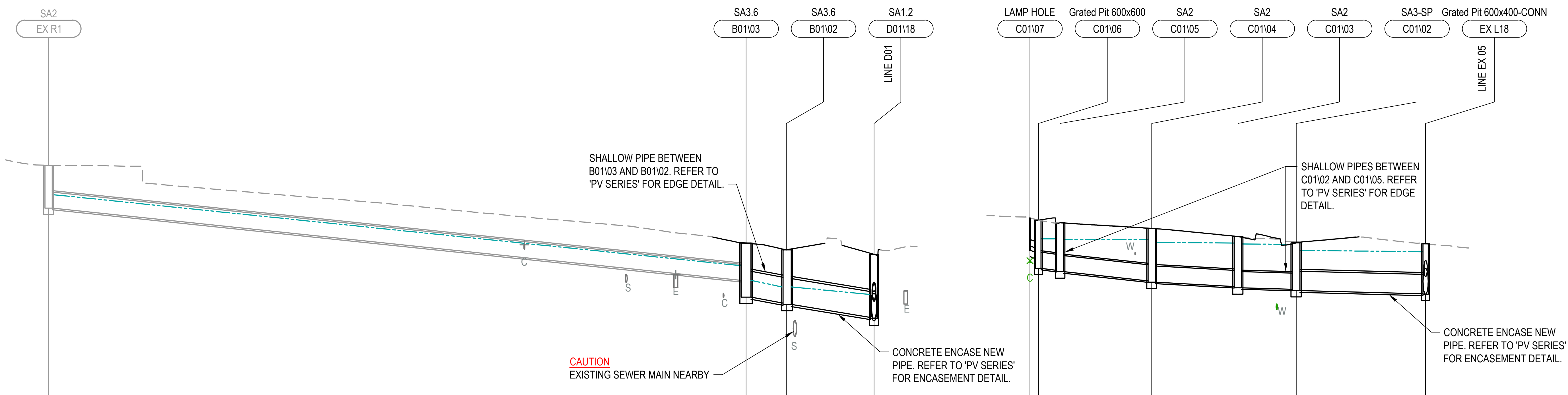
TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-002002
ISSUE: 1

Last saved by: MEGHWARB(2020-11-23) Last Plotted: 2020-11-23

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- 0_x $+_x$ — UTILITY (NEW)
- 0_x $+_x$ — UTILITY (EXISTING RETAINED)



LINE B01

	EX R1 → B01\03	B01\03 → B01\02	B01\02 → D01\18
10 YR ARI FLOW (m3/s)	0.19	0.36	0.43
10 YR ARI VELOCITY (m/s)	1.9	1.9	2.1
PIPE SIZE (mm) & CLASS	Ø375 EXISTING PIPE	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4
GRADE (%)	2.07%	3%	3%

DATUM R.L -2.00

	EX R1	B01\03	B01\02	D01\18
PIT LID / GRATE LEVEL	7.978	6.169	6.011	5.907
EXISTING SURFACE	7.978	6.169	6.013	5.906
10 YR ARI HYDRAULIC GRADE LEVEL	7.297	5.643 / 5.303	5.151 / 5.151	4.975 / 4.866
INVERT LEVEL	6.980	5.300 / 4.914	4.773 / 4.743	4.437 / 4.407
DEPTH TO INVERT	0.998	0.869 / 1.256	1.237 / 1.267	1.470 / 1.500
CHAINAGE	0.000 (L=81.078)	81.078 (L=4.674)	85.753 (L=10.201)	95.954

LINE C01

	C01\07 → C01\06	C01\06 → C01\05	C01\05 → C01\04	C01\04 → C01\03	C01\03 → C01\02	C01\02 → EX L18
10 YR ARI FLOW (m3/s)		0.03	0.04	0.07	0.07	0.13
10 YR ARI VELOCITY (m/s)		0.3	0.3	0.6	0.7	0.8
PIPE SIZE (mm) & CLASS	Ø200x100 RCBC	Ø375 RCP CLASS 4	Ø375 RCP CLASS 4	Ø375 RCP CLASS 4	Ø375 RCP CLASS 4	Ø450 RCP CLASS 4
GRADE (%)	5%	2%	2%	1%	0.5%	0.5%

DATUM R.L 1.00

	C01\07	C01\06	C01\05	C01\04	C01\03	C01\02	EX L18
PIT LID / GRATE LEVEL	9.753	9.702	9.641	9.509	9.322	9.172	9.153
EXISTING SURFACE	9.753	9.702	9.643	9.512	9.323	9.194	9.153
10 YR ARI HYDRAULIC GRADE LEVEL		9.266	9.265 / 9.252	9.247 / 9.185	9.171 / 9.148	9.136 / 8.999	8.967 / 8.803
INVERT LEVEL	9.001	8.952 / 8.583	8.533 / 8.503	8.289 / 8.259	8.159 / 8.129	8.095 / 8.065	7.990 / 7.980
DEPTH TO INVERT	0.752	0.750 / 1.119	1.109 / 1.139	1.219 / 1.249	1.163 / 1.193	1.076 / 1.106	1.163 / 1.173
CHAINAGE	0.000 (L=0.982)	0.982 (L=2.504)	3.486 (L=10.669)	14.155 (L=10.027)	24.182 (L=6.779)	30.961 (L=15.039)	46.000

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THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003001.DWG
DESIGN LOT CODE
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:14:39 PM
PLOT BY: MEGHWARB

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CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

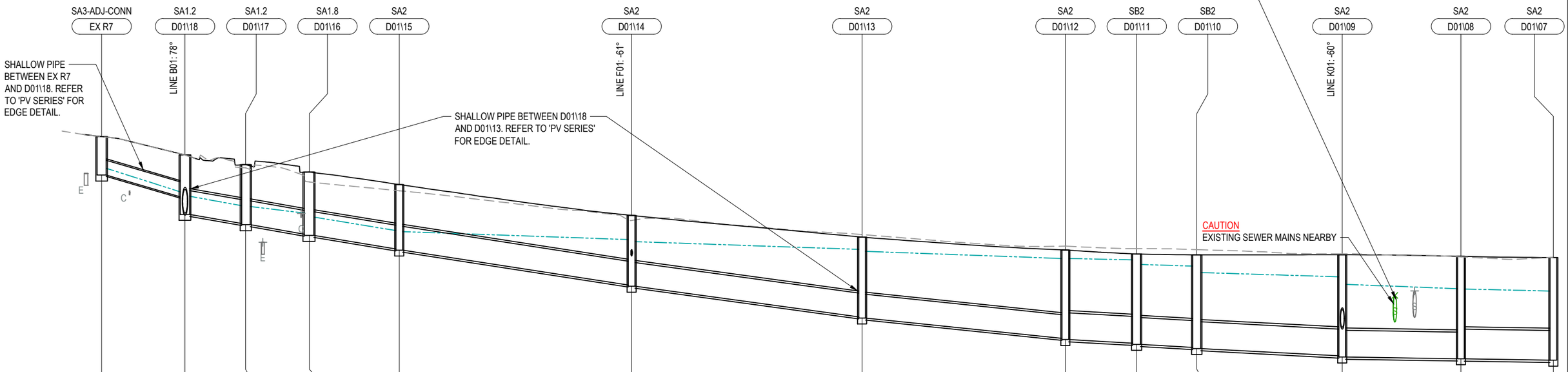
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER LONG SECTIONS

A3
SHEET 1 OF 5
TfNSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No. -
SHEET No. SHT-SM-003001
ISSUE 1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- $0_x +_x$ — UTILITY (NEW)
- $0_x +_x$ — UTILITY (EXISTING RETAINED)

CONTRACTOR TO CONFIRM DEPTH AND ALIGNMENT OF SEWER MAINS PRIOR TO CONSTRUCTION OF THE NEW DRAINAGE LINE TO ENSURE NO CLASH BETWEEN STORMWATER PIPE AND SEWER PIPE PROTECTION. STORMWATER PIPE WITHOUT SOCKET ACHIEVES APPROXIMATELY 25 mm CLEARANCE BELOW PROPOSED SEWER MAIN CONCRETE ENCASEMENT. THE STORMWATER PIPE SOCKETS/JOINTS SHOULD BE PLACED EITHER SIDE OF THE SEWER MAINS OR IN BETWEEN THE SEWER MAINS AND SHOULD NOT BE PLACED DIRECTLY UNDER EITHER SEWER MAIN. CONTRACTOR TO CONFIRM NEW DRAINAGE PIPE HAS ADEQUATE CLEARANCE TO THE SEWER MAIN AND DESIGN PIPE GRADE CAN BE ACHIEVED.



	SA3-ADJ-CONN	SA1.2	SA1.2	SA1.8	SA2	SA2	SA2	SA2	SB2	SB2	SA2	SA2	SA2	
	EX R7	D01\18	D01\17	D01\16	D01\15	D01\14	D01\13	D01\12	D01\11	D01\10	D01\09	D01\08	D01\07	
10 YR ARI FLOW (m3/s)	0.06	0.5	0.5	0.51	0.49	0.5	0.51	0.52	0.62	0.65	0.73	0.73		
10 YR ARI VELOCITY (m/s)	1.8	2.2	2.1	2.2	2.1	1.8	1.8	1.5	1.7	1.8	2	1.7		
PIPE SIZE (mm) & CLASS	Ø375 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 4	Ø600 RCP CLASS 3	Ø675 RCP CLASS 3	Ø675 RCP CLASS 3	Ø675 RCP CLASS 3 MARINE GRADE	Ø675 RCP CLASS 3 MARINE GRADE	Ø750 RCP CLASS 3 MARINE GRADE		
GRADE (%)	5.21%	3%	3%	3%	3%	2.65%	2%	1%	1%	1%	0.3%	0.3%		
DATUM R.L	-4.00													
PIT LID / GRATE LEVEL	6.372	5.907	5.662	5.475	5.161	4.382	3.833	3.507	3.407	3.386	3.391	3.347	3.318	
EXISTING SURFACE	6.370	5.906	5.581	5.227	5.003	4.254	3.898	3.605	3.542	3.518	3.412	3.334	3.323	
10 YR ARI HYDRAULIC GRADE LEVEL	5.572 / 4.975	4.866 / 4.629	4.607 / 4.438	4.339 / 3.998	3.972 / 3.772	3.719 / 3.525	3.474 / 3.295	3.295 / 3.258	3.143 / 3.103	2.939 / 2.832	2.642 / 2.531	2.523 / 2.473		
INVERT LEVEL	5.400 / 4.850	4.407 / 4.177	4.147 / 3.906	3.876 / 3.535	3.505 / 2.623	2.593 / 1.821	1.791 / 1.277	1.247 / 1.157	1.127 / 1.051	1.021 / 0.837	0.807 / 0.762	0.762 / 0.727		
DEPTH TO INVERT	0.972 / 1.057	1.500 / 1.484	1.514 / 1.569	1.599 / 1.626	1.656 / 1.759	1.789 / 2.013	2.043 / 2.230	2.260 / 2.250	2.280 / 2.335	2.365 / 2.554	2.584 /	2.585 /		
CHAINAGE	0.000 L=10.543	10.543 L=7.661	18.205 L=8.061	26.265 L=11.357	37.622 L=29.383	67.005 L=29.140	96.145 L=25.693	121.838 L=9.014	130.851 L=7.605	138.457 L=18.401	156.858 L=15.000	171.868 L=11.679	183.536	

LINE D01

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003002.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:14:50 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER LONG SECTIONS

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

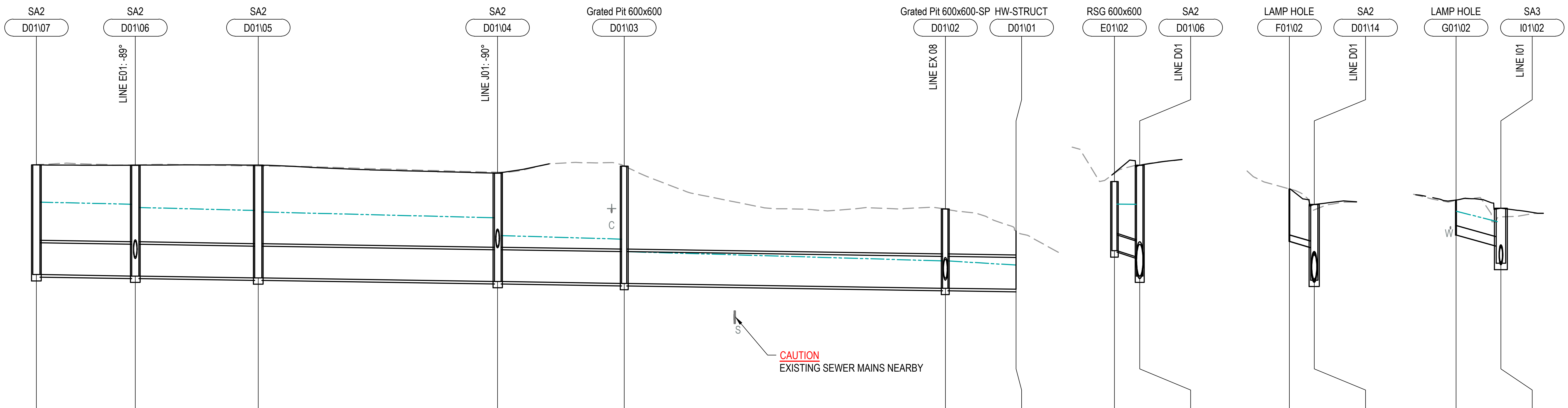
SHEET No.: SHT-SM-003002

ISSUE: 1

Last saved by: MEGHWARB(2020-11-23) Last Plotted: 2020-11-23

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- 0x +x — UTILITY (NEW)
- 0x +x — UTILITY (EXISTING RETAINED)



LINE D01

	D01\07		D01\06		D01\05		D01\04		D01\03		D01\02		D01\01
10 YR ARI FLOW (m3/s)		0.73		0.78		0.78		0.84		0.84		0.85	
10 YR ARI VELOCITY (m/s)		1.7		1.8		1.8		1.9		2.1		2.4	
PIPE SIZE (mm) & CLASS		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 4 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE		Ø750 RCP CLASS 3 MARINE GRADE	
GRADE (%)		0.3%		0.3%		0.3%		0.3%		0.3%		0.3%	
DATUM R.L	-6.00												
PIT LID / GRATE LEVEL	3.318		3.312		3.313		3.124		3.290		2.278		1.756
EXISTING SURFACE	3.323		3.319		3.294		3.147		3.290		2.278		1.756
10 YR ARI HYDRAULIC GRADE LEVEL	2.473 / 2.439		2.389 / 2.312		2.242 / 2.207		2.070 / 1.648		1.564 / 1.269		1.050 / 1.050		0.952 / 0.952
INVERT LEVEL	0.727 / 0.727		0.692 / 0.692		0.648 / 0.648		0.564 / 0.564		0.519 / 0.519		0.405 / 0.405		0.380 / 0.380
DEPTH TO INVERT	2.591		2.620		2.664		2.560		2.771		1.873		1.376
CHAINAGE	183.536	L=11.678	195.214	L=14.515	209.729	L=28.266	237.995	L=14.963	252.958	L=37.915	290.873	L=8.338	299.211

LINE E01

	E01\02		D01\06
10 YR ARI FLOW (m3/s)		0.05	
10 YR ARI VELOCITY (m/s)		0.5	
PIPE SIZE (mm) & CLASS		Ø375 RCP CLASS 3 MARINE GRADE	
GRADE (%)		5%	
DATUM R.L	-6.00		
PIT LID / GRATE LEVEL	3.131		3.312
EXISTING SURFACE	3.120		3.319
10 YR ARI HYDRAULIC GRADE LEVEL	2.392		2.389 / 2.312
INVERT LEVEL	1.291		1.142 / 0.692
DEPTH TO INVERT	1.635		2.171 / 2.620
CHAINAGE	0.000	L=2.988	2.988

LINE F01

	F01\02		D01\14
10 YR ARI FLOW (m3/s)			
10 YR ARI VELOCITY (m/s)			
PIPE SIZE (mm) & CLASS		Ø(2x)150 PVC-U	
GRADE (%)		5%	
DATUM R.L	-4.00		
PIT LID / GRATE LEVEL	4.752		4.382
EXISTING SURFACE	4.752		4.254
10 YR ARI HYDRAULIC GRADE LEVEL			3.704
INVERT LEVEL	3.511		3.364 / 2.593
DEPTH TO INVERT	1.241		1.018 / 1.789
CHAINAGE	0.000	L=2.936	2.936

LINE G01

	G01\02		I01\02
10 YR ARI FLOW (m3/s)		0.02	
10 YR ARI VELOCITY (m/s)		1.1	
PIPE SIZE (mm) & CLASS		Ø225 PVC-U	
GRADE (%)		5%	
DATUM R.L	-2.00		
PIT LID / GRATE LEVEL	6.490		6.294
EXISTING SURFACE	6.483		6.089
10 YR ARI HYDRAULIC GRADE LEVEL	6.224		5.978 / 5.598
INVERT LEVEL	5.661		5.396 / 4.993
DEPTH TO INVERT	0.828		0.898 / 1.301
CHAINAGE	-21.188	L=5.305	-15.882

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-003003.DWG

DESIGN LOT CODE

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:15:00 PM — PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER LONG SECTIONS

A3

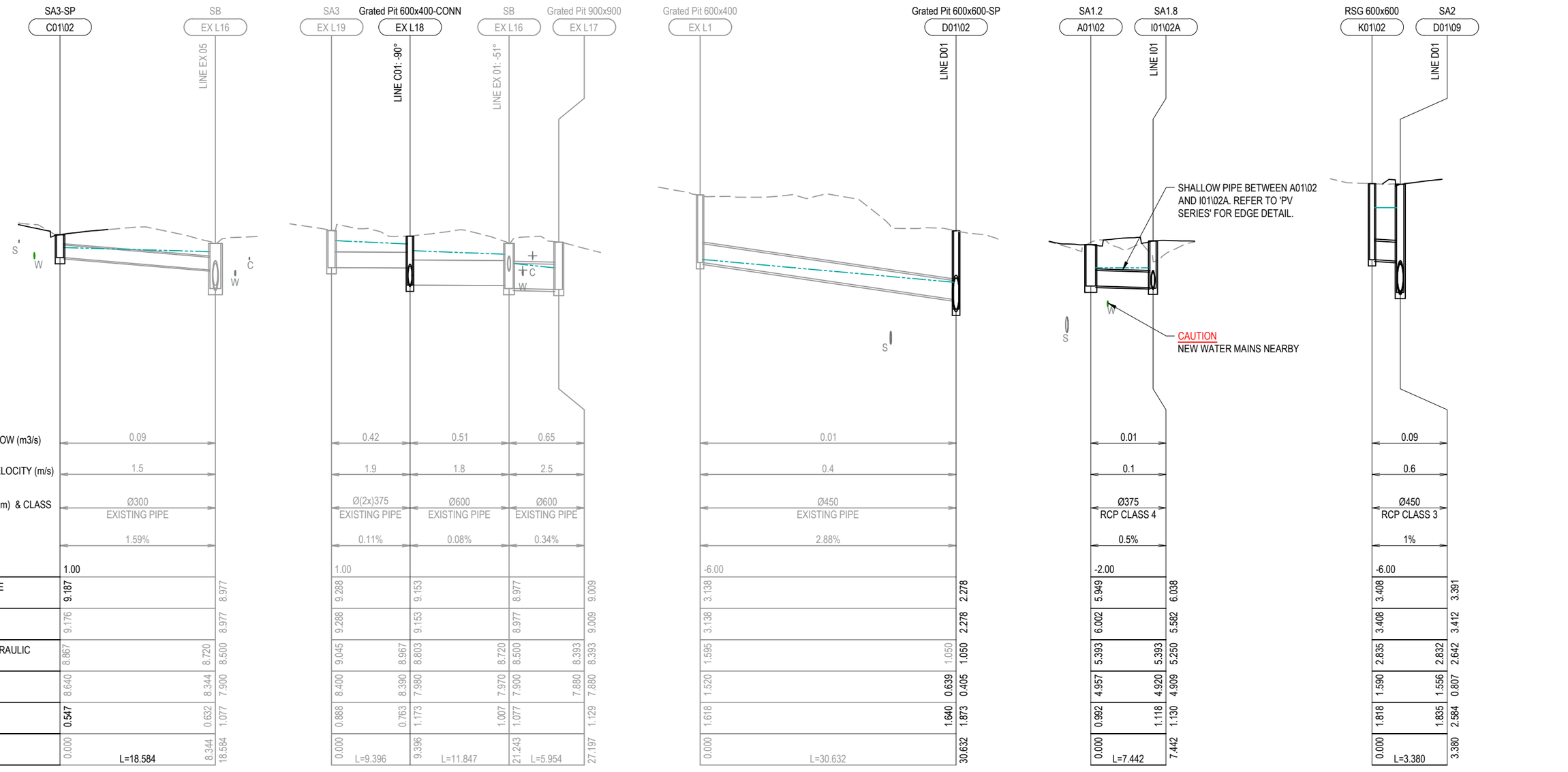
SHEET 3 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN — EDMS No. - — SHEET No. SHT-SM-003003 — ISSUE 1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- $0_x +_x$ — UTILITY (NEW)
- $0_x +_x$ — UTILITY (EXISTING RETAINED)



	LINE EX 01			LINE EX 05			LINE EX 08		LINE A01		LINE K01	
10 YR ARI FLOW (m3/s)	0.09			0.42	0.51	0.65	0.01		0.01		0.09	
10 YR ARI VELOCITY (m/s)	1.5			1.9	1.8	2.5	0.4		0.1		0.6	
PIPE SIZE (mm) & CLASS	Ø300 EXISTING PIPE			Ø(2x)375 EXISTING PIPE	Ø600 EXISTING PIPE	Ø600 EXISTING PIPE	Ø450 EXISTING PIPE		Ø375 RCP CLASS 4		Ø450 RCP CLASS 3	
GRADE (%)	1.59%			0.11%	0.08%	0.34%	2.88%		0.5%		1%	
DATUM R.L	1.00			1.00			-6.00		-2.00		-6.00	
PIT LID / GRATE LEVEL	9.187		8.977	9.288	9.153	8.977	3.138	2.278	5.949	6.038	3.408	3.391
EXISTING SURFACE	9.176	8.977	8.977	9.288	9.153	8.977	3.138	2.278	6.002	5.582	3.408	3.412
10 YR ARI HYDRAULIC GRADE LEVEL	8.867	8.720	8.500	9.045	8.967	8.803	8.720	8.500	8.393	1.595	1.050	5.393	5.250	2.835	2.832	2.642
INVERT LEVEL	8.640	8.344	7.900	8.400	8.390	7.980	7.970	7.900	7.880	1.520	0.639	4.957	4.920	4.909	1.590	1.556	0.807
DEPTH TO INVERT	0.547	0.632	1.077	0.888	0.763	1.173	1.007	1.077	1.129	1.618	1.640	1.873	0.992	1.118	1.130	1.818	1.835	2.584
CHAINAGE	0.000	L=18.584	8.344	18.584	0.000	L=9.396	9.396	L=11.847	21.243	L=5.954	27.197	0.000	L=30.632	30.632	0.000	L=7.442	7.442	0.000	L=3.380	3.380

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50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
PW:/P0043031-SHT-SM-003004.DWG	-	-	23-Nov-20 / 9:14:28 PM	MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER LONG SECTIONS

A3

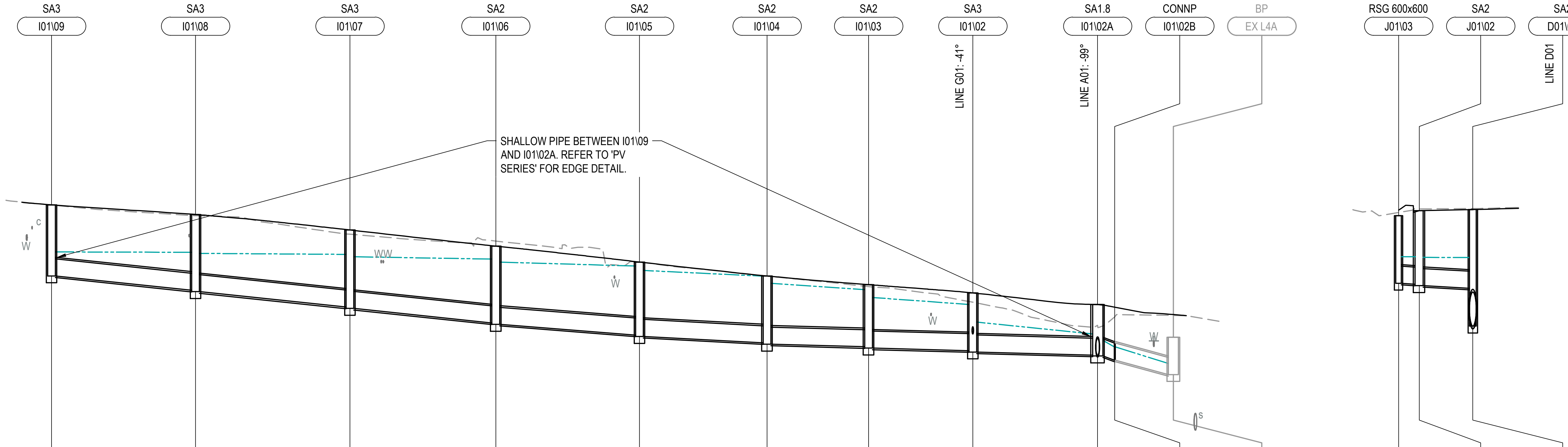
SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-003004	1

LEGEND

- HYDRAULIC GRADIENT LINE
- NEW DRAINAGE PIPES
- EXISTING DRAINAGE PIPES
- DESIGN SURFACE
- EXISTING SURFACE
- AXX\XX — PIT TAG - PROPOSED PIT
- EX XXXX — PIT TAG - EXISTING PIT
- $0_x +_x$ — UTILITY (NEW)
- $0_x +_x$ — UTILITY (EXISTING RETAINED)



LINE I01

DATUM R.L -1.00

Pit (upstream)	10 YR ARI FLOW (m3/s)	10 YR ARI VELOCITY (m/s)	PIPE SIZE (mm) & CLASS	GRADE (%)	PIT LID / GRATE LEVEL	EXISTING SURFACE	10 YR ARI HYDRAULIC GRADE LEVEL (start)	10 YR ARI HYDRAULIC GRADE LEVEL (end)	INVERT LEVEL (start)	INVERT LEVEL (end)	DEPTH TO INVERT (start)	DEPTH TO INVERT (end)	CHAINAGE	Length
I01\09	0.05	0.4	Ø375 RCP CLASS 3	2%	8.229	8.225	7.194	7.186	6.667	6.351	1.562	1.664	0.000	L=15.787
I01\08	0.07	0.6	Ø375 RCP CLASS 3	2%	8.015	7.989	7.162	7.140	6.321	5.982	1.694	1.693	15.787	L=16.924
I01\07	0.1	0.9	Ø375 RCP CLASS 3	2%	7.675	7.582	7.089	7.036	5.952	5.632	1.723	1.689	32.710	L=15.996
I01\06	0.13	1.2	Ø375 RCP CLASS 3	1.5%	7.322	7.433	6.970	6.884	5.602	5.366	1.719	1.606	48.707	L=15.756
I01\05	0.17	1.5	Ø375 RCP CLASS 3	1%	6.972	6.972	6.787	6.662	5.336	5.196	1.636	1.469	64.463	L=13.982
I01\04	0.19	1.8	Ø375 RCP CLASS 3	0.5%	6.665	6.665	6.506	6.367	5.166	5.111	1.499	1.364	78.445	L=11.134
I01\03	0.2	1.8	Ø375 RCP CLASS 3	0.5%	6.475	6.434	6.193	6.040	5.081	5.023	1.394	1.271	89.579	L=11.434
I01\02	0.24	2.2	Ø375 RCP CLASS 3	0.5%	6.294	6.089	5.652	5.393	4.993	4.925	1.301	1.113	101.013	L=13.687
I01\02A	0.25	2.7	Ø375 RCP CLASS 4	4.92%	6.038	5.582	5.250	5.109	4.909	4.816	1.130		114.700	L=1.877
I01\02B	0.25	3.3	Ø375 EXISTING PIPE	4.92%	5.981	5.767	5.109	4.742	4.816	4.500	0.375		116.577	L=6.431
EX L4A					5.819	5.799	4.742		4.500		1.319		123.008	

LINE J01

DATUM R.L -6.00

Pit (upstream)	10 YR ARI FLOW (m3/s)	10 YR ARI VELOCITY (m/s)	PIPE SIZE (mm) & CLASS	GRADE (%)	PIT LID / GRATE LEVEL	EXISTING SURFACE	10 YR ARI HYDRAULIC GRADE LEVEL (start)	10 YR ARI HYDRAULIC GRADE LEVEL (end)	INVERT LEVEL (start)	INVERT LEVEL (end)	DEPTH TO INVERT (start)	DEPTH TO INVERT (end)	CHAINAGE	Length
J01\03	0.04	0.4	Ø375 RCP CLASS 3	1%	3.114	3.059	2.089	2.088	1.506	1.483	1.483	1.619	0.000	L=2.281
J01\02	0.05	0.4	Ø375 RCP CLASS 3	1%	3.102	3.138	2.074	2.070	1.453	1.395	1.649	1.729	2.281	L=5.863
D01\04					3.124	3.147	1.648		0.564		2.560		8.143	

CHECK PRINT

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
PW:/P0043031-SHT-SM-003005.DWG		-	23-Nov-20 / 9:04:13 PM	MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	PRE-AFC		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: HORZ. 1 : 500 (2.5 0 2.5 5 7.5 10 12.5m); VERT. 1 : 100 (0.5 0 0.5 1 1.5 2 2.5m); FULL SIZE A3

DRAWINGS / DESIGN PREPARED BY: -

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

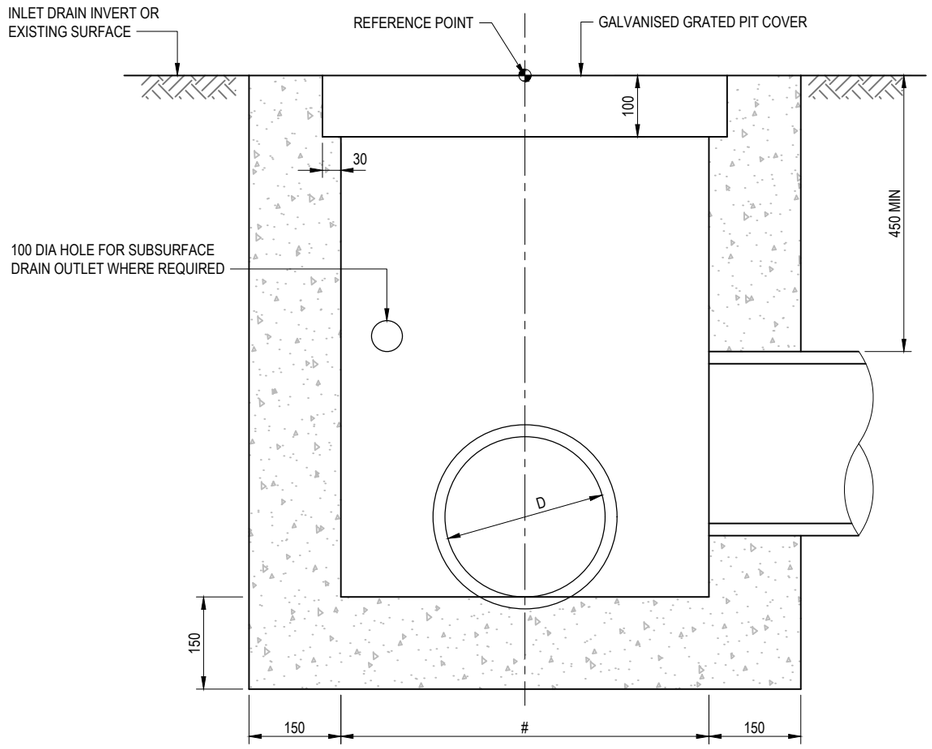
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER LONG SECTIONS

A3

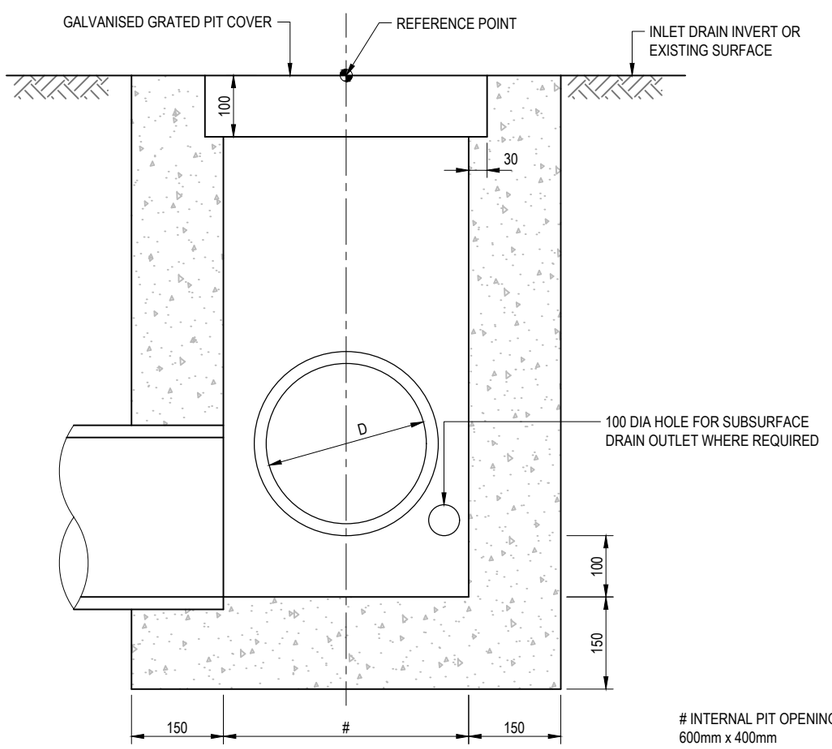
SHEET 5 OF 5

TfNSW REGISTRATION No. DS2020/000130 | PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No. - | SHEET No. SHT-SM-003005 | ISSUE 1

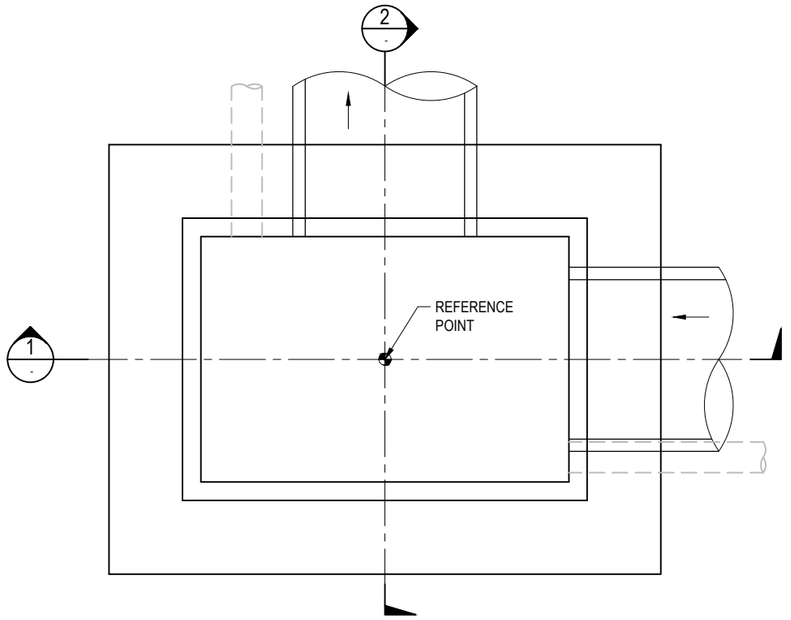


SECTION 1
SCALE 1:10

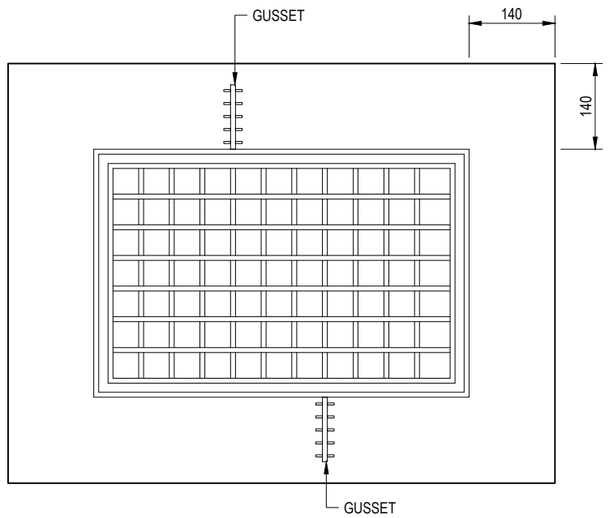


SECTION 2
SCALE 1:10

INTERNAL PIT OPENING SIZE
600mm x 400mm
600mm x 600mm
600mm x 900mm
900mm x 900mm
1200mm x 1200mm



PLAN (GRATE NOT SHOWN)
SCALE 1:10



GRATE
SCALE 1:10

NOTES:

1. CONCRETE GRADE N25.
2. LOCATION AND LEVEL OF INLET SUMP SHOWN IN THE DRAWINGS REFER TO THIS POINT:
3. SIDE WALLS OF ALL PITS DEEPER THAN 1500 TO BE REINFORCED WITH ONE LAYER OF F82 MESH RETURNED 300 INTO BASE.
4. DEPTH OF JUNCTION BOX NOT TO EXCEED 3500.
5. MINIMUM COVER OF REINFORCEMENT SHALL BE 50 UNLESS SHOWN OTHERWISE.
6. STEEL GRATES AND FRAMES ARE TO BE FABRICATED FROM MILD STEEL AND HOT DIP GALVANISED.
7. GRATING PATTERN AND BAR SIZES MAY VARY BUT SHALL BE CLASS D AND BICYCLE SAFE IN ACCORDANCE WITH AS 3996 UNLESS OTHERWISE STATED.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000501.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:24:20 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.05 0 0.05 0.1 0.15 0.2m — 1 : 10 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

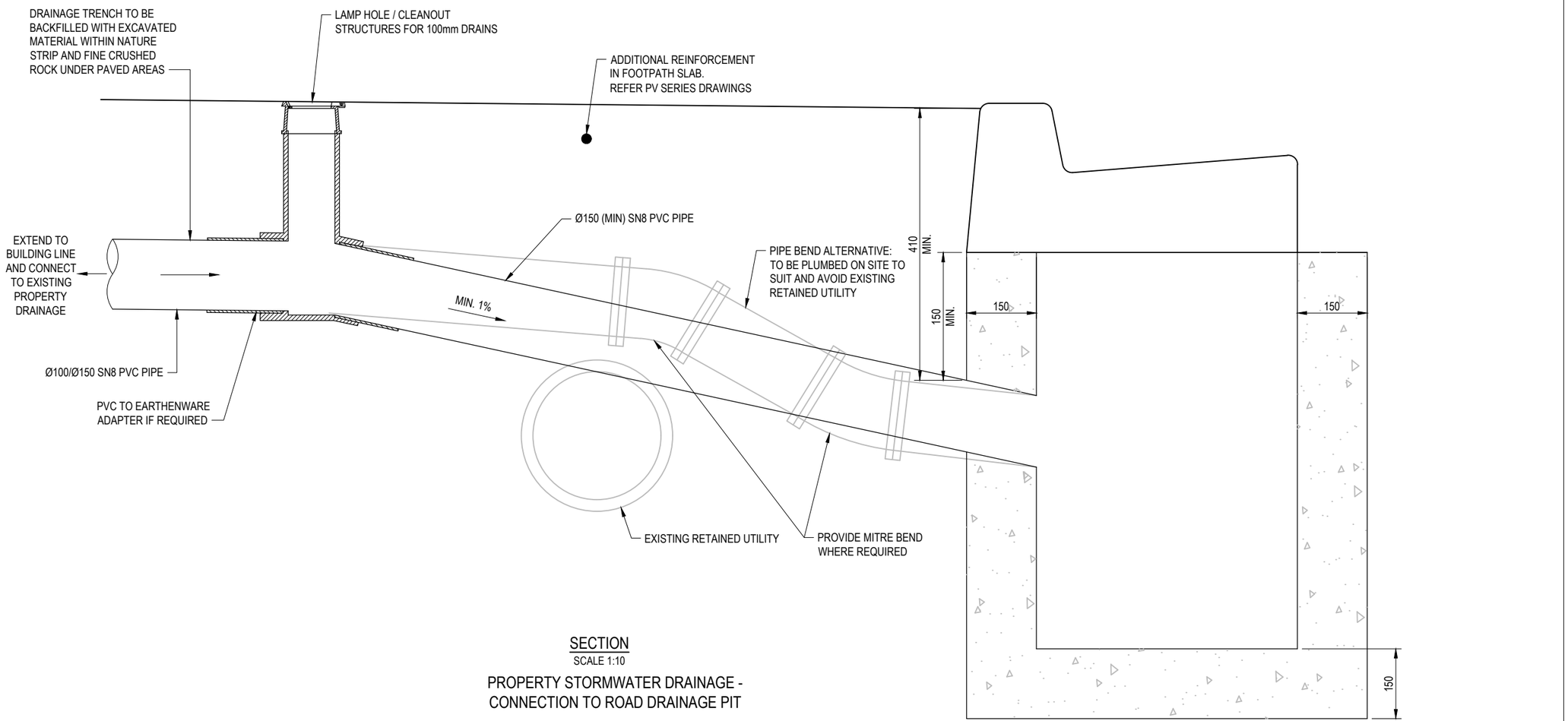
PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS

A3
SHEET 1 OF 7

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000501	1



SECTION
SCALE 1:10

PROPERTY STORMWATER DRAINAGE - CONNECTION TO ROAD DRAINAGE PIT

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000502.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:13:20 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.05 0 0.05 0.1 0.15 0.2m — 1 : 10 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

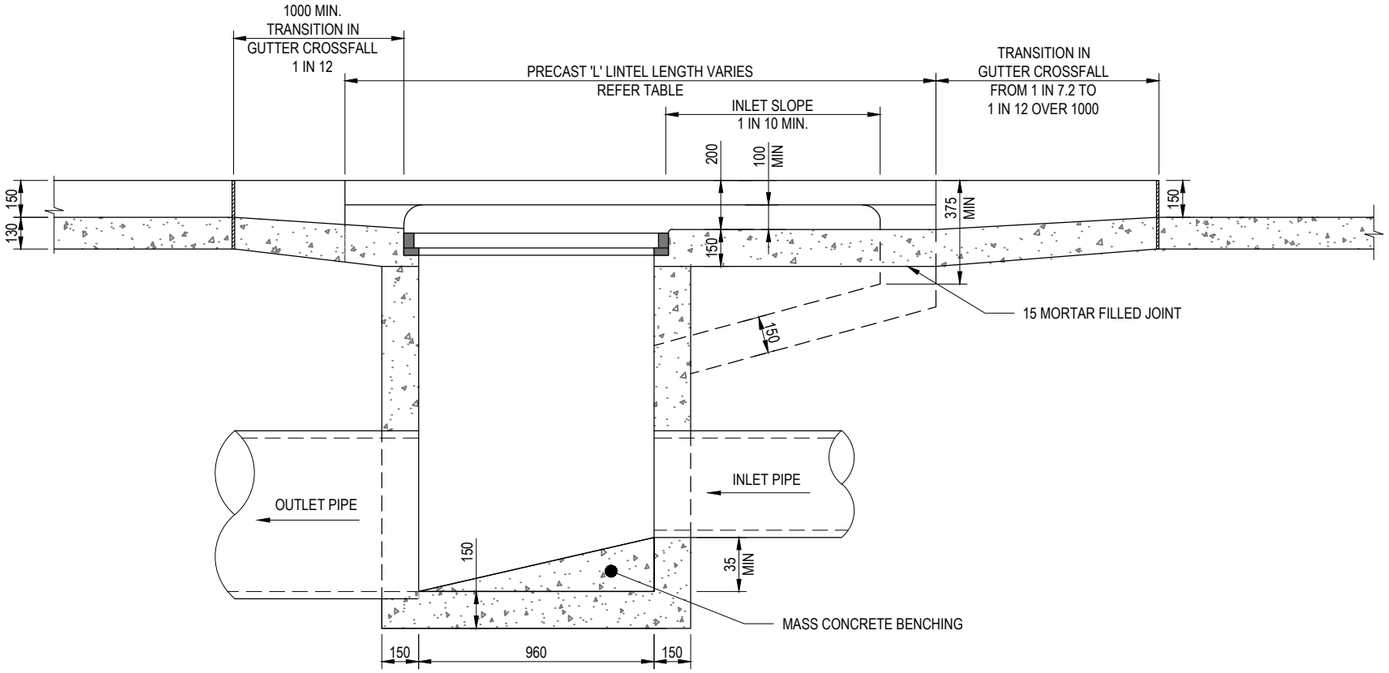
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
STORMWATER DETAILS

A3

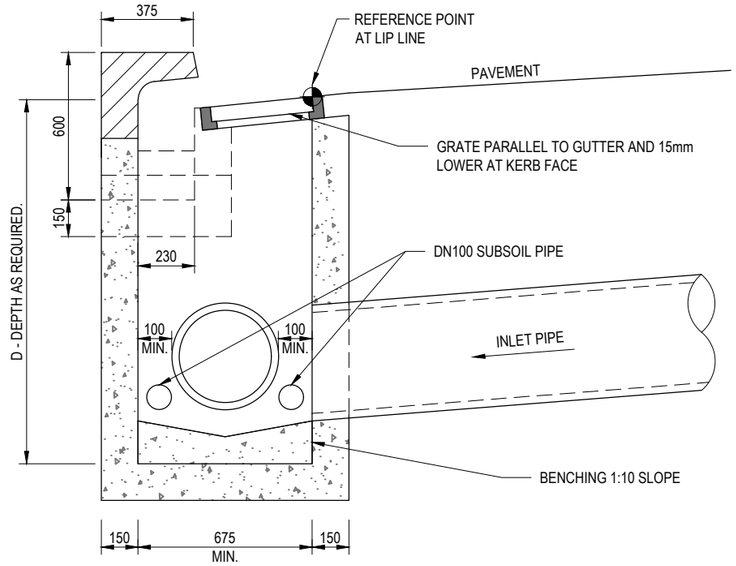
SHEET 2 OF 7

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

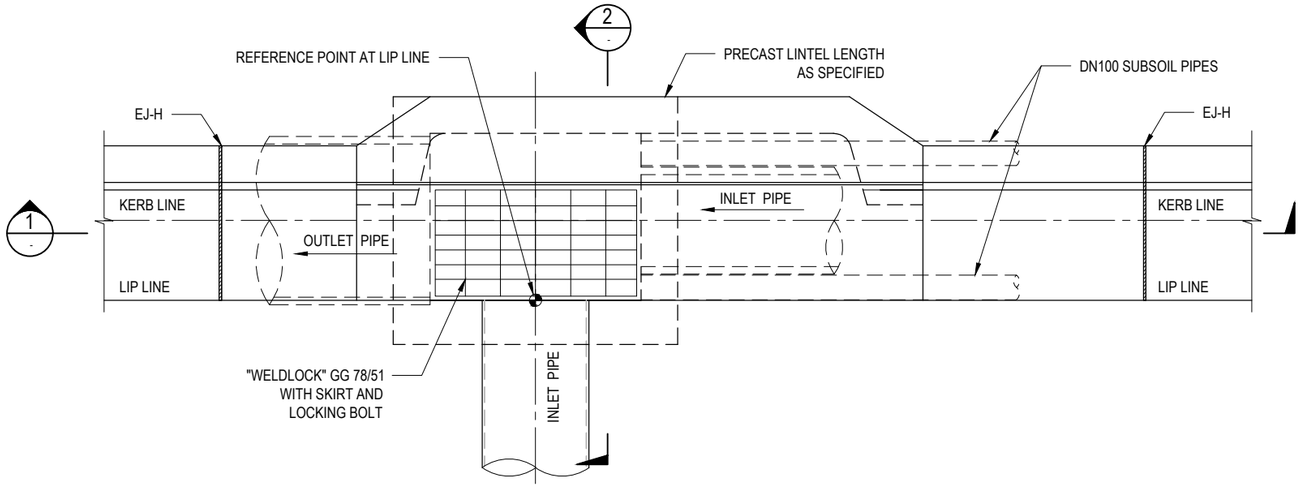
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000502	1



SECTION 1
SCALE 1:25



SECTION 2
SCALE 1:25



PLAN - TYPE SA PIT TO SUIT COUNCIL GUTTER (ON GRADE)
SCALE 1:25

PRECAST LINTEL SIZES	
NOMINAL OPENING SIZE (m)	OVERALL LENGTH 'L' (mm)
1.2	1825
1.8	2438
2.4	3048
3.0	3657
3.6	4267

NOTES

1. REFER TO GENERAL NOTES.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. LOCATION AND LEVEL OF PIT SHOWN IN DRAWINGS REFER TO THIS POINT.
4. FOR PIPE DIAMETERS GREATER THAN 450 OR MULTIPLE PIPES REFER TO RMS DRAWING R0220-28 OR OTHER SPECIFIED HAUNCH DETAIL.
5. DEPTH OF PIT TO NOT EXCEED 3500.
6. PITS DEEPER THAN 1200 TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH RMS DRAWING R0220-45.
7. MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 32 MPa U.N.O.
8. NOMINAL CLEAR COVER TO REINFORCEMENT NEAREST TO CAST INSITU CONCRETE SURFACES FOR:
   a. SURFACE IN CONTACT WITH SOIL = 75
   b. SURFACE IN CONTACT WITH AIR = 40
9. EDGES SHALL BE CHAMFERED 20 x 20.
10. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671.
11. ALL BARS SHALL BE GRADE D500N DEFORMED RIBBED BAR U.N.O.
12. ALL EXPOSED STEEL TO BE GALVANISED IN ACCORDANCE WITH AS1214 AND TO BE 375 g/m².
13. LAPS NOT SHOWN ON THE DRAWINGS SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY CROSS SECTION.
14. ALL LAPPED PORTIONS OF BARS SHALL BE IN CONTACT REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
15. ALL PIT GRATES AND FRAMES TO BE "MEDIUM / HEAVY TRAFFICABLE" BIKE SAFE CLASS "D" GRATES AND FRAMES TO AS3996.
16. DESIGN LOADS TO AS5100.2 AND PITS DESIGNED TO AS3600.
17. SIDE WALLS OF PITS DEEPER THAN 1500 ARE TO BE REINFORCED WITH ONE LAYER OF RL1218 MESH RETURNED 300 INTO BASE.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000503.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:13:32 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.125 0 0.125 0.25 0.375m; 1 : 25 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

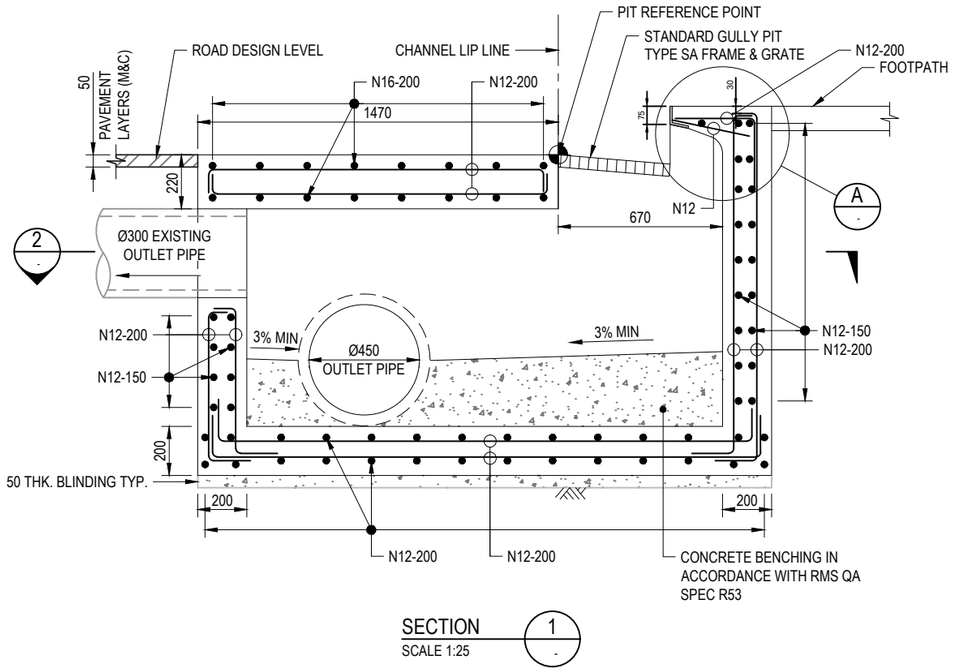
PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

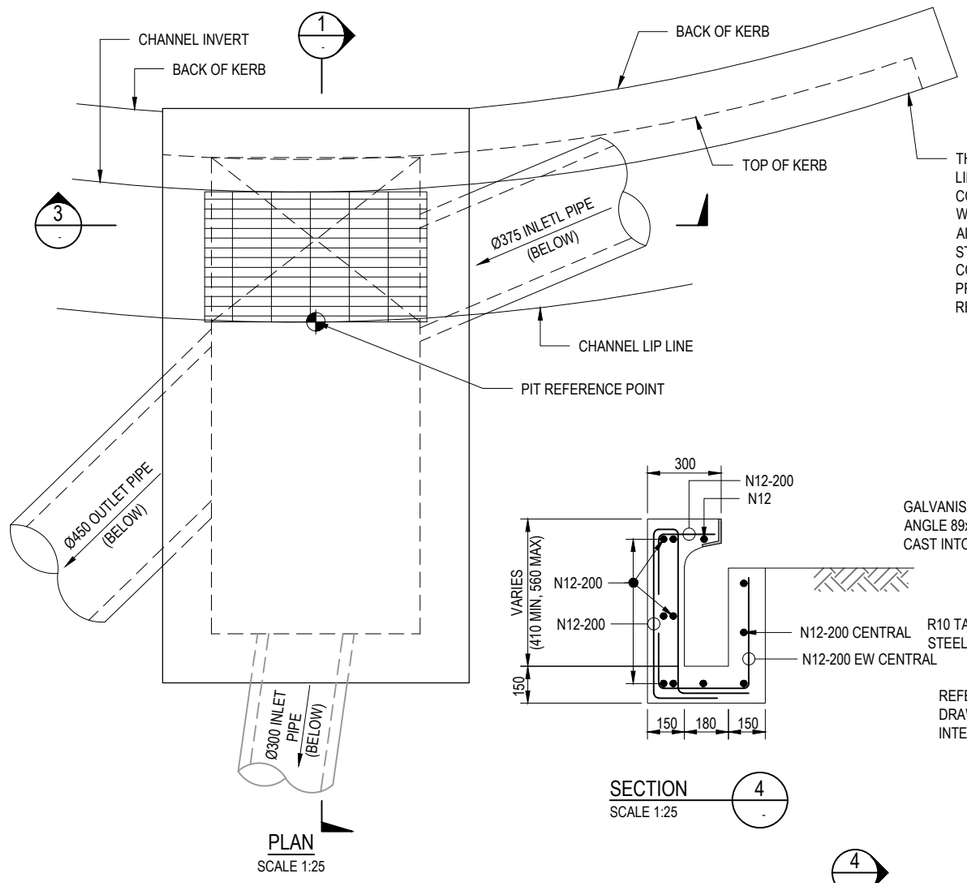
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER DETAILS

A3
SHEET 3 OF 7

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-000503
ISSUE: 1



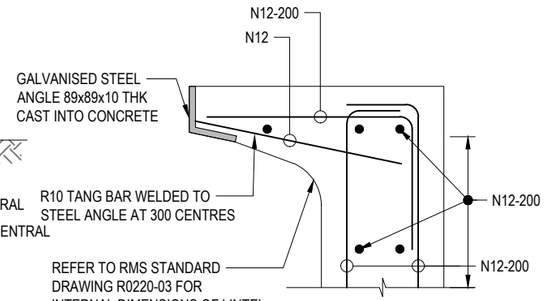
SECTION 1
SCALE 1:25



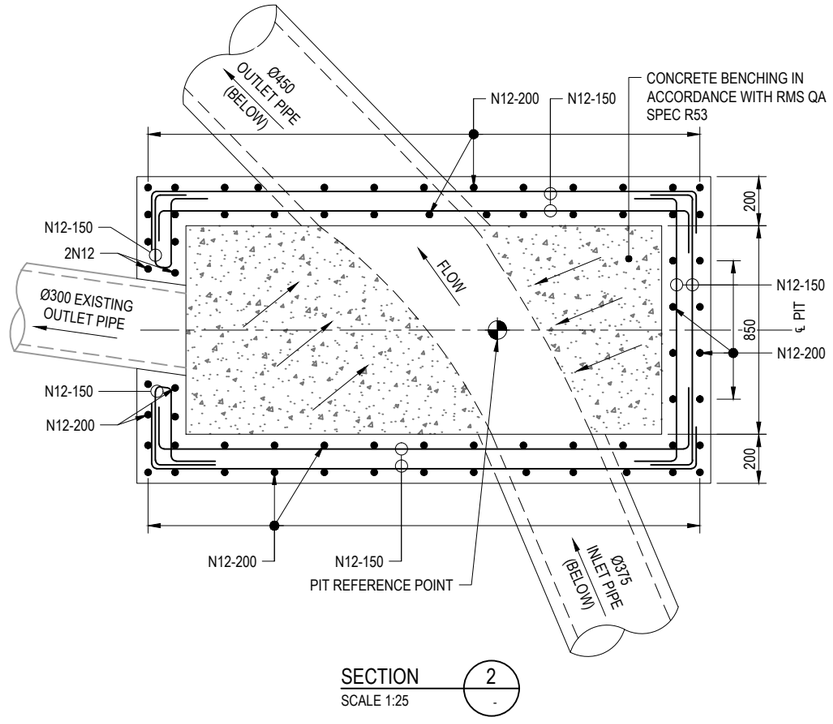
PLAN
SCALE 1:25

THE CONTRACTOR MAY PROPOSE THE USE OF A PRECAST LINTEL INSTEAD OF THE DESIGNED IN-SITU LINTEL. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE PRINCIPAL WITH DOCUMENTATION SHOWING THE PROPOSED ALTERNATIVE LINTEL AND MODIFICATIONS TO THE PIT STRUCTURE TO ACCOMMODATE THE PRECAST LINTEL. THIS CONTRACTOR MUST ALSO PROVIDE CERTIFICATION THAT THE PROPOSED ALTERNATIVE DESIGN IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT DESIGN STANDARDS.

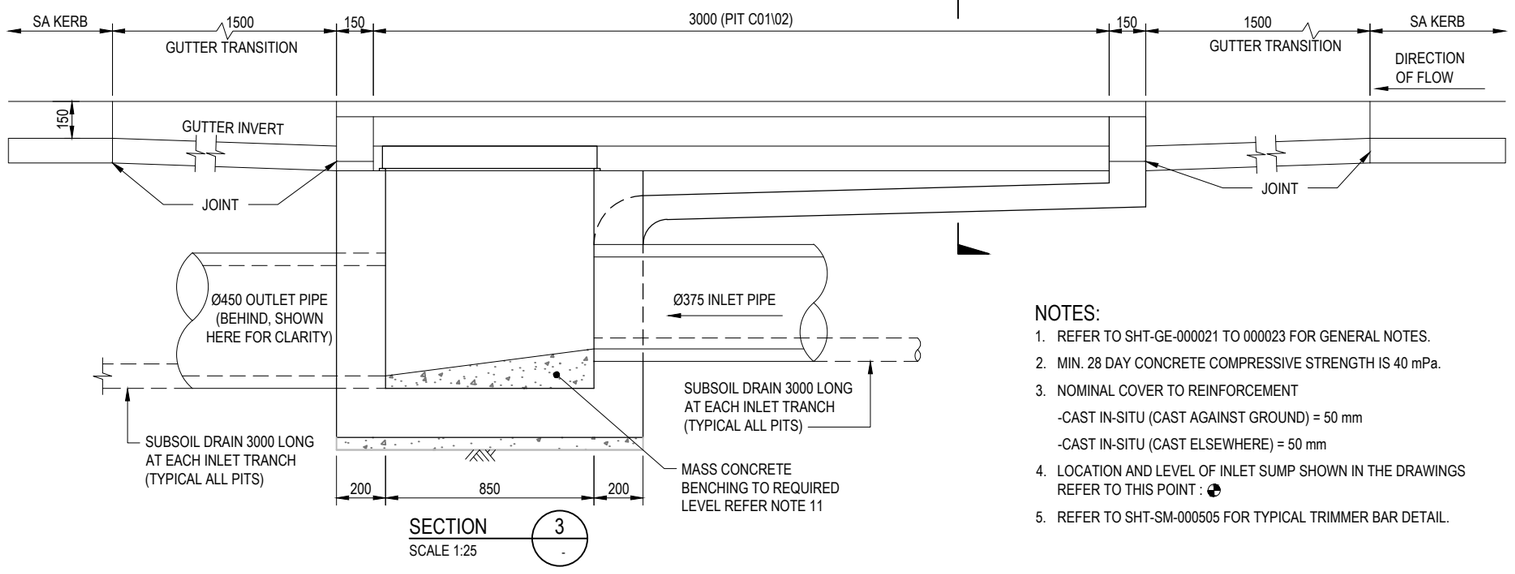
SECTION 4
SCALE 1:25



DETAIL A
SCALE 1:10



SECTION 2
SCALE 1:25



SECTION 3
SCALE 1:25

NOTES:

1. REFER TO SHT-GE-000021 TO 000023 FOR GENERAL NOTES.
2. MIN. 28 DAY CONCRETE COMPRESSIVE STRENGTH IS 40 mPa.
3. NOMINAL COVER TO REINFORCEMENT
   -CAST IN-SITU (CAST AGAINST GROUND) = 50 mm
   -CAST IN-SITU (CAST ELSEWHERE) = 50 mm
4. LOCATION AND LEVEL OF INLET SUMP SHOWN IN THE DRAWINGS REFER TO THIS POINT : ⊕
5. REFER TO SHT-SM-000505 FOR TYPICAL TRIMMER BAR DETAIL.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000504.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:03:23 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0.05 0 0.05 0.1 0.15 0.2m — 1 : 10 FULL SIZE A3; 0.125 0 0.125 0.25 0.375m — 1 : 25 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

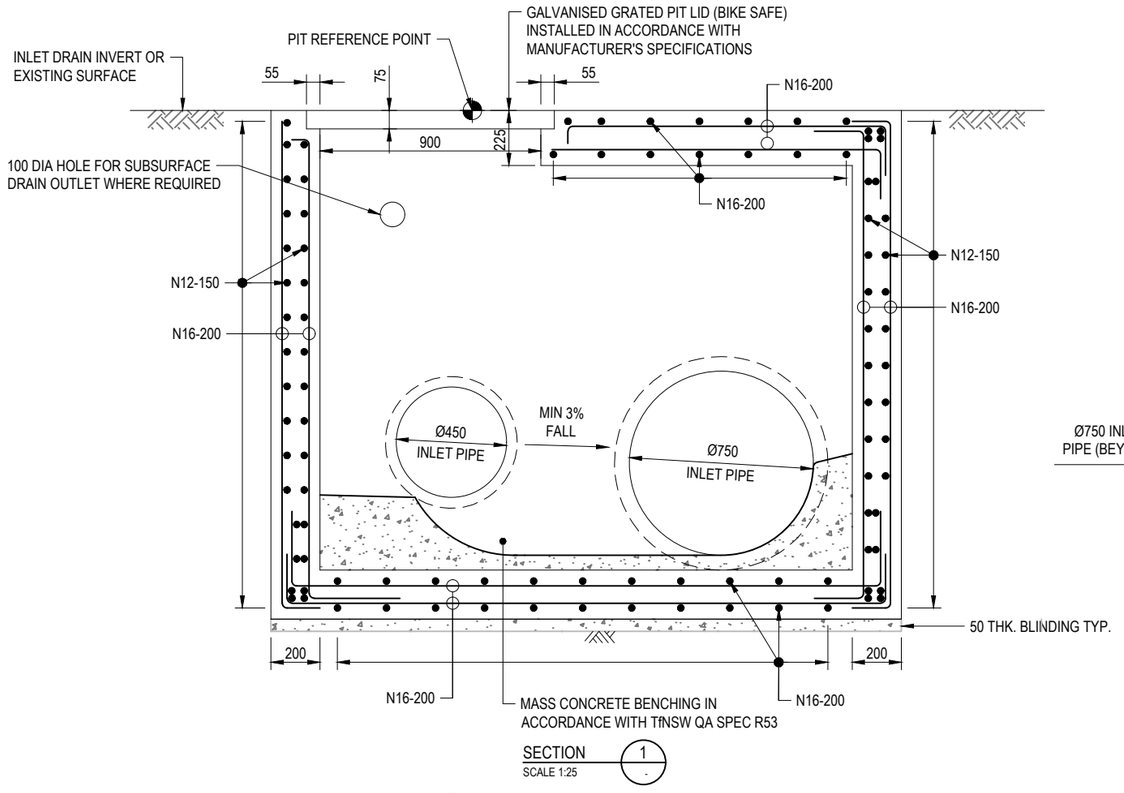
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS

A3
SHEET 4 OF 7

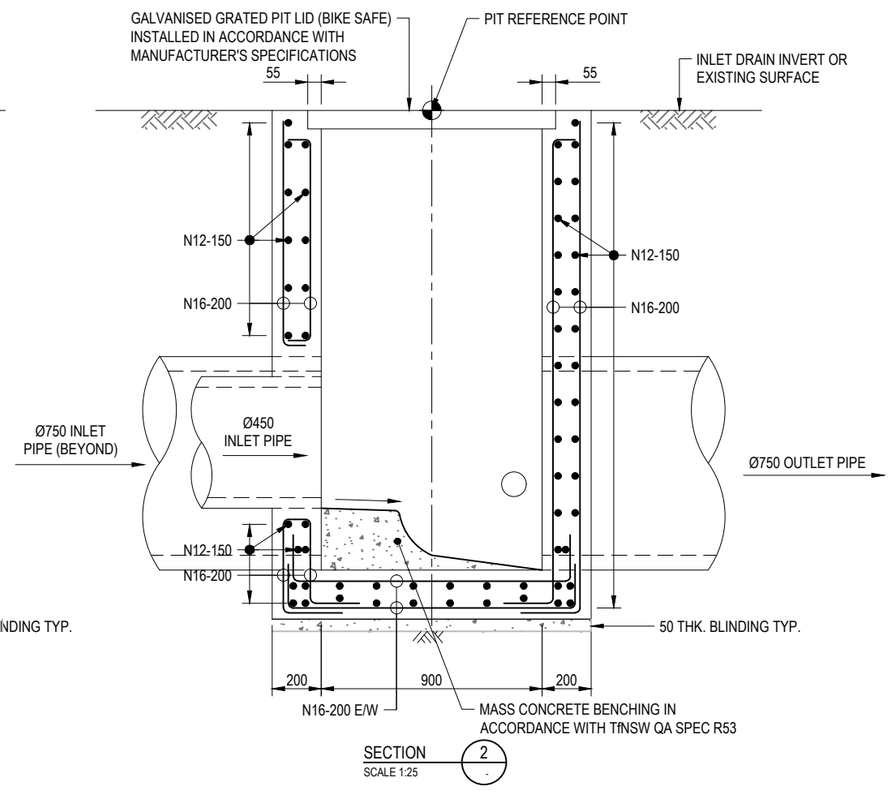
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

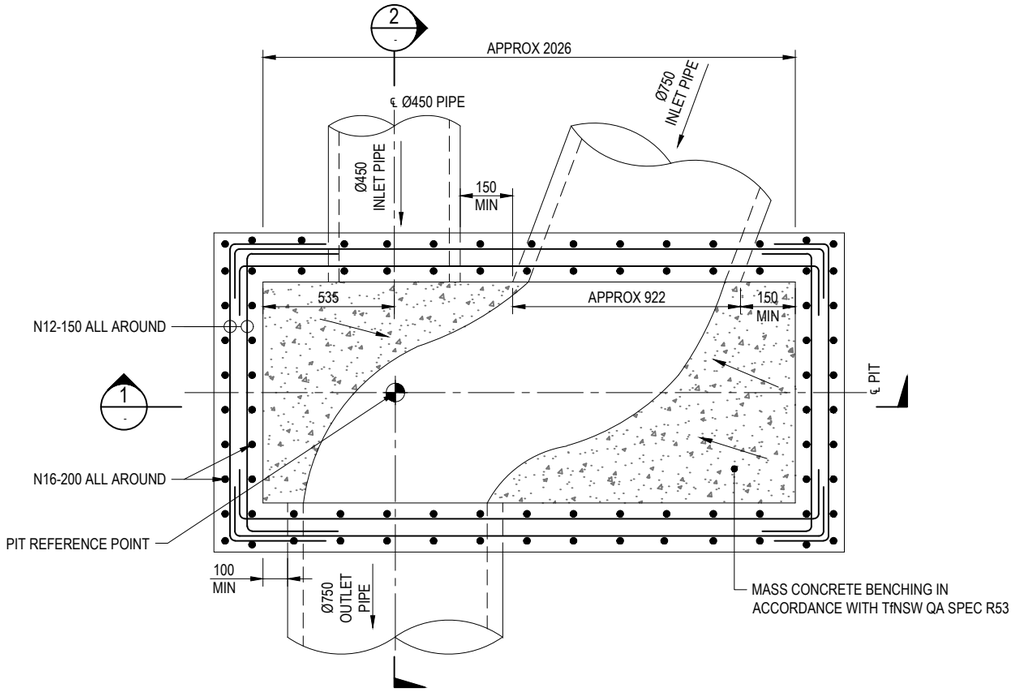
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-000504
ISSUE: 1



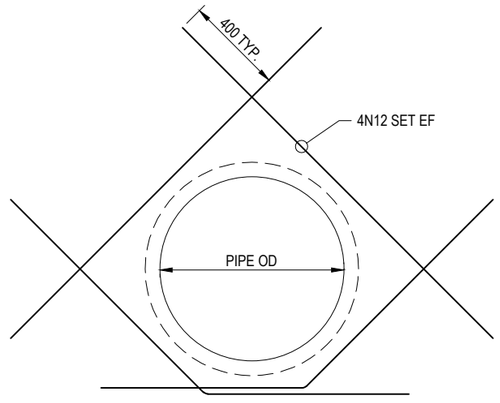
SECTION 1
SCALE 1:25



SECTION 2
SCALE 1:25



PLAN (GRATE NOT SHOWN)-D01/02
SCALE 1:25



TYPICAL TRIMMER BAR DETAIL
SCALE 1:25

NOTES:
1. REFER TO SHT-SM-000504 FOR DRAWING NOTES.

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED | 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000505.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:03:42 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	06.11.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

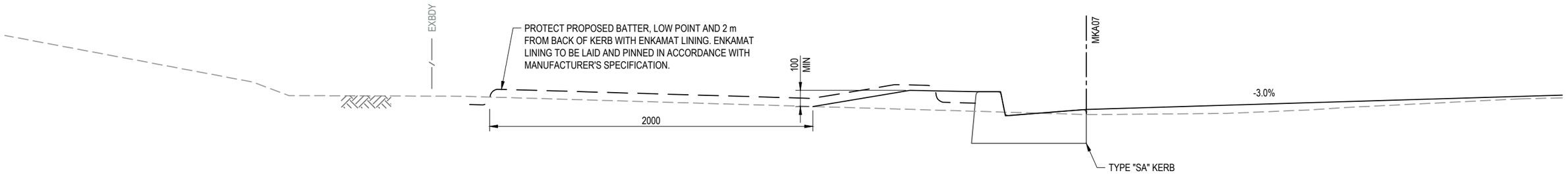
SCALES ON A3 SIZE DRAWING: 0.125 0 0.125 0.25 0.375m; 1 : 25 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS
A3
SHEET 5 OF 7

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST
TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-SM-000505
ISSUE: 0



TYPICAL BATTER PROTECTION

SCALE 1:25

CHECK PRINT

DRAWING FILE LOCATION / NAME				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	
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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	06.11.2020	PRE-AFC		A. PEREZ	0.125 0 0.125 0.25 0.375m 1 : 25 FULL SIZE A3	
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD	-

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:03:59 PM	MEGHWARB

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	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT

NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

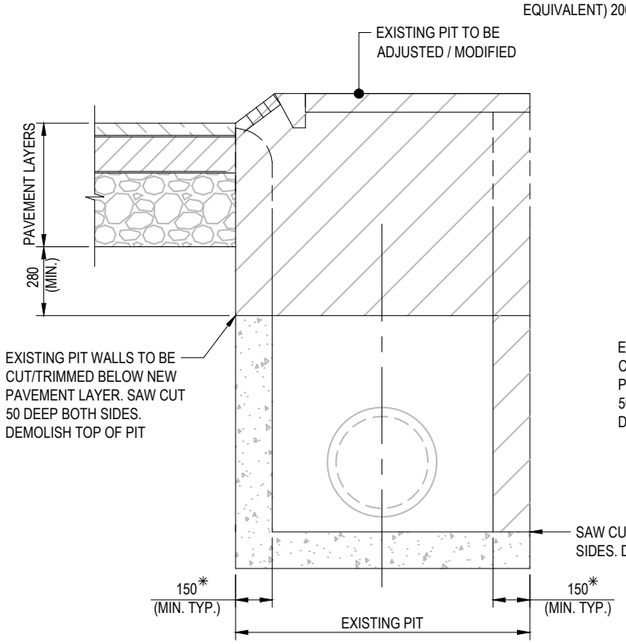
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
STORMWATER DETAILS

A3

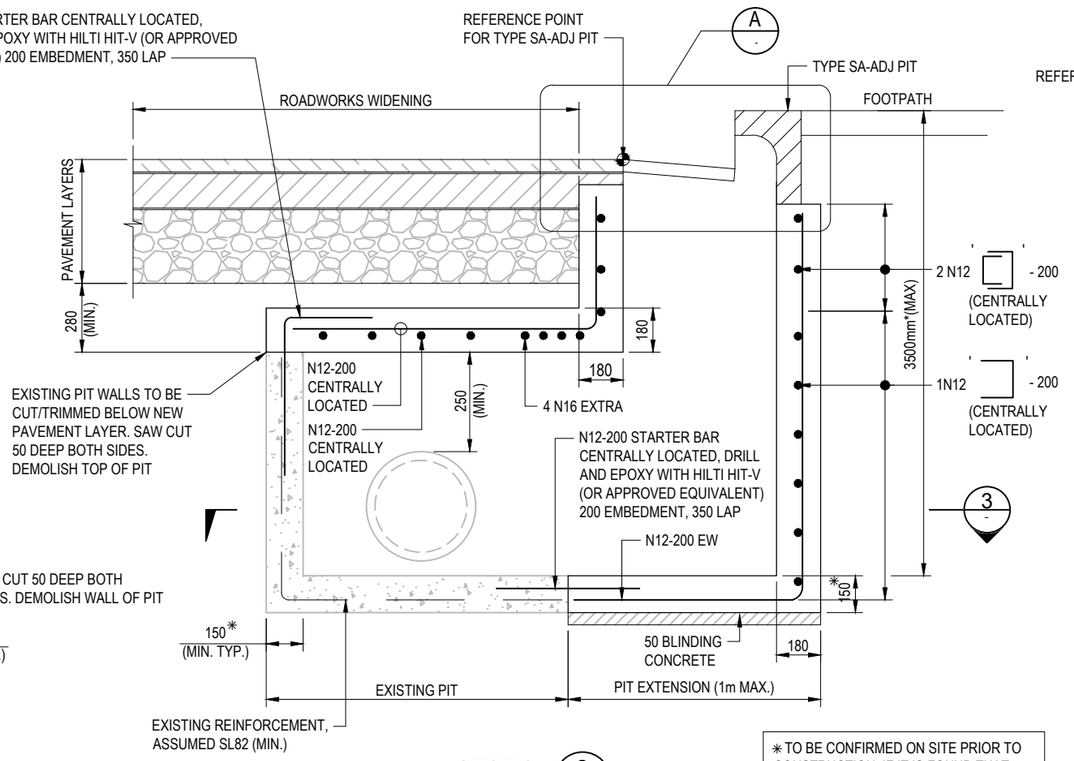
SHEET 6 OF 7

TfNSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000506	0



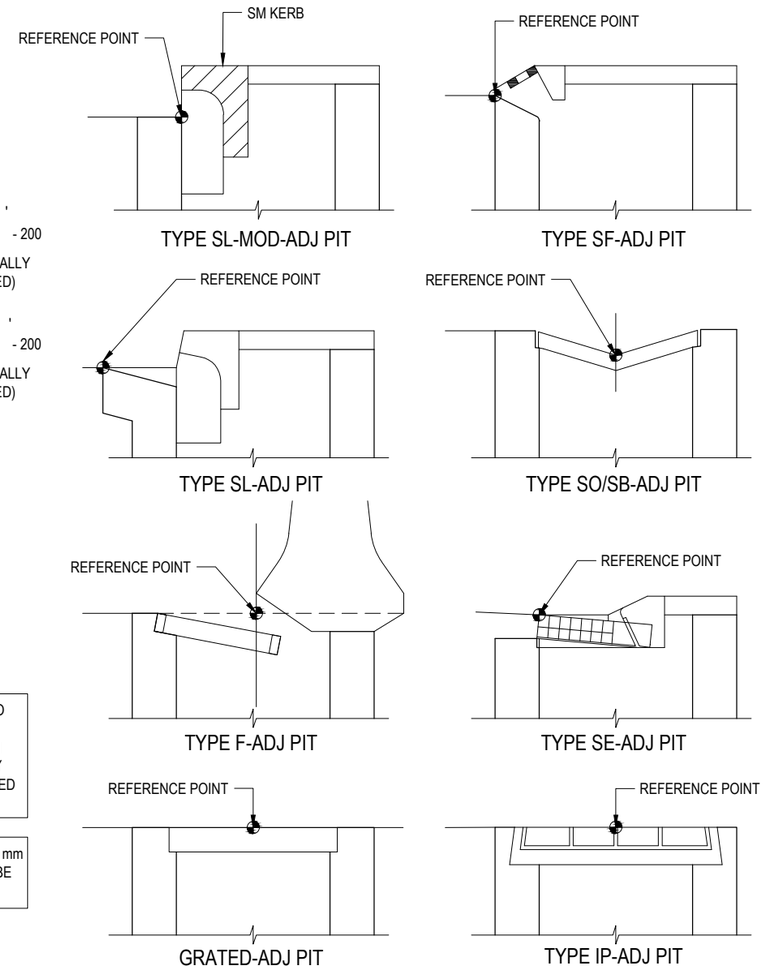
SECTION 1
SCALE 1:25



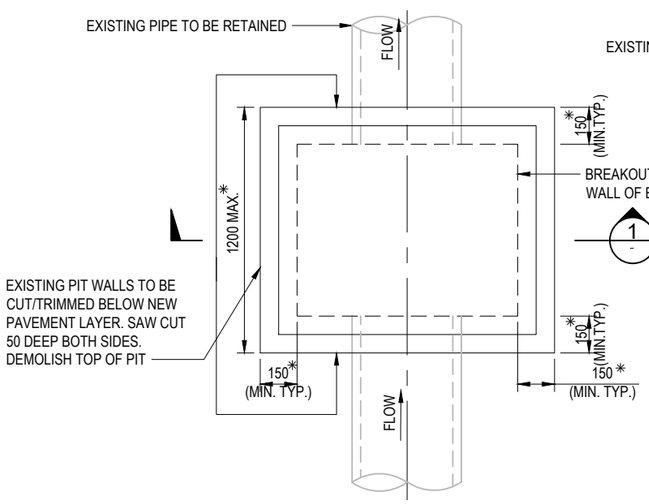
SECTION 2
SCALE 1:25

* TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION. IF IT IS FOUND THAT EXISTING PIT DOES NOT COMPLY WITH THESE CONDITIONS, EXISTING PIT MAY NOT BE MODIFIED, AND TO BE REPLACED WITH NEW PIT

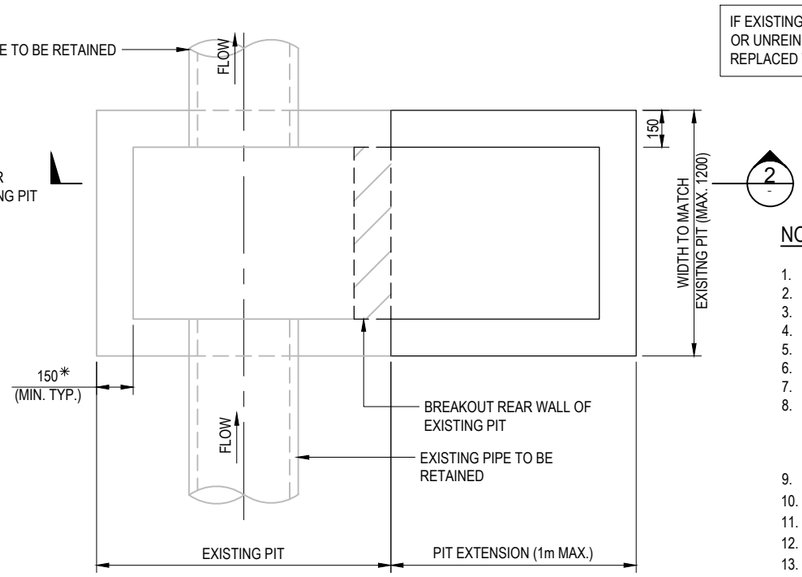
IF EXISTING PIT WALL THICKNESS <150 mm OR UNREINFORCED, EXISTING PIT TO BE REPLACED WITH NEW PIT



DETAIL A REFERENCE POINTS FOR xx-ADJ PITS
SCALE 1:25



PLAN - EXISTING PIT TO BE ADJUSTED (xx - ADJ)
SCALE 1:25



SECTION 3 PLAN - PROPOSED PIT EXTENSION
SCALE 1:25

NOTES

1. REFER TO GENERAL NOTES.
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. LOCATION AND LEVEL OF PIT SHOWN IN DRAWINGS REFER TO THIS POINT◔.
4. FOR PIPE DIAMETERS GREATER THAN 450 OR MULTIPLE PIPES REFER TO RMS DRAWING R0220-28 OR OTHER SPECIFIED HAUNCH DETAIL.
5. DEPTH OF PIT TO NOT EXCEED 3500.
6. PITS DEEPER THAN 1200 TO BE FITTED WITH STEP IRONS IN ACCORDANCE WITH RMS DRAWING R0220-45.
7. MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 32 MPa U.N.O.
8. NOMINAL CLEAR COVER TO REINFORCEMENT NEAREST TO CAST INSITU CONCRETE SURFACES FOR:
   a. SURFACE IN CONTACT WITH SOIL = 75
   b. SURFACE IN CONTACT WITH AIR = 40
9. EDGES SHALL BE CHAMFERED 20 x 20.
10. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671.
11. ALL BARS SHALL BE GRADE D500N DEFORMED RIBBED BAR U.N.O.
12. ALL EXPOSED STEEL TO BE GALVANISED IN ACCORDANCE WITH AS1214 AND TO BE 375 g/m².
13. LAPS NOT SHOWN ON THE DRAWINGS SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY CROSS SECTION.
14. ALL LAPPED PORTIONS OF BARS SHALL BE IN CONTACT REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.
15. ALL PIT GRATES AND FRAMES TO BE "MEDIUM / HEAVY TRAFFICABLE" BIKE SAFE CLASS "D" GRATES AND FRAMES TO AS3996.
16. DESIGN LOADS TO AS5100.2 AND PITS DESIGNED TO AS3600.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-SM-000507.DWG				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:03:06 PM; PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING: 0.125 0 0.125 0.25 0.375m; 1 : 25 FULL SIZE A3	DRAWINGS / DESIGN PREPARED BY
	0	06.11.2020	PRE-AFC		A. PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL STORMWATER DETAILS

A3

SHEET 7 OF 7

TfNSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-SM-000507	0

LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
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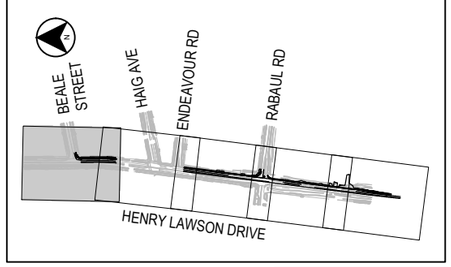
KEYPLAN



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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

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CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

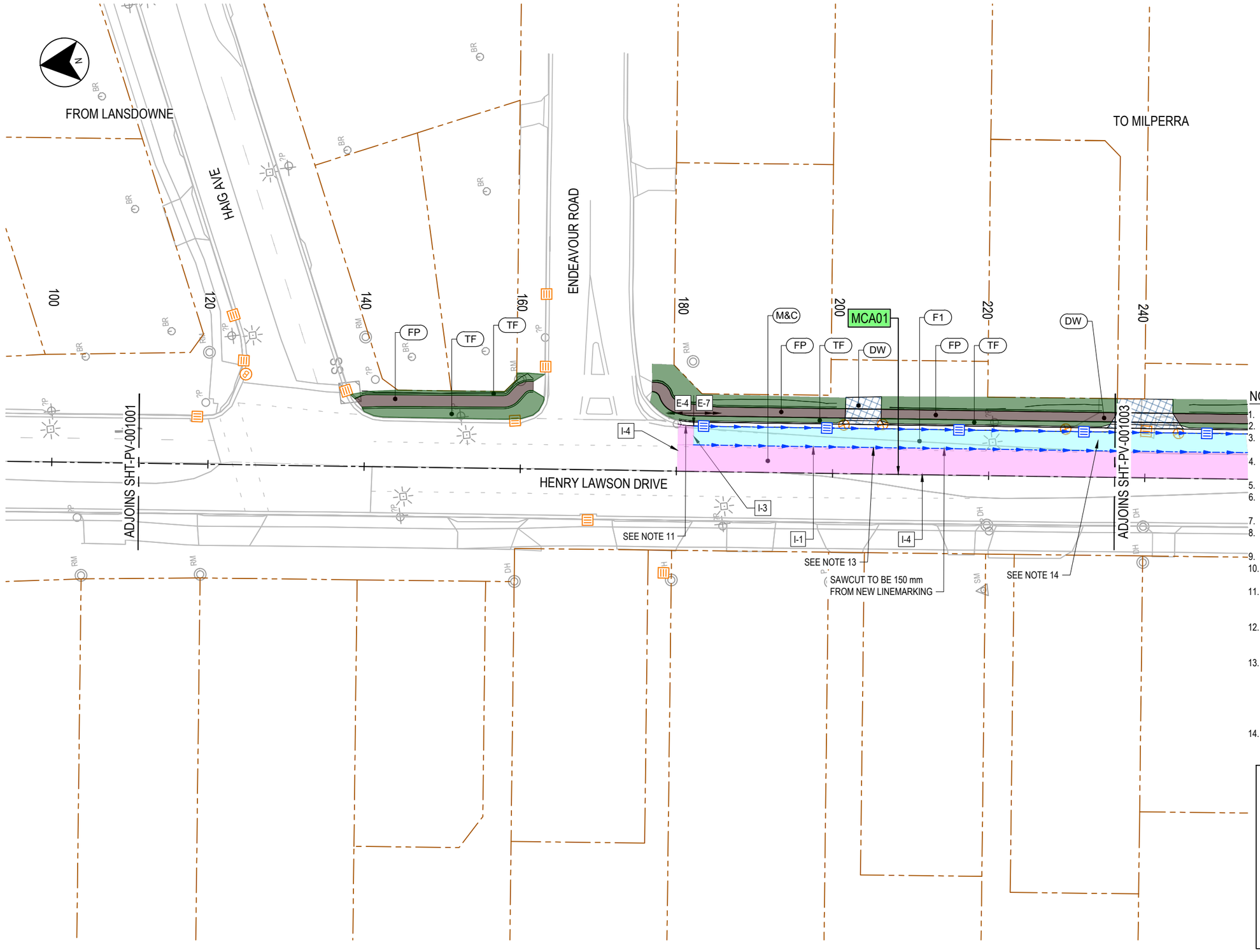
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL PAVEMENT PLAN

A3

SHEET 1 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-PV-001001 | ISSUE 1



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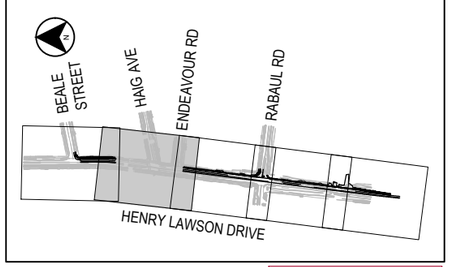

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REVISION IN PROGRESS

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CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

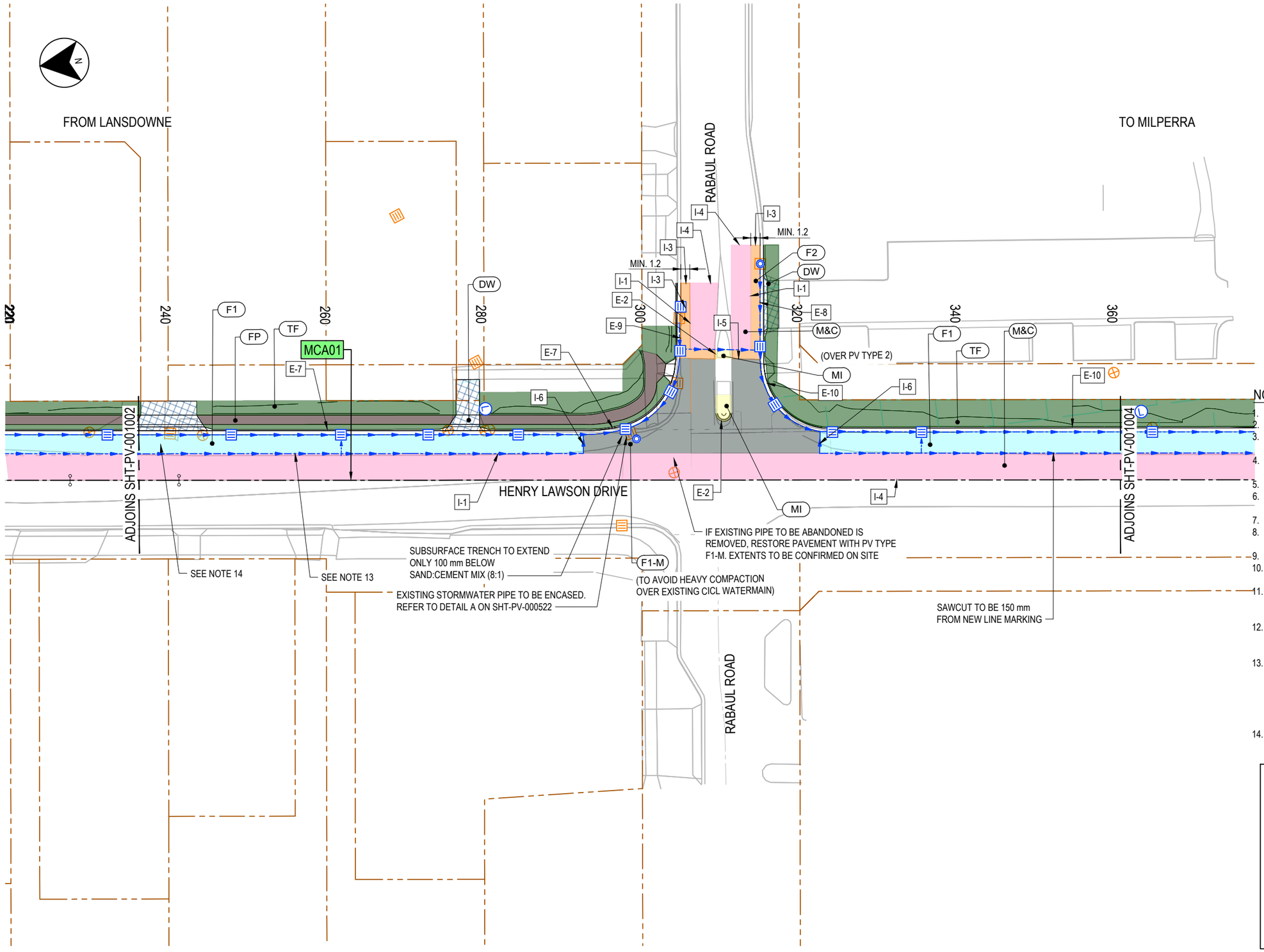
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL PAVEMENT PLAN

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-PV-001002 | ISSUE 1



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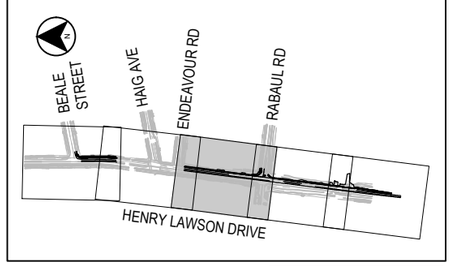

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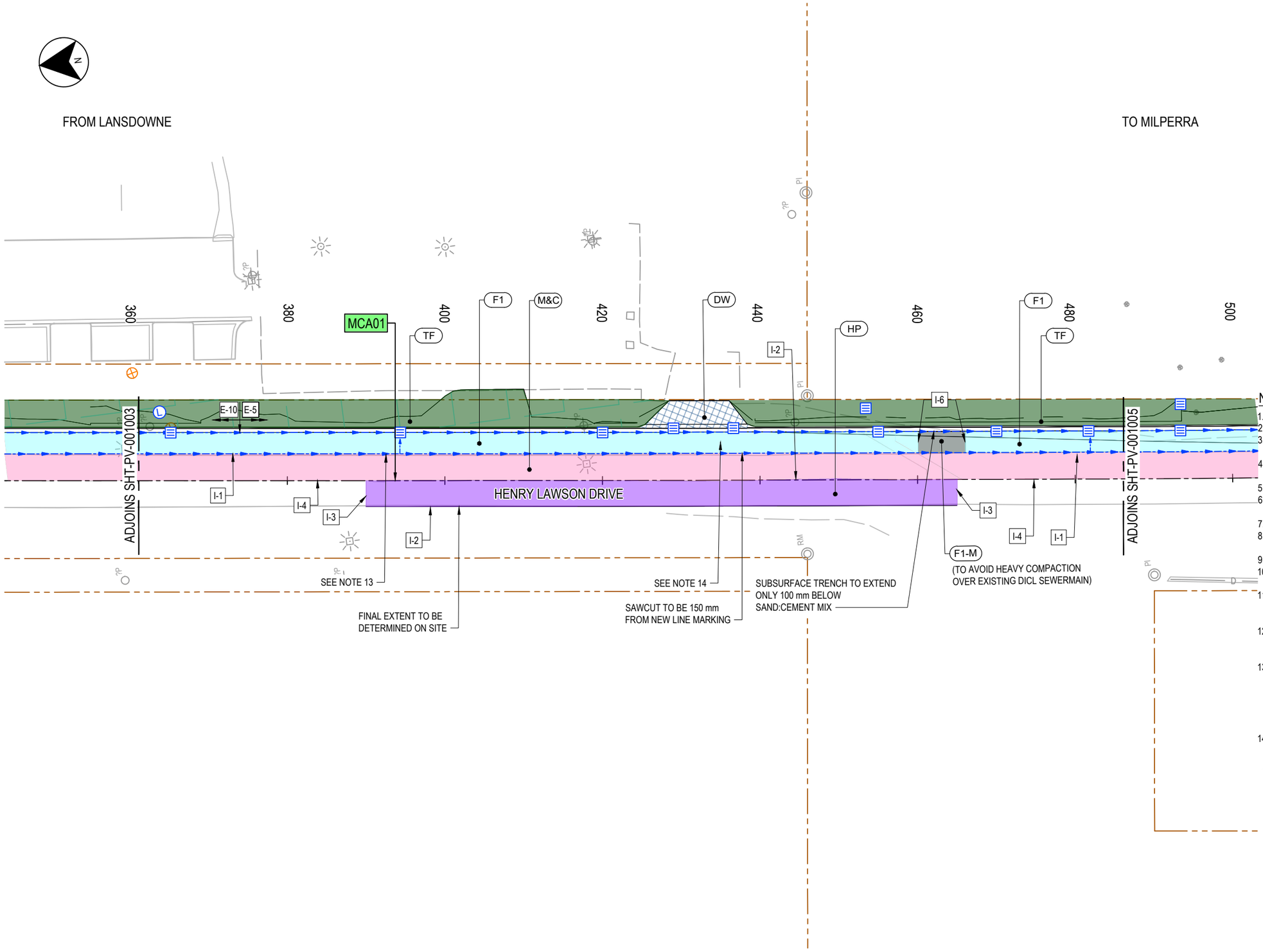
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL PAVEMENT PLAN

A3
SHEET 3 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-PV-001003
ISSUE: 1

FROM LANSDOWNE

TO MILPERRA



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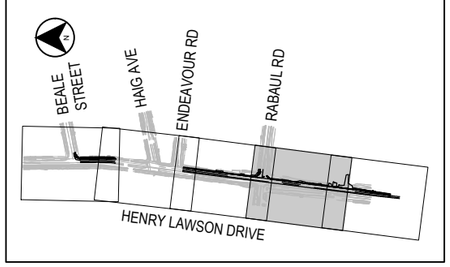

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PLOT DATE / TIME: 23-Nov-20 / 9:21:05 PM

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REVISION IN PROGRESS

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PAVEMENT PLAN

A3

SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

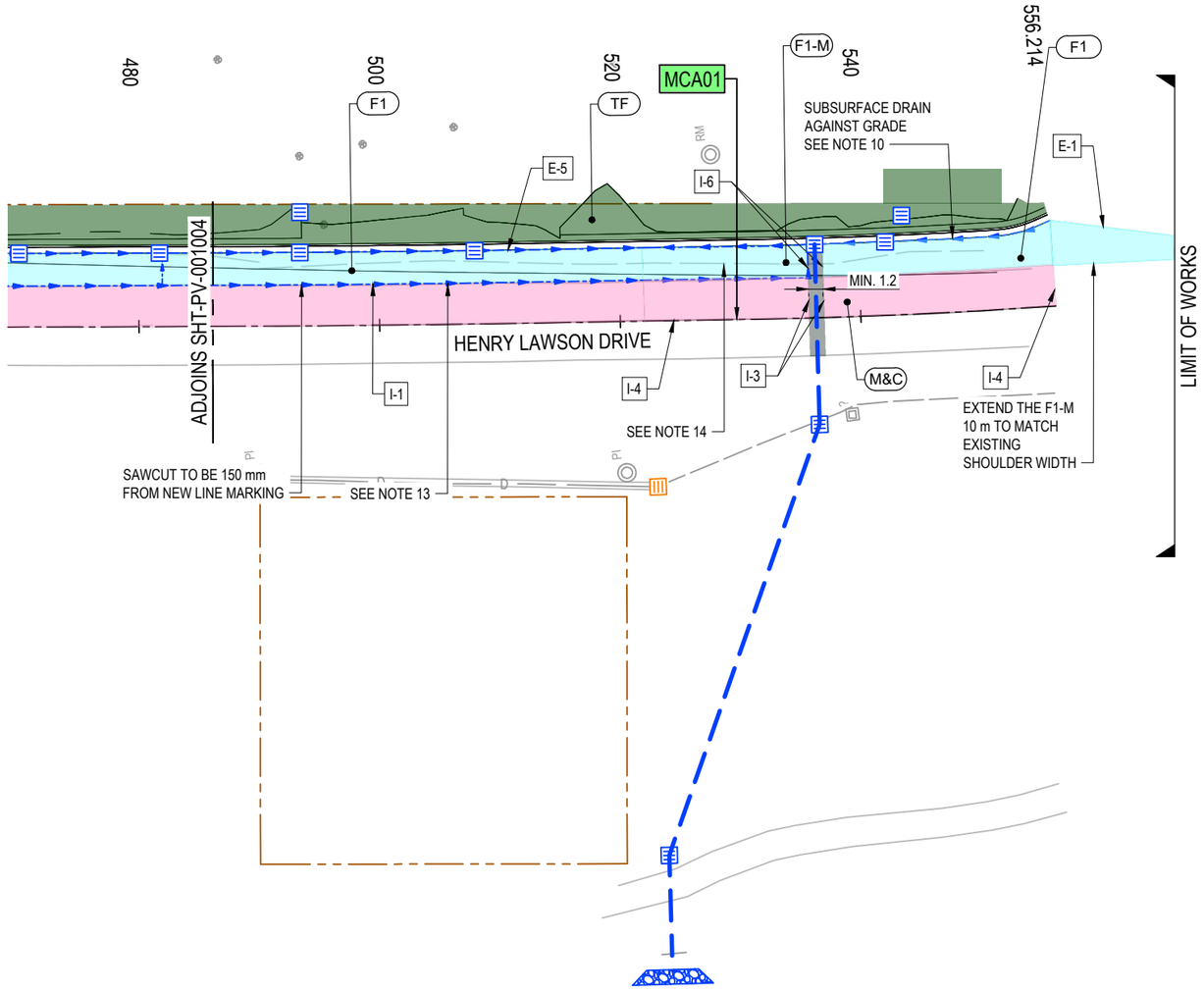
EDMS No.: -

SHEET No.: SHT-PV-001004

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA



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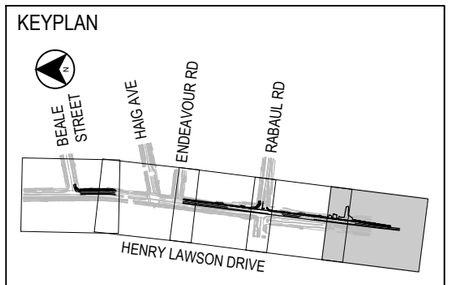

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PLOT BY: MEGHWARB

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A3

SHEET 5 OF 5

TNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-PV-001005

ISSUE 1

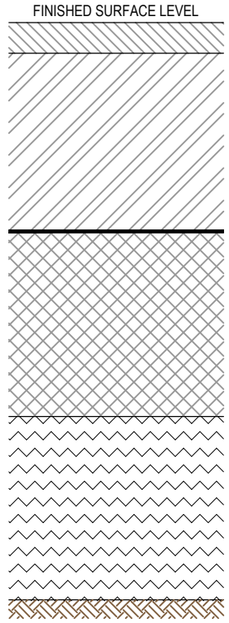
NOTES

1. ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. MATERIAL SUPPLY AND CONSTRUCTION:
   a. ALL ASPHALT TO CONFORM TO SPECIFICATION R116.
   b. PRIME, PRIMER SEALS AND SPRAY SEALS TO CONFORM TO SPECIFICATION R106.
   c. CONCRETE FOR FOOTPATHS, DRIVEWAYS AND MEDIANS TO CONFORM TO SPECIFICATION R54.
   d. ALL EARTHWORKS TO BE IN ACCORDANCE WITH SPECIFICATION R44, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   e. JOINT FILLER TO COMPLY WITH SPECIFICATION 3204.
3. THE THICKNESS OF SEAL SHALL BE TAKEN INTO ACCOUNT IN THE DESIGN MILLING DEPTH AND SHALL APPROXIMATELY BE EQUIVALENT TO THE AVERAGE LEAST DIMENSION (ALD) OF THE AGGREGATE. UNTIL SUCH TIME ALD TESTS ARE CONDUCTED ON THE AGGREGATES, AN ALD OF 4 mm MAY BE ASSUMED FOR A 7 mm NOMINAL SIZE AGGREGATE.
4. LOW CUTTER SEAL (C170 BINDER WITH MAXIMUM 2% CUTTER) SHALL BE APPLIED UNDERNEATH ASPHALT BASE COURSE. NOMINAL AGGREGATE SPREAD RATE AND RESIDUAL BINDER APPLICATION RATE SHALL BE BETWEEN 200 AND 250 m²/m³ AND 0.80 L/m² RESPECTIVELY.
5. ALL PROFILING OPERATIONS SHALL BE IN ACCORDANCE WITH R101.
6. MILL AND CORRECT: AFTER MILLING THE TOP 50 mm OF THE EXISTING PAVEMENT, THE EXPOSED SURFACE MAY REQUIRE A CORRECTIVE LAYER IF DEPTH TO FINISHED SURFACE LEVEL IS GREATER THAN 70 mm. CORRECTIVE LAYER SHALL BE A MINIMUM 20 mm AC7 (A15E). ASPHALT TYPES SHOULD COMPLY WITH SPECIFICATION R116.
7. ON COMPLETION OF THE MILLING OPERATION FOR THE PAVEMENT TYPE M&C, THE REMAINING ASPHALT LAYER SHALL BE INSPECTED. IF IT IS CRACKED, STRIPPED OR DELAMINATED AND IF THE REMAINING LAYER IS LESS THAN 30 mm THICK SHALL BE REMOVED AS WELL. CRACKS WIDER THAN 3 mm SHALL BE SEALED IN ACCORDANCE WITH SPECIFICATION TfNSW M211, PRIOR TO CONSTRUCTION OF THE NEW ASPHALT LAYERS.
8. ALL LAYERS INCLUDING THE CORRECTIVE COURSE SHALL BE WITHIN THE RANGE OF THE ALLOWABLE ASPHALT LAYER THICKNESS LISTED IN TABLE 1.

TABLE 1 : ALLOWABLE ASPHALT LAYER THICKNESS

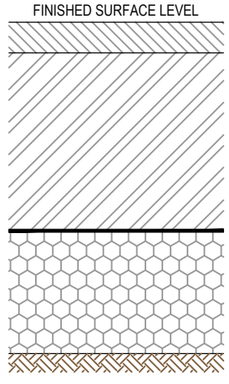
ASPHALT TYPE	ALLOWABLE ASPHALT LAYER THICKNESS FOR DIFFERENT NOMINAL ASPHALT SIZE (mm)				
	5	7	10	14	20
DENSE GRADED ASPHALT (DGA)	15 - 25	21 - 35	30 - 50	42 - 70	60 - 100

9. FOUNDATION TREATMENTS FOR PAVEMENT TYPE F1-M AND F2:
   - EXCAVATE TO FOUNDATION LEVEL
   - TRIM THE FLOOR OF THE CUTTING TO CONFORM TO THE TOLERANCES STATED IN 7.7 (TfNSW R44)
   - COMPACT THE MATERIAL EXPOSED WITH NO LESS THAN 6 PASSES OF A VIBRATING ROLLER
   - PROOF ROLLING TO TfNSW T198
   - IF UNSUITABLE MATERIAL IS ENCOUNTERED , REMOVE AND REPLACE WITH SUITABLE MATERIAL IN ACCORDANCE WITH CLAUSE 5.1 OF TfNSW R44
   - PLACE SAND:CEMENT MIX (8:1) AND COMPACT TO REQUIREMENTS OF M258.
10. FOR PAVEMENT TYPES FP, DW AND MI THE SURFACE OF THE COMPACTED UNBOUND GRANULAR MATERIAL SHALL BE MOISTENED PRIOR TO PLACING THE CONCRETE TO MINIMISE MOISTURE LOSS.
11. AC14 AND AC20 WARM MIX SHALL BE COMPACTED AT TEMPERATURES APPROXIMATELY AROUND 125°C. COMPACTION TEMPERATURES SHALL BE CONFIRMED AFTER FOLLOWING METHODOLOGY INCLUDED IN APPENDIX B OF AS2891.2.2.
12. FOR PV TYPE F2 AND F1-M SAND:CEMENT MIX (8:1) SHALL BE COMPACTED IN MAXIMUM 100 mm THICK LAYERS.
13. PAVEMENT TYPE FP AND DW TO BE CONSTRUCTED AS PER CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-027 AND S-008.
14. FOUNDATION TREATMENT FOR PAVEMENT TYPE F1:
   - EXCAVATE TO DESIGNED FLOOR LEVEL.
   - WHERE CBR AT THE DESIGNED FLOOR LEVEL IS LESS THAN 5%, OR PI GREATER THAN 25% PROVIDE TREATMENT TYPE C3-I TO RMS R44 CONSISTING OF 300 mm IN-SITU STABILISATION (TfNSW R50) WITH 4% HYDRATED LIME TO ACHIEVE MINIMUM CBR 8%.
   - ACTUAL PERCENTAGE OF LIME SHALL BE CONFIRMED BY LABORATORY TESTING (T143 AND T117).
     FOR AREAS WITH REDUCED WORKING WIDTH (I.E. LESS THAN 2.5 m), PROVIDE 300 mm MODIFIED MATERIALS SUBBASE TO TfNSW R71. MATERIAL TO NOT EXCEED 1.0 MPa UCS (TfNSW T116 AFTER 7 DAYS ACCELERATED CURING)
   - IF CBR AT DESIGNED FLOOR LEVEL IS GREATER THAN 5%, PROVIDE FOUNDATION TREATMENT C1 TO RMS R44.



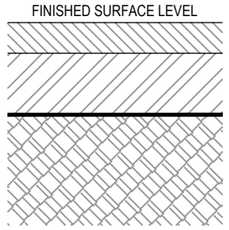
50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
290	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
4	7 mm LOW CUTTER SEAL (TfNSW R106) (SEE NOTES 3 AND 4) OR TACK COAT FOR OVERNIGHT WORK
300	SELECTED MATERIAL ZONE (TfNSW 3071)
	DESIGNED FLOOR LEVEL. SEE NOTE 14
300	FOUNDATION TREATMENT C3-I OR C3-11. SEE NOTE 14
	FOUNDATION LEVEL

PAVEMENT TYPE - F1
FULL DEPTH ASPHALT



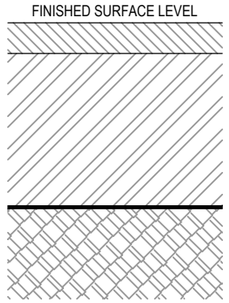
50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
290	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
4	7 mm LOW CUTTER SEAL (TfNSW R106) (SEE NOTES 3 AND 4) OR TACK COAT FOR OVERNIGHT WORK
200	SAND:CEMENT MIX (8:1) (TfNSW M258) (SEE NOTE 12)
	FOUNDATION LEVEL. SEE NOTE 9

PAVEMENT TYPE - F1-M
FULL DEPTH ASPHALT



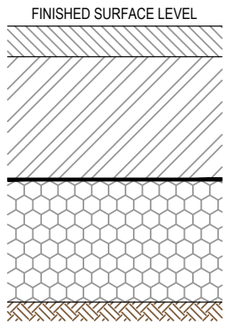
50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTES 6 TO 8 AND 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
VARIES	CORRECTIVE LAYER (TfNSW R116) IF REQUIRED
	TACK COAT (IF ASPHALT EXPOSED)
VARIES	EXISTING PAVEMENT

PAVEMENT TYPE - M&C
MILL AND CORRECTION



50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
250	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
	TACK COAT (IF ASPHALT EXPOSED)
VARIES	EXISTING PAVEMENT (IF UNSUITABLE OR CLAYEY SUBGRADE IS ENCOUNTERED, 150 mm SAND:CEMENT MIX (8:1) SHALL BE APPLIED)

PAVEMENT TYPE - HP
HEAVY PATCHING



50	AC14 WARM MIX (A15E) (TfNSW R116) (SEE NOTE 11) 2.5% WASHED RECYCLED GLASS (TfNSW 3154)
200	AC20 WARM MIX (AR450) (TfNSW R116) (SEE NOTE 11) MIN. 5% WASHED RECYCLED GLASS (TfNSW 3154)
4	7 mm LOW CUTTER SEAL (TfNSW R106) (SEE NOTES 3 AND 4) OR TACK COAT FOR OVERNIGHT WORK
200	SAND:CEMENT MIX (8:1) (TfNSW M258) (SEE NOTE 12)
	FOUNDATION LEVEL. SEE NOTE 9

PAVEMENT TYPE - F2
FULL DEPTH ASPHALT

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000501.DWG
DESIGN LOT CODE:
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:23:16 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

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SCALES ON A3 SIZE DRAWING:
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A3
SHEET 1 OF 2

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-PV-000501
ISSUE: 1

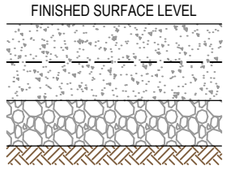
NOTES

1. ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. MATERIAL SUPPLY AND CONSTRUCTION:
   a. ALL ASPHALT TO CONFORM TO SPECIFICATION R116.
   b. PRIME, PRIMER SEALS AND SPRAY SEALS TO CONFORM TO SPECIFICATION R106.
   c. CONCRETE FOR FOOTPATHS, DRIVEWAYS AND MEDIANS TO CONFORM TO SPECIFICATION R54.
   d. ALL EARTHWORKS TO BE IN ACCORDANCE WITH SPECIFICATION R44, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   e. JOINT FILLER TO COMPLY WITH SPECIFICATION 3204.
3. THE THICKNESS OF SEAL SHALL BE TAKEN INTO ACCOUNT IN THE DESIGN MILLING DEPTH AND SHALL APPROXIMATELY BE EQUIVALENT TO THE AVERAGE LEAST DIMENSION (ALD) OF THE AGGREGATE. UNTIL SUCH TIME ALD TESTS ARE CONDUCTED ON THE AGGREGATES, AN ALD OF 4 mm MAY BE ASSUMED FOR A 7 mm NOMINAL SIZE AGGREGATE.
4. LOW CUTTER SEAL (C170 BINDER WITH MAXIMUM 2% CUTTER) SHALL BE APPLIED UNDERNEATH ASPHALT BASE COURSE. NOMINAL AGGREGATE SPREAD RATE AND RESIDUAL BINDER APPLICATION RATE SHALL BE BETWEEN 200 AND 250 m^2/m^3 AND 0.80 L/m^2 RESPECTIVELY.
5. ALL PROFILING OPERATIONS SHALL BE IN ACCORDANCE WITH R101.
6. MILL AND CORRECT: AFTER MILLING THE TOP 50 mm OF THE EXISTING PAVEMENT, THE EXPOSED SURFACE MAY REQUIRE A CORRECTIVE LAYER IF DEPTH TO FINISHED SURFACE LEVEL IS GREATER THAN 70 mm. CORRECTIVE LAYER SHALL BE A MINIMUM 20 mm AC7 (A15E). ASPHALT TYPES SHOULD COMPLY WITH SPECIFICATION R116.
7. ON COMPLETION OF THE MILLING OPERATION FOR THE PAVEMENT TYPE M&C, THE REMAINING ASPHALT LAYER SHALL BE INSPECTED. IF IT IS CRACKED, STRIPPED OR DELAMINATED AND IF THE REMAINING LAYER IS LESS THAN 30 mm THICK SHALL BE REMOVED AS WELL. CRACKS WIDER THAN 3 mm SHALL BE SEALED IN ACCORDANCE WITH SPECIFICATION TfNSW M211, PRIOR TO CONSTRUCTION OF THE NEW ASPHALT LAYERS.
8. ALL LAYERS INCLUDING THE CORRECTIVE COURSE SHALL BE WITHIN THE RANGE OF THE ALLOWABLE ASPHALT LAYER THICKNESS LISTED IN TABLE 1.

TABLE 1 : ALLOWABLE ASPHALT LAYER THICKNESS

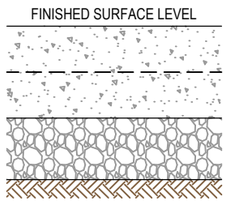
ASPHALT TYPE	ALLOWABLE ASPHALT LAYER THICKNESS FOR DIFFERENT NOMINAL ASPHALT SIZE (mm)				
	5	7	10	14	20
DENSE GRADED ASPHALT (DGA)	15 - 25	21 - 35	30 - 50	42 - 70	60 - 100

9. FOUNDATION TREATMENTS FOR PAVEMENT TYPE F1-M AND F2:
   - EXCAVATE TO FOUNDATION LEVEL
   - TRIM THE FLOOR OF THE CUTTING TO CONFORM TO THE TOLERANCES STATED IN 7.7 (TfNSW R44)
   - COMPACT THE MATERIAL EXPOSED WITH NO LESS THAN 6 PASSES OF A VIBRATING ROLLER
   - PROOF ROLLING TO TfNSW T198
   - IF UNSUITABLE MATERIAL IS ENCOUNTERED , REMOVE AND REPLACE WITH SUITABLE MATERIAL IN ACCORDANCE WITH CLAUSE 5.1 OF TfNSW R44
   - PLACE SAND:CEMENT MIX (8:1) AND COMPACT TO REQUIREMENTS OF M258.
10. FOR PAVEMENT TYPES FP, DW AND MI THE SURFACE OF THE COMPACTED UNBOUND GRANULAR MATERIAL SHALL BE MOISTENED PRIOR TO PLACING THE CONCRETE TO MINIMISE MOISTURE LOSS.
11. AC14 AND AC20 WARM MIX SHALL BE COMPACTED AT TEMPERATURES APPROXIMATELY AROUND 125°C. COMPACTION TEMPERATURES SHALL BE CONFIRMED AFTER FOLLOWING METHODOLOGY INCLUDED IN APPENDIX B OF AS2891.2.2.
12. FOR PV TYPE F2 AND F1-M SAND:CEMENT MIX (8:1) SHALL BE COMPACTED IN MAXIMUM 100 mm THICK LAYERS.
13. PAVEMENT TYPE FP AND DW TO BE CONSTRUCTED AS PER CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-027 AND S-008.
14. FOUNDATION TREATMENT FOR PAVEMENT TYPE F1:
   - EXCAVATE TO DESIGNED FLOOR LEVEL.
   - WHERE CBR AT THE DESIGNED FLOOR LEVEL IS LESS THAN 5%, OR PI GREATER THAN 25% PROVIDE TREATMENT TYPE C3-I TO RMS R44 CONSISTING OF 300 mm IN-SITU STABILISATION (RMS R50) WITH 4% HYDRATED LIME TO ACHIEVE MINIMUM CBR 8%.
   - ACTUAL PERCENTAGE OF LIME SHALL BE CONFIRMED BY LABORATORY TESTING (T143 AND T117). FOR AREAS WITH REDUCED WORKING WIDTH (I.E. LESS THAN 2.5 m), PROVIDE 300 mm MODIFIED MATERIALS SUBBASE TO TfNSW R71. MATERIAL TO NOT EXCEED 1.0 MPa UCS (TfNSW T116 AFTER 7 DAYS ACCELERATED CURING)
   - IF CBR AT DESIGNED FLOOR LEVEL IS GREATER THAN 5%, PROVIDE FOUNDATION TREATMENT C1 TO RMS R44.



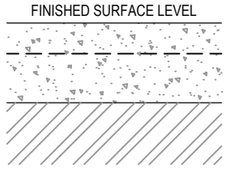
125	25 MPa CONCRETE WITH SL72 MESH (TfNSW R54)
75	DGB20 (TfNSW 3051) (SEE NOTE 10)
	SUBGRADE CBR 2.5%

PAVEMENT TYPE - FP
FOOTPATH
(SEE NOTE 10)



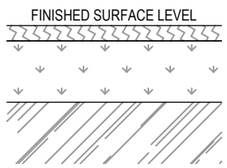
150	32 MPa CONCRETE WITH SL72 MESH (TfNSW R54)
100	DGB20 (TfNSW 3051) (SEE NOTE 10)
	SUBGRADE CBR 2.5%

PAVEMENT TYPE - DW
DRIVEWAYS
(SEE NOTE 13)



MIN. 130	25 MPa CONCRETE WITH SL72 MESH (TfNSW R54)
	AC20 WARM MIX (PLACE AS A PART OF PV TYPE F2) OR EXISTING AC

PAVEMENT TYPE - MI
MEDIAN INFILL



25	TURF (TfNSW R179)
100	TURF UNDERLAY (TfNSW R179)
VARIES	RECOMPACTED EXISTING MATERIALS

PAVEMENT TYPE - TF
LANDSCAPING

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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000502.DWG
EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

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DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
SCALES ON A3 SIZE DRAWING
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HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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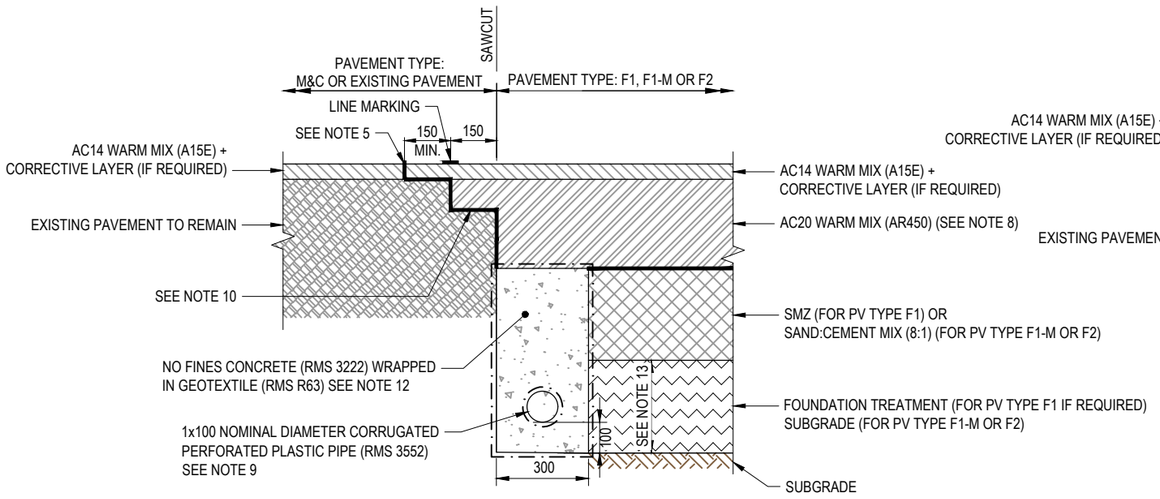
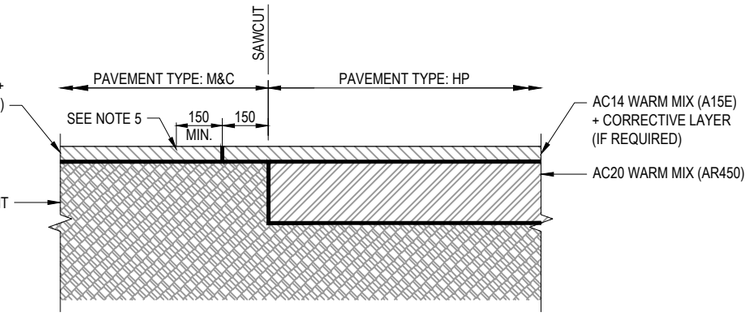
A3
SHEET 2 OF 2

TfNSW REGISTRATION No. DS2020/000130 | PART 1
ISSUE STATUS: DETAILED DESIGN | EDMS No. - | SHEET No. SHT-PV-000502 | ISSUE 1



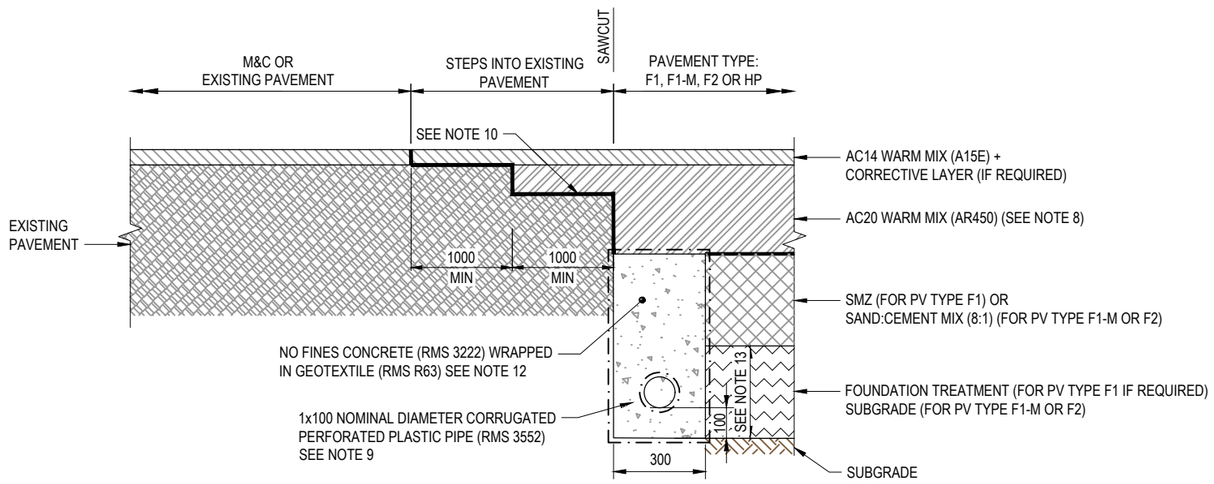
INTERFACE DETAIL I-1
PAVEMENT TYPE M&C OR EXISTING PAVEMENT AND PAVEMENT TYPE F1, F1-M OR F2
NTS



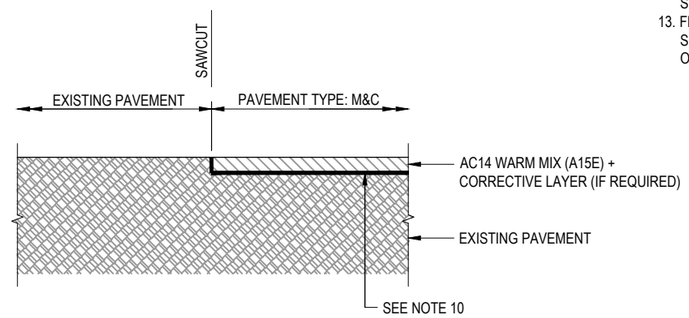
INTERFACE DETAIL I-2
PAVEMENT TYPE M&C AND PAVEMENT TYPE HP
NTS

NOTES:

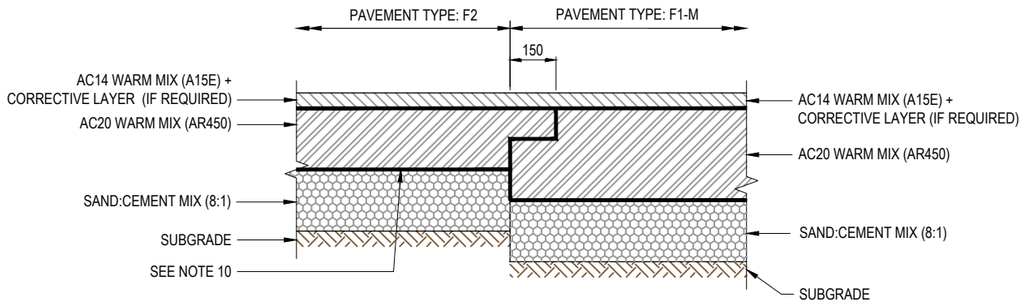
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYER; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.



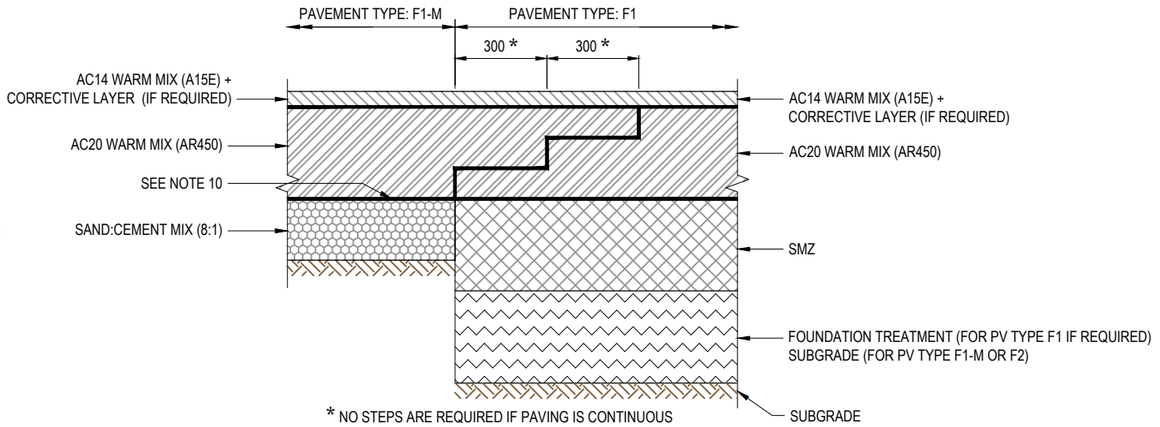
INTERFACE DETAIL I-3
TRANSVERSE CONSTRUCTION DETAIL
NTS



INTERFACE DETAIL I-4
EXISTING PAVEMENT AND PAVEMENT TYPE M&C
NTS



INTERFACE DETAIL I-5
PAVEMENT TYPE F2 OR HP AND PAVEMENT TYPE F1 OR F1-M
NTS



* NO STEPS ARE REQUIRED IF PAVING IS CONTINUOUS

INTERFACE DETAIL I-6
PAVEMENT TYPE F1-M AND PAVEMENT TYPE F1
NTS

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PW:/P0043031-SHT-PV-000521.DWG		-	23-Nov-20 / 9:23:28 PM	MEGHWARB	NSW GOVERNMENT Transport for NSW

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

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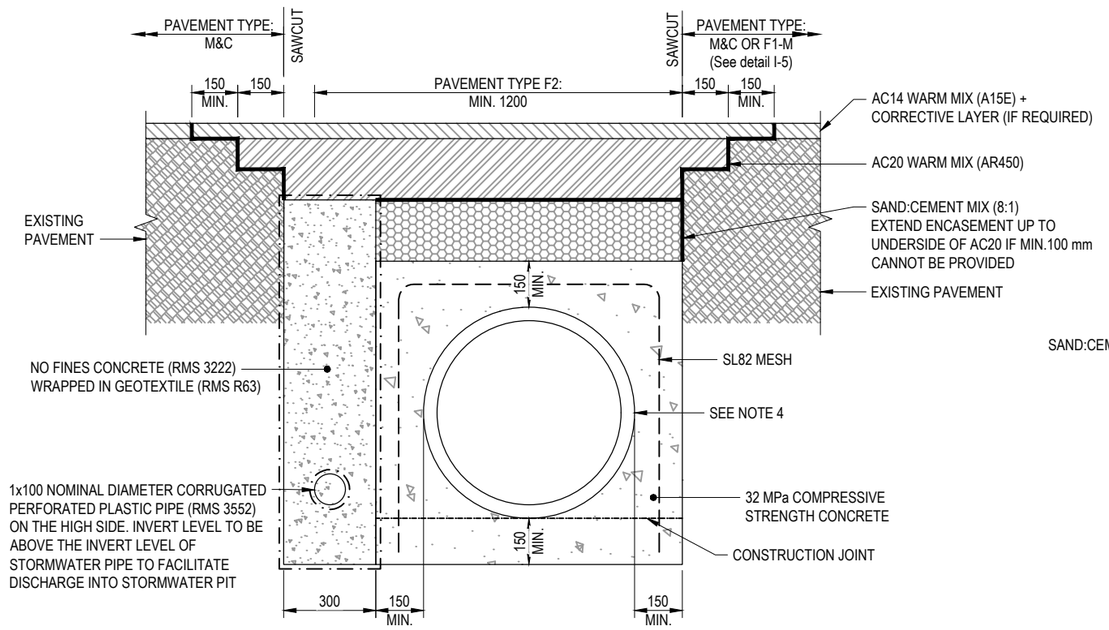
PAVEMENT DETAILS

A3

SHEET 1 OF 2

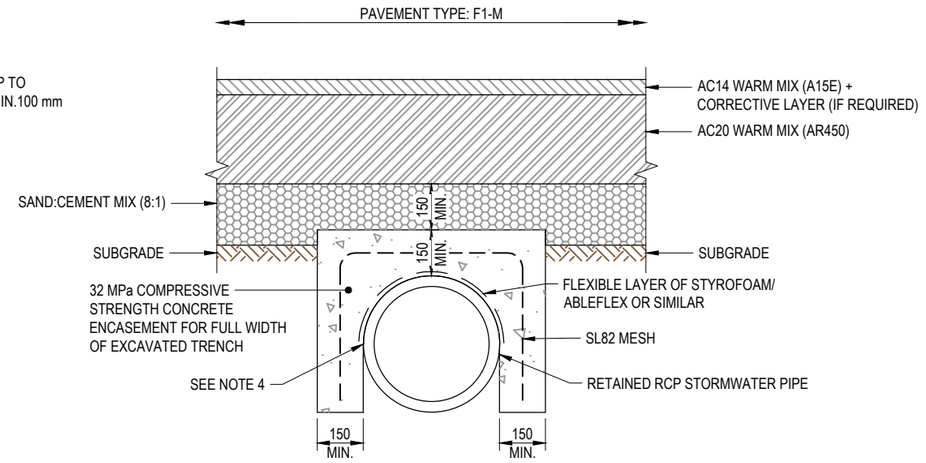
TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000521	1



INTERFACE DETAIL I-7

PAVEMENT TYPE F2 AND EXISTING PAVEMENT WITH STORMWATER PIPE ENCASEMENT
NTS



INTERFACE DETAIL A

PAVEMENT TYPE F1-M AND EXISTING PAVEMENT WITH ENCASEMENT OF EXISTING STORMWATER PIPE
NTS

NOTES:

1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYER; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000522.DWG				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ		
	1	06.11.2020	PRE-AFC		A.PEREZ		
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:13:56 PM	MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

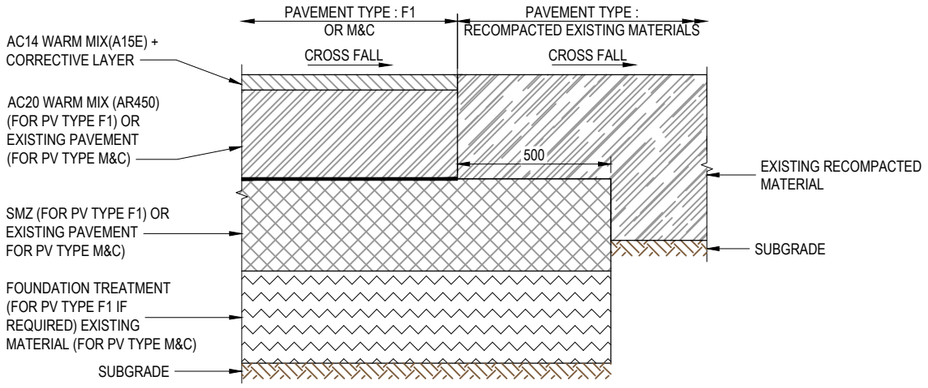
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
PAVEMENT DETAILS

A3

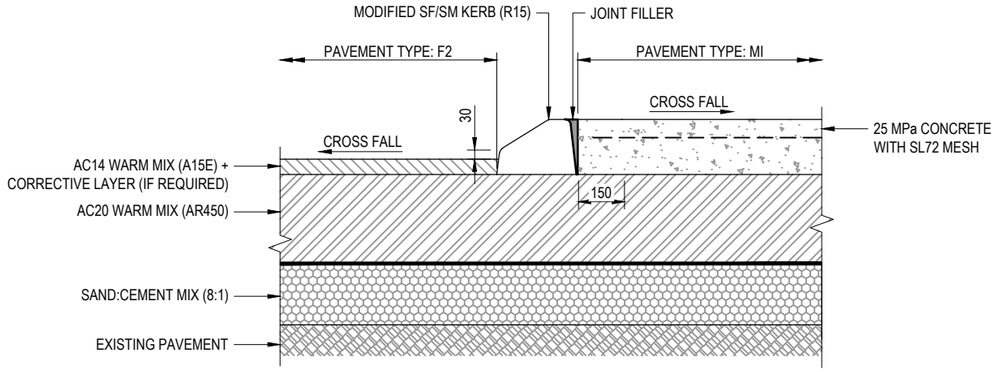
SHEET 2 OF 2

TfNSW REGISTRATION No.			PART
DS2020/000130			1
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000522	1



EDGE DETAIL E-1

PAVEMENT TYPE F1 OR M&C WITH EXISTING RECOMPACTED MATERIALS
SCALE 1 : 20



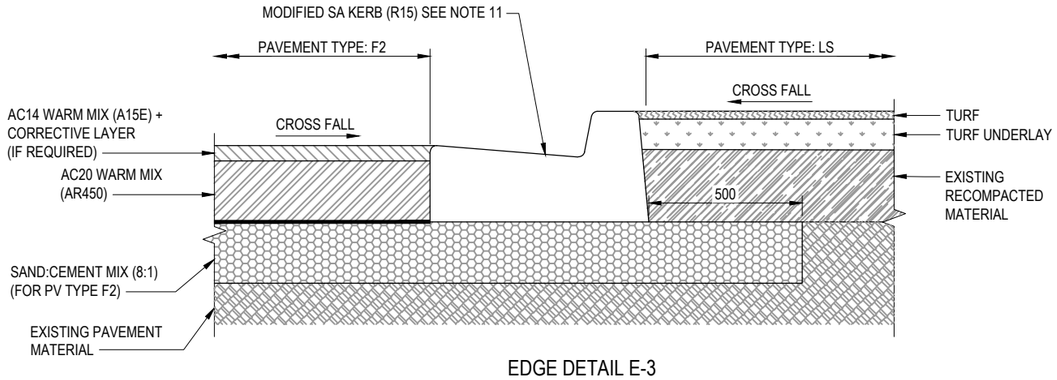
EDGE DETAIL E-2

PAVEMENT TYPE F1-M WITH MODIFIED SF/SM KERB AND PAVEMENT TYPE MI

SCALE 1 : 20

NOTES:

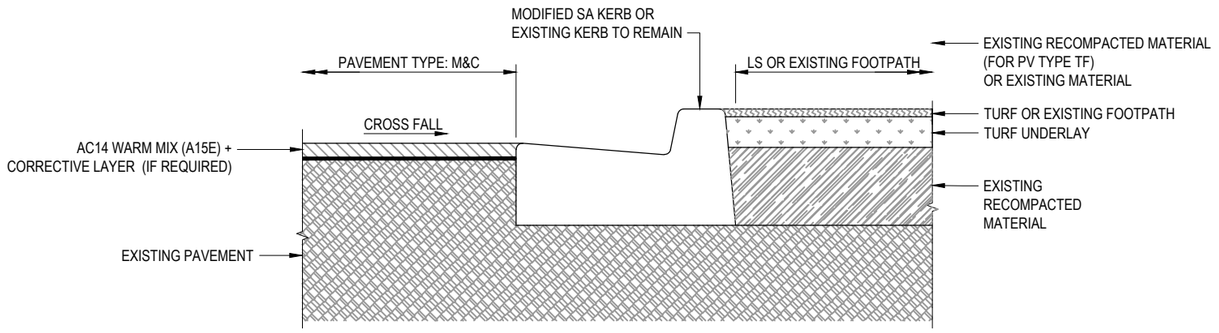
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYERS; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.



EDGE DETAIL E-3

PAVEMENT TYPE F2 WITH MODIFIED SA KERB AND PAVEMENT TYPE LS

SCALE 1 : 20



EDGE DETAIL E-4

PAVEMENT TYPE M&C WITH MODIFIED SA KERB OR EXISTING KERB AND PAVEMENT TYPE LS OR EXISTING FOOTPATH

SCALE 1 : 20

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000531.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	0.1 0 0.1 0.2 0.3 0.4m	
	1	06.11.2020	PRE-AFC		A.PEREZ	1 : 20 FULL SIZE A3	
			REVISION IN PROGRESS			CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:22:42 PM	MEGHWARB

CHECK PRINT (PRELIM. INITIAL / FINAL DATE)

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

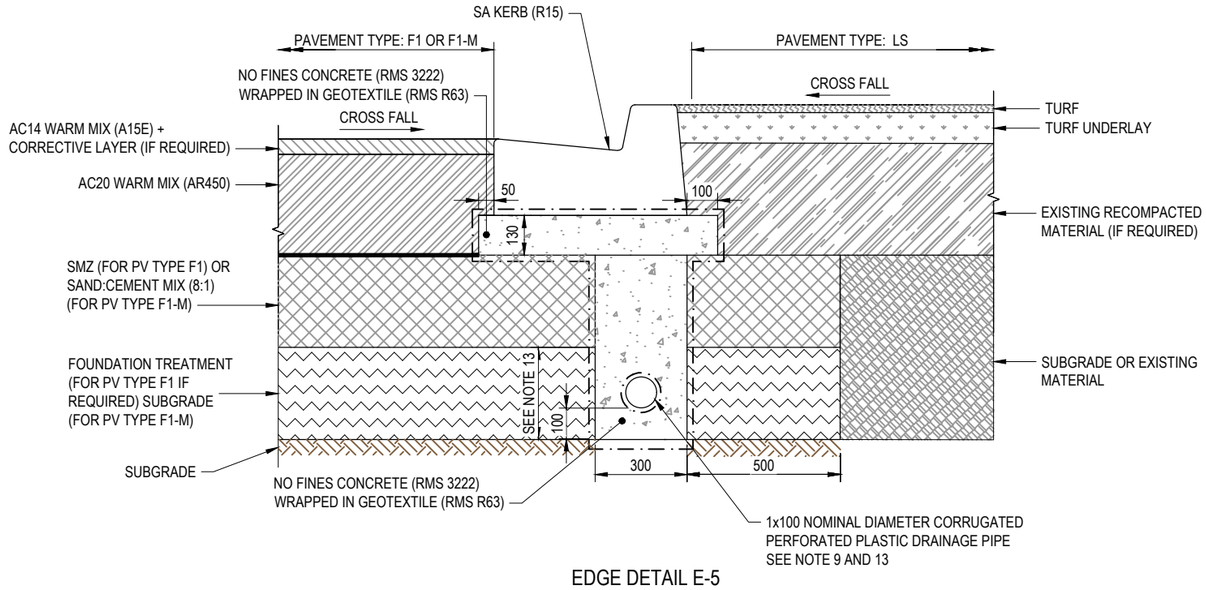
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
PAVEMENT EDGE DETAILS

A3

SHEET 1 OF 3

TNSW REGISTRATION No.	PART
DS2020/000130	1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000531	1



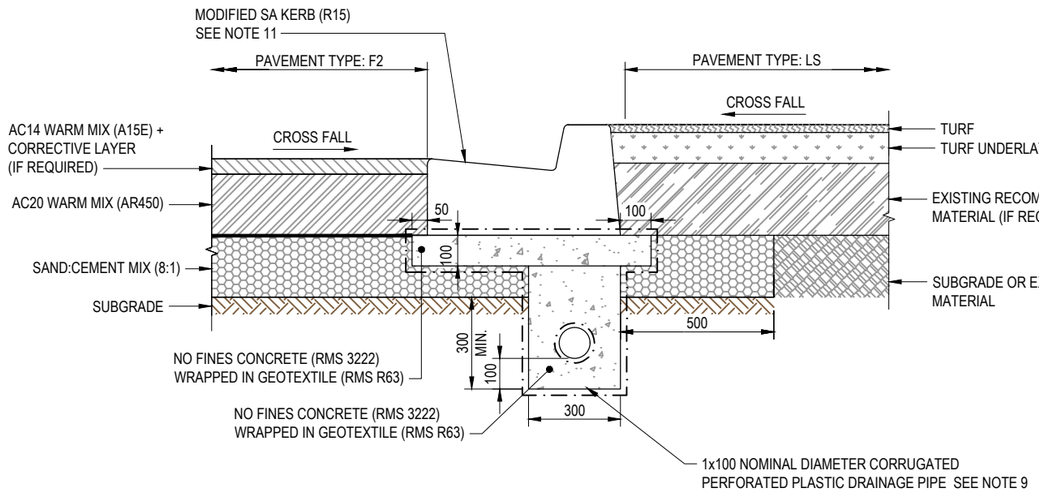
EDGE DETAIL E-5

PAVEMENT TYPE F1 OR F1-M WITH SA KERB AND PAVEMENT TYPE LS

SCALE 1 : 20

NOTES:

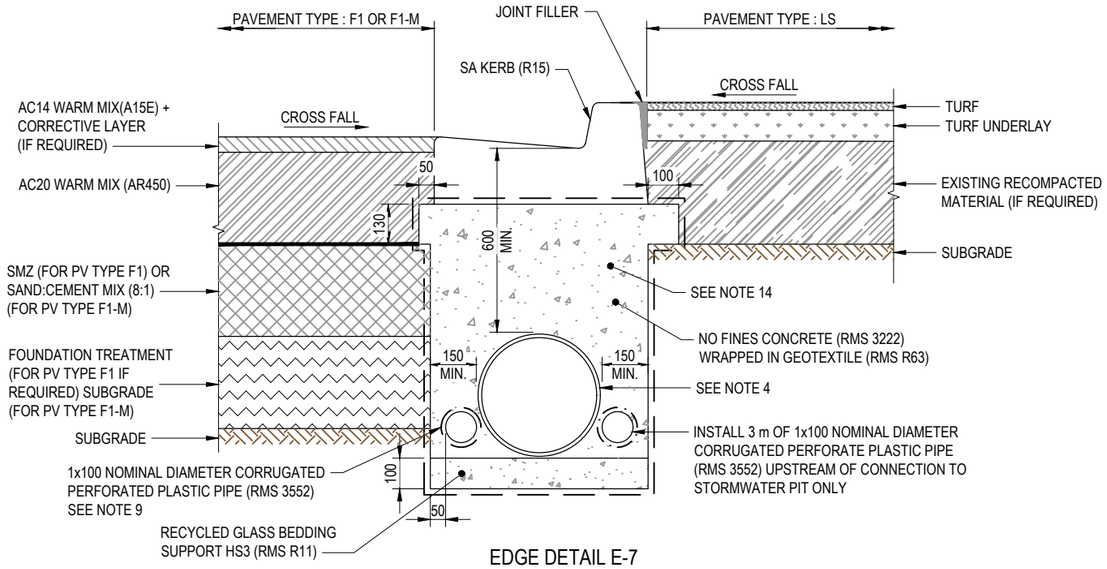
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYERS; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.
14. FOR DETAIL E-7 TO E-10, IF DEPTH TO OBVERT EXCEEDS 1200 mm, SUBJECT TO PRINCIPAL'S APPROVAL REPLACE DETAIL WITH E-5 OR E-6 AND STANDARD R11 BACKFILL.



EDGE DETAIL E-6

PAVEMENT TYPE F2 WITH SA KERB AND PAVEMENT TYPE LS

SCALE 1 : 20



EDGE DETAIL E-7

PAVEMENT TYPE F1 OR F1-M WITH COMBINED STORMWATER/SUBSURFACE TRENCH AND PAVEMENT TYPE LS

SCALE 1 : 20

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000532.DWG				DESIGN LOT CODE: -		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		PLOT DATE / TIME: 23-Nov-20 / 9:15:22 PM; PLOT BY: MEGHWARB
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY	CHECK PRINT PRELIM. INITIAL / FINAL DATE
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	0.1 0 0.1 0.2 0.3 0.4m		DISCIPLINE
	1	06.11.2020	PRE-AFC		A.PEREZ	1 : 20 FULL SIZE A3		DISCIPLINE
			REVISION IN PROGRESS					DISCIPLINE
								DISCIPLINE
						CO-ORDINATE SYSTEM: MGA ZONE 56	HEIGHT DATUM: AHD	BACKDRAFTED/CORRECTED
								CONFIRMED

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION; PINCH POINTS; PINCH POINTS SOUTH WEST

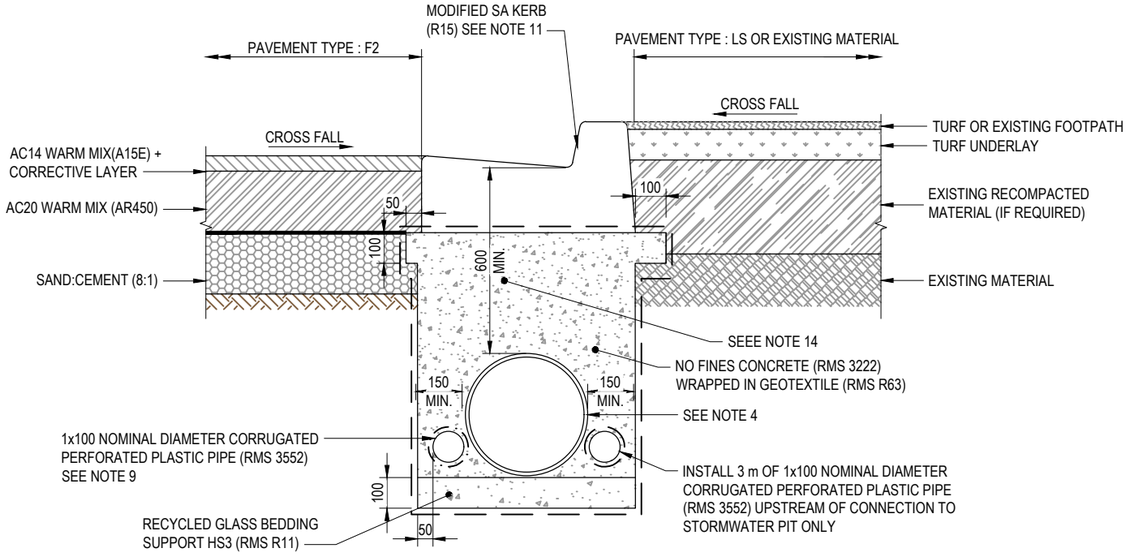
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
PAVEMENT EDGE DETAILS

A3

SHEET 2 OF 3

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-PV-000532	1



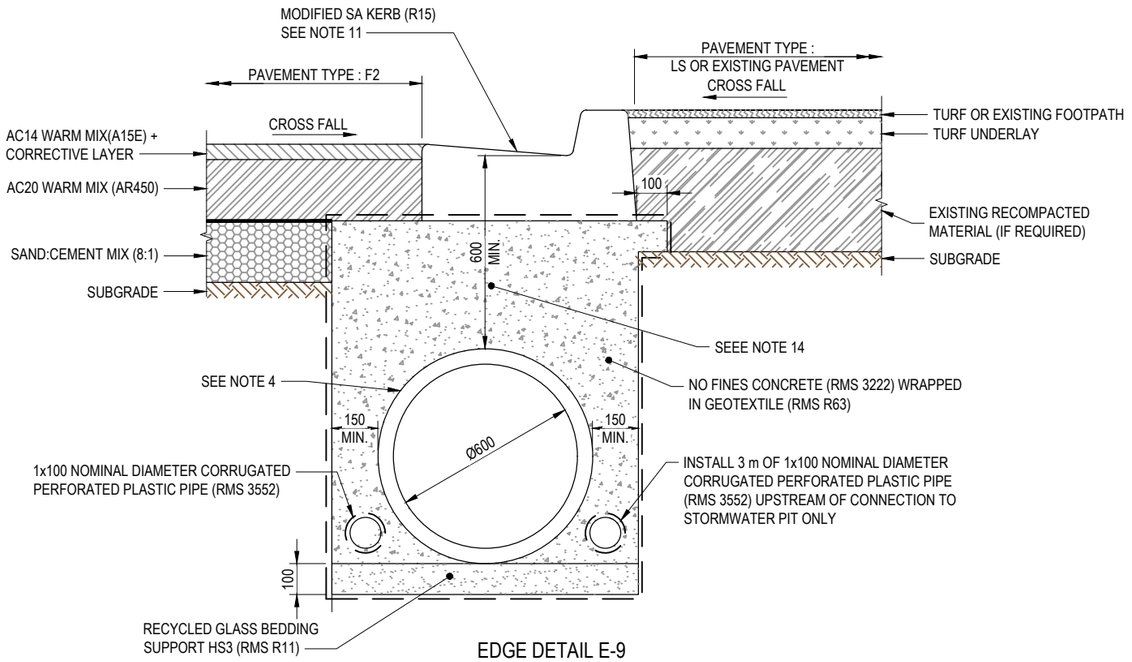
EDGE DETAIL E-8

PAVEMENT TYPE F2 WITH COMBINED STORMWATER/SUBSURFACE TRENCH AND PAVEMENT TYPE LS OR EXISTING MATERIAL

SCALE 1 : 20

NOTES:

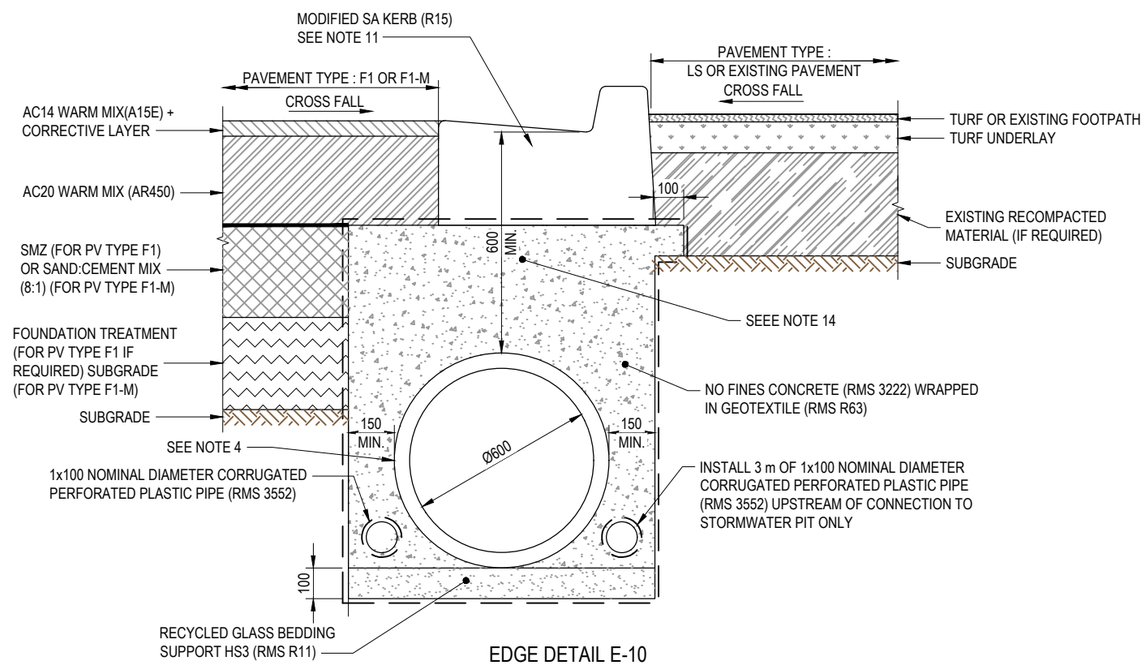
1. ALL DIMENSIONS SHOWN IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. REFER TO PAVEMENT PLAN SHEETS SHT-PV-001001 TO SHEET-PV-001005 FOR LOCATION OF THE INTERFACE JOINT.
3. REFER TO SHT-PV-000501 TO SHT-PV502 FOR PAVEMENT PROFILE DETAILS.
4. REFER TO SM SERIES FOR STORMWATER DRAINAGE DETAILS.
5. WEARING COURSE LONGITUDINAL JOINT SHALL BE LOCATED WITHIN ±25 mm OF LINE MARKING OR IN THE CENTRE OF A LANE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
6. LONGITUDINAL JOINT IN ASPHALT LAYERS SHALL BE OFFSET 150 mm MINIMUM FROM JOINTS IN UNDERLYING LAYER.
7. FOR TRANSVERSE INTERFACE MINIMUM DIMENSIONS ARE 1000 mm.
8. AC20 BASE COURSE FOR PAVEMENT TYPE F1, F1-M AND HP SHALL BE PLACED AS 3 SUB LAYERS REQUIRING 1 STEP. F2 SHALL BE PLACED AS 2 SUBLAYERS REQUIRING 1 STEP.
9. PROVIDE SUBSURFACE DRAINAGE ONLY WHERE INDICATED ON PAVEMENT PLAN DRAWINGS.
10. TACK COAT IF ASPHALT EXPOSED, POLYMER MODIFIED PRIMER EMULSION IF CONCRETE EXPOSED OR LOW CUTTER SEAL IF GRANULAR MATERIAL EXPOSED.
11. DEPTH OF MODIFIED SA KERB AT THE LIP OF THE GUTTER IS TO MATCH THICKNESS OF AC20 BASE.
12. SUBSURFACE DRAINS SHALL BE CUT INTO SMZ AND SUBGRADE TREATMENT OR SAND CEMENT MIX (8:1) LAYERS; I.E. SUBSURFACE DRAINS SHALL BE CONSTRUCTED AFTER PLACEMENT OF SMZ, SUBGRADE TREATMENT OR SAND:CEMENT MIX (8:1).
13. FROM CH. 298 (MCA01) TO CH. 322 AND D01\08 AND D01\07 SUBSURFACE DRAINAGE TO EXTEND 100 mm BELOW SUBBASE. ALL OTHER CHAINAGES DRAIN TO EXTEND 300 mm BELOW SUBBASE.
14. FOR DETAIL E-7 TO E-10, IF DEPTH TO OBVERT EXCEEDS 1200 mm, SUBJECT TO PRINCIPAL'S APPROVAL REPLACE DETAIL WITH E-5 OR E-6 AND STANDARD R11 BACKFILL.



EDGE DETAIL E-9

PAVEMENT TYPE F2 WITH COMBINED STORMWATER /SUBSURFACE TRENCH WITH PAVEMENT TYPE LS OR EXISTING MATERIAL

SCALE 1 : 20



EDGE DETAIL E-10

PAVEMENT TYPE F1 OR F1-M WITH COMBINED STORMWATER /SUBSURFACE TRENCH WITH PAVEMENT TYPE LS OR EXISTING MATERIAL

SCALE 1 : 20

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-PV-000533.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:13:07 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 0,1 0 0,1 0,2 0,3 0,4m; 1 : 20 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
PAVEMENT EDGE DETAILS

A3

SHEET 3 OF 3

TfNSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-PV-000533

ISSUE: 1

FROM LANSDOWNE

TO MILPERRA

BEALE STREET

HAIG AVE

HENRY LAWSON DRIVE

LIMIT OF WORKS

ADJOINS SHT-RF-001002

MCA01

VEHICULAR CROSSING TO BE PROVIDED PER CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-008A

REMOVE EXISTING PAVEMENT ARROWS WITH HIGH PRESSURE WATER BLASTING

KR01

N01

R1-2

GIVE WAY

R2-9

X8

R5-400(R)

N02

X10

N15 & N16

N13 & N14

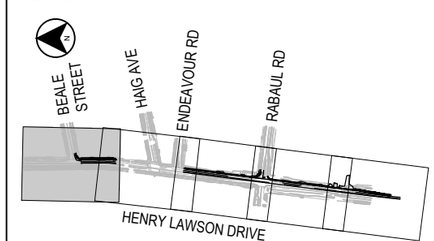
LEGEND

- 0.000 — ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- Nxx — NEW SIGN ID
- Xxx — EXISTING SIGN ID
- AR3(R) — PAVEMENT ARROW LABEL
- XX — LINEMARKING / PAVEMENT LABEL
- NEW SINGLE FACE SIGNPOST
- NEW SIGNS
- SIGNS TO BE REMOVED
- SIGNS TO BE RELOCATED
- NEW BUS SHELTER
- TCS 1225 — TCS NUMBER

NOTES

1. ALL REGULATORY SIGNPOSTING AND LINEMARKING SHOWN ON THESE DRAWINGS WILL NEED TO BE APPROVED BY WRITTEN AUTHORISATION FROM AN OFFICER AUTHORISED UNDER SECTION 5.9 OF THE RMS DELEGATIONS MANUAL.
2. REFER TO DWGs SHT-RF-001101 AND SHT-RF-001102 FOR SIGN SCHEDULE.
3. UNLESS OTHERWISE INDICATED, ALL SIGN FACES TO BE SIZE TYPE A IN ACCORDANCE WITH AS1742.
4. POST TYPE: 60.3 x 3.6 CHS AS/NZS 1163-C250L0.
5. TYPICAL SIGN MOUNTING
   - MOUNTING HEIGHT: 2.5 m ON VERGES AND 1.5 m MINIMUM ON ISLANDS
   - KERB OFFSET: 0.3 m ON VERGES AND 0.5 m MINIMUM ON ISLANDS
5. SIGN POSITIONS TO BE CONFIRMED WITH PRINCIPAL PRIOR TO MOUNTING.

KEYPLAN



CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001001.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME: 23-Nov-20 / 9:22:59 PM — PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. / FINAL — INITIAL / DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3

SHEET 1 OF 5

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN — EDMS No.: - — SHEET No.: SHT-RF-001001 — ISSUE 1

FROM LANSDOWNE

TO MILPERRA

HAIG AVE

ENDEAVOUR ROAD

HENRY LAWSON DRIVE

ADJOINS SHT-RF-001001

ADJOINS SHT-RF-001003

100 120 140 160 180 200 220 240

X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38

R2-6 MERGE RIGHT LANE KEEP LEFT

W8-15(R) MERGE RIGHT

W4-9 LEFT LANE ENDS

G9-15 FORM LANE

NO STOPPING R5-400(LR) N03

NO STOPPING R5-400(LR) N04

NO RIGHT TURN R2-6N(R)

NO STOPPING R5-400(L)

RELOCATE TO NEW POST

MCA01

R4-1 60

N15 &N16 N13 & N14 R9-225 VEHICLES OVER 4.5 T EXCEPTED R2-6(L) NO LEFT TURN

R5-400(L) X43

L1 E5

VEHICULAR CROSSING TO BE PROVIDED PER CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-008A

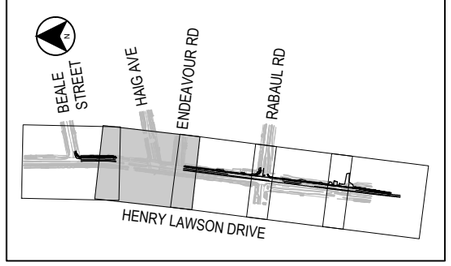
LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- Nxx — NEW SIGN ID
- Xxx — EXISTING SIGN ID
- AR3(R) — PAVEMENT ARROW LABEL
- XX — LINEMARKING / PAVEMENT LABEL
- NEW SINGLE FACE SIGNPOST
- NEW SIGNS
- SIGNS TO BE REMOVED
- SIGNS TO BE RELOCATED
- NEW BUS SHELTER
- TCS 1225 — TCS NUMBER

NOTES

1. ALL REGULATORY SIGNPOSTING AND LINEMARKING SHOWN ON THESE DRAWINGS WILL NEED TO BE APPROVED BY WRITTEN AUTHORISATION FROM AN OFFICER AUTHORISED UNDER SECTION 5.9 OF THE RMS DELEGATIONS MANUAL.
2. REFER TO DWGs SHT-RF-001101 AND SHT-RF-001102 FOR SIGN SCHEDULE.
3. UNLESS OTHERWISE INDICATED, ALL SIGN FACES TO BE SIZE TYPE A IN ACCORDANCE WITH AS1742.
4. POST TYPE: 60.3 x 3.6 CHS AS/NZS 1163-C250L0.
5. TYPICAL SIGN MOUNTING
   - MOUNTING HEIGHT: 2.5 m ON VERGES AND 1.5 m MINIMUM ON ISLANDS
   - KERB OFFSET: 0.3 m ON VERGES AND 0.5 m MINIMUM ON ISLANDS
5. SIGN POSITIONS TO BE CONFIRMED WITH PRINCIPAL PRIOR TO MOUNTING.

KEYPLAN



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DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001002.DWG

DESIGN LOT CODE: WVR No. | APPROVAL

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:22:28 PM — PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

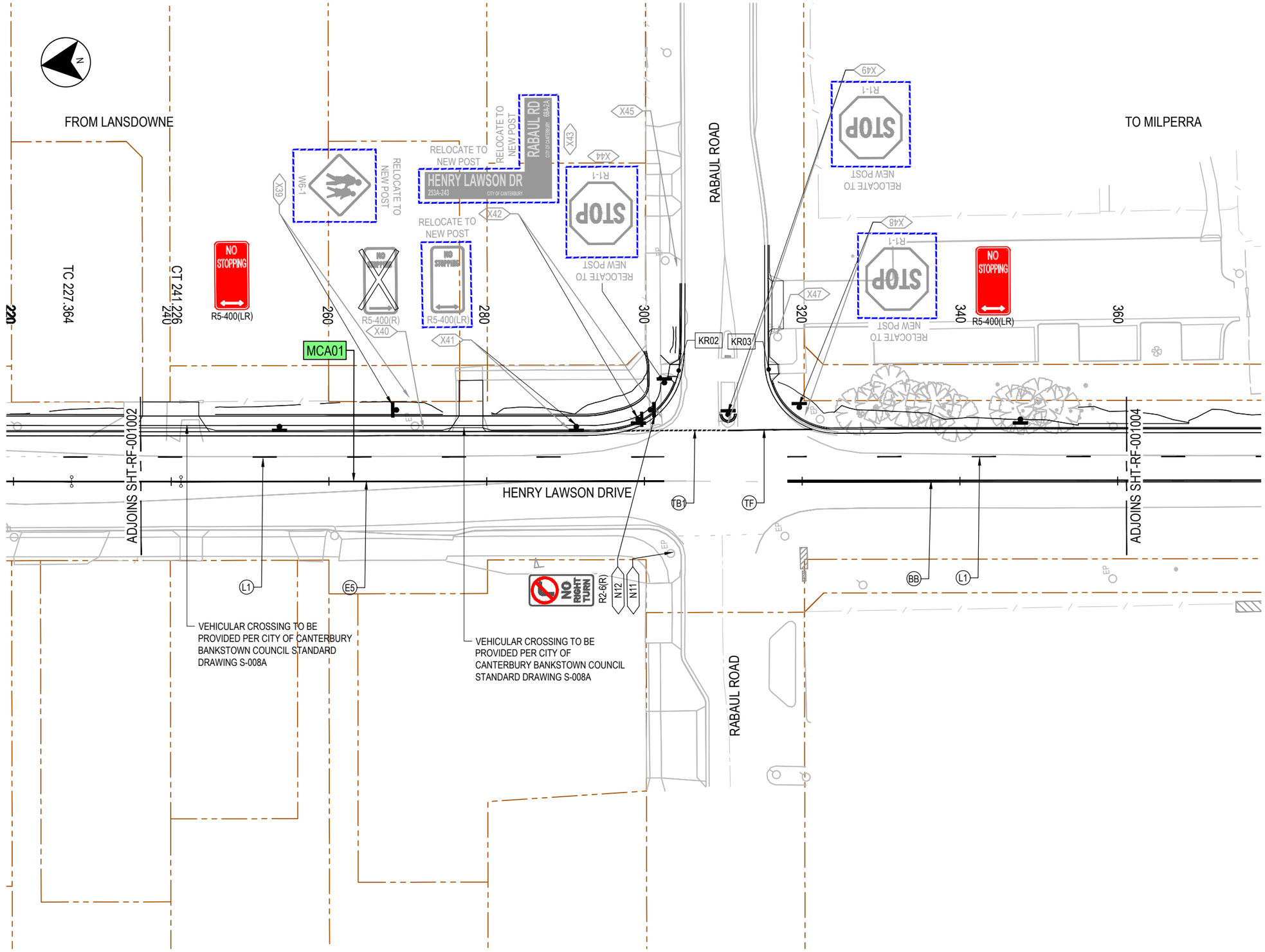
CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3

SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN — EDMS No.: - — SHEET No.: SHT-RF-001002 — ISSUE 1



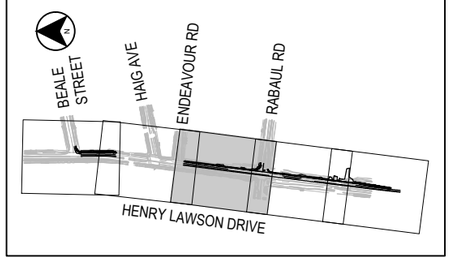
LEGEND

- 0.000
- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
- Nxx — NEW SIGN ID
- Xxx — EXISTING SIGN ID
- AR3(R) — PAVEMENT ARROW LABEL
- XX — LINEMARKING / PAVEMENT LABEL
- NEW SINGLE FACE SIGNPOST
- NEW SIGNS
- SIGNS TO BE REMOVED
- SIGNS TO BE RELOCATED
- NEW BUS SHELTER
- TCS 1225 — TCS NUMBER

NOTES

1. ALL REGULATORY SIGNPOSTING AND LINEMARKING SHOWN ON THESE DRAWINGS WILL NEED TO BE APPROVED BY WRITTEN AUTHORISATION FROM AN OFFICER AUTHORISED UNDER SECTION 5.9 OF THE RMS DELEGATIONS MANUAL.
2. REFER TO DWGs SHT-RF-001101 AND SHT-RF-001102 FOR SIGN SCHEDULE.
3. UNLESS OTHERWISE INDICATED, ALL SIGN FACES TO BE SIZE TYPE A IN ACCORDANCE WITH AS1742.
4. POST TYPE: 60.3 x 3.6 CHS AS/NZS 1163-C250L0.
5. TYPICAL SIGN MOUNTING
   - MOUNTING HEIGHT: 2.5 m ON VERGES AND 1.5 m MINIMUM ON ISLANDS
   - KERB OFFSET: 0.3 m ON VERGES AND 0.5 m MINIMUM ON ISLANDS
5. SIGN POSITIONS TO BE CONFIRMED WITH PRINCIPAL PRIOR TO MOUNTING.

KEYPLAN



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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:20:50 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES: -

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

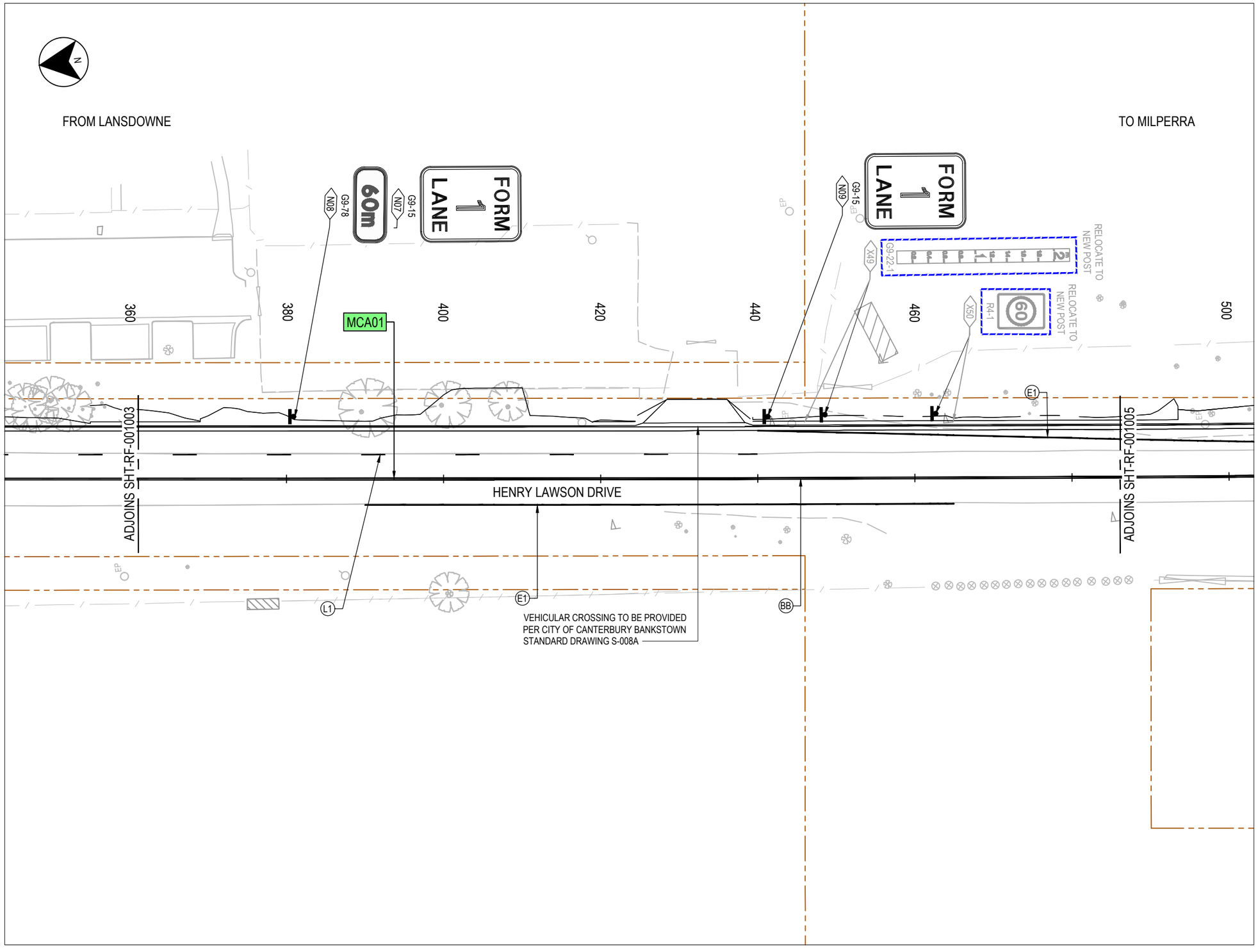
PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3
SHEET 3 OF 5

TINSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-RF-001003
ISSUE 1



LEGEND

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
- NEW PEDESTRIAN FENCE
- EXISTING SURVEY
- MXXX — ROAD CONTROL LINE LABEL
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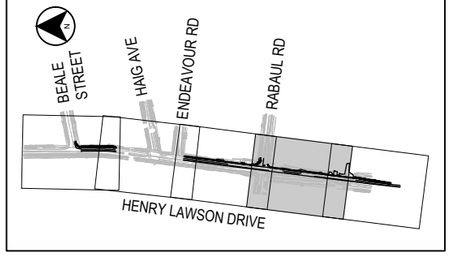


CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001004.DWG				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m; 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56; HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME: 23-Nov-20 / 9:20:13 PM — PLOT BY: MEGHWARB

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL LINEMARKING AND SIGNAGE PLAN

A3

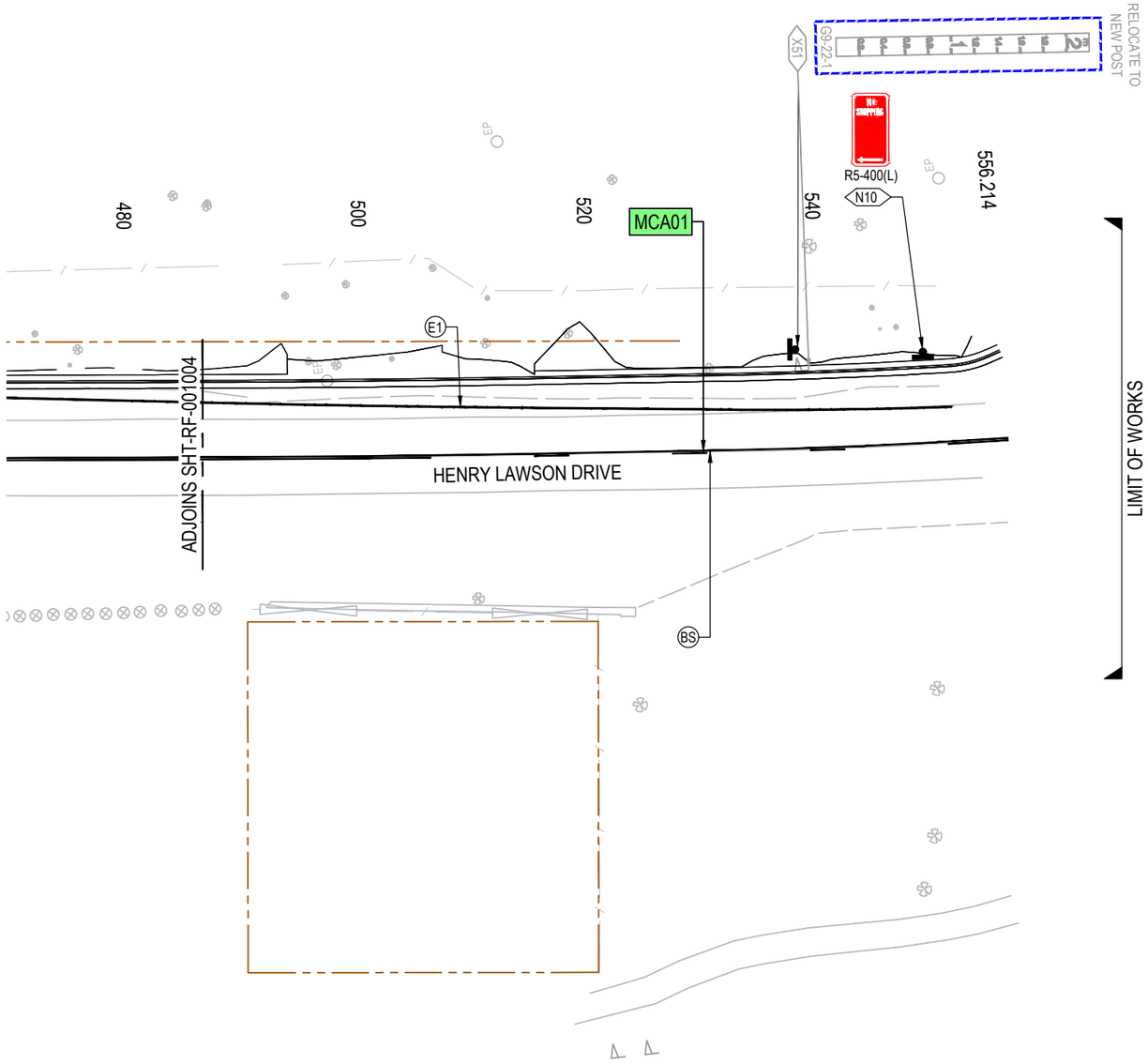
SHEET 4 OF 5

TINSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RF-001004	1

FROM LANSDOWNE

TO MILPERRA



LEGEND

0.000

- ROAD CONTROL LINE
- BOUNDARY / LOT PROPERTY
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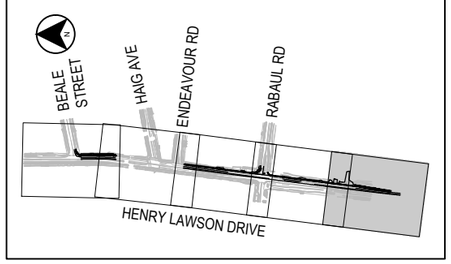
KEYPLAN



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DRAWING FILE LOCATION / NAME				DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	
PW:/P0043031-SHT-RF-001005.DWG						-	
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ	2.5 0 2.5 5 7.5m 1 : 500 FULL SIZE A3	
	1	06.11.2020	PRE-AFC		A.PEREZ	CO-ORDINATE SYSTEM: MGA ZONE 56 / HEIGHT DATUM: AHD	-

REVISION IN PROGRESS

PLOT DATE / TIME	PLOT BY
23-Nov-20 / 9:19:25 PM	MEGHWARB

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LINEMARKING AND SIGNAGE PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.		PART
DS2020/000130		1
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
DETAILED DESIGN	-	SHT-RF-001005 / 1

EXISTING SIGN SCHEDULE

SIGN TAG X - EXISTING R - RELOCATED	CONTROL	CHAINAGE	CODE	SIGN DESCRIPTION	TREATMENT	NEW LOCATION		MOUNTING	REMARKS
						CONTROL	CHAINAGE		
X1	MCA01	-24	G7-2-3	"BANKSTOWN AIRPORT/HAIG AVENUE" (LEFT)	RETAIN	-	-	-	
X2	MCA01	-24	G9-66	SUPPLEMENTARY DISTANCE PLATE x 150m	RETAIN	-	-	-	
X3	MCA01	-7	G5-13	"TO BABY HEALTH CENTRE"	RETAIN	-	-	-	
X4	MCA01	6	G5-14	"PRESCHOOL/CHRISTIAN SCHOOL"	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X5	MCA01	6	G5-14	"HOPE POINT CHURCH"	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X6	MCA01	6	-	"BEALE STREET" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X7	MCA01	6	-	"HENRY LAWSON DRIVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOACTE AT THE BACK OF NEW KERB	-	-	-	
X8	MCA01	71	R2-9 (L)	LEFT LANE MUST TURN LEFT	REMOVE	-	-	-	
X9	MCA01	101	G7-2-3	"BANKSTOWN AIRPORT/HAIG AVENUE" (LEFT)	RETAIN	-	-	-	
X10	MCA01	101	R5-400 (R)	NO STOPPING	REMOVE	-	-	-	
X11	MCA01	114	R2-9 (L)	LEFT LANE MUST TURN LEFT	REMOVE	-	-	-	
X12	MCA01	122	G7-2-3	"BANKSTOWN AIRPORT/HAIG AVENUE" (RIGHT)	RETAIN	-	-	-	
X13	MCA01	123	G5-13	"TO SHOPPING CENTRE"	RETAIN	-	-	-	
X14	MCA01	123	G5-13	"TO POST OFFICE"	RETAIN	-	-	-	
X15	MCA01	138	R1-4	STOP	RETAIN	-	-	-	
X16	MCA01	138	R9-201	WHEN SIGNALS BLACKED OUT OR FLASHING	RETAIN	-	-	-	
X17	MCA01	142	-	"HAIG AVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RETAIN	-	-	-	
X18	MCA01	142	G5-13	"TO SHOPPING CENTRE"	RETAIN	-	-	-	
X19	MCA01	142	G5-13	"TO POST OFFICE"	RETAIN	-	-	-	
X20	MCA01	142	G5-13	"CATHOLIC CHURCH"	RETAIN	-	-	-	
X21	MCA01	151	W4-9	LEFT LANE ENDS	REMOVE	-	-	-	
X22	MCA01	151	W8-15	MERGE RIGHT	REMOVE	-	-	-	
X23	MCA01	151	R5-400 (L+R)	NO STOPPING	REMOVE	-	-	-	
X24	MCA01	160	R2-6 (R)	NO RIGHT TURN	RETAIN	-	-	-	
X25	MCA01	162	R1-4	STOP	RETAIN	-	-	-	
X26	ENDEAVOUR ROAD	-	R4-10	SPEED LIMIT 50 AREA	RETAIN	-	-	-	
X27	ENDEAVOUR ROAD	-	R5-400 (R)	NO STOPPING	RETAIN	-	-	-	
X28	MCA01	168	R1-4	STOP	RETAIN	-	-	-	
X29	ENDEAVOUR ROAD	-	R4-11	END SPEED LIMIT 50 AREA	RETAIN	-	-	-	
X30	ENDEAVOUR ROAD	-	R5-400 (L)	NO STOPPING	RETAIN	-	-	-	
X31	ENDEAVOUR ROAD	-	G9-13	ALL TRAFFIC LEFT	RETAIN	-	-	-	
X32	MCA01	175	R1-4	STOP	RETAIN	-	-	-	
X33	MCA01	178	-	"ENDEAVOUR RD" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RETAIN	-	-	-	
X34	MCA01	178	-	"HENRY LAWSON DRIVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RETAIN	-	-	-	
X35	MCA01	181	G9-15	FORM 1 LANE	REMOVE	-	-	-	
X36	MCA01	181	R5-400 (L)	NO STOPPING	REMOVE	-	-	-	
X37	MCA01	181	R2-6 (R)	NO RIGHT TURN	RELOCATE (R37)	MCA01	181	TYPICAL	
X38	MCA01	220	R4-1	SPEED LIMIT 60	RELOCATE (R38)	MCA01	222	TYPICAL	
X39	MCA01	268	W6-1	PEDESTRIAN	RELOCATE (R39)	MCA01	269	TYPICAL	

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001101.DWG

DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:07:02 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT PRELIM. [ ] FINAL [ ]

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
SIGNAGE SCHEDULE

A3

SHEET 1 OF 2

TfNSW REGISTRATION No. DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-RF-001101

ISSUE: 0

EXISTING SIGN SCHEDULE

SIGN TAG X - EXISTING R - RELOCATED	CONTROL	CHAINAGE	CODE	SIGN DESCRIPTION	TREATMENT	NEW LOCATION		MOUNTING	REMARKS
						CONTROL	CHAINAGE		
X40	MCA01	275	R5-400 (R)	NO STOPPING	REMOVE			-	
X41	MCA01	291	R5-400 (L+R)	NO STOPPING	RELOCATE (R41)	MCA01	305	-	
X42	MCA01	303	-	"HENRY LAWSON DRIVE" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOCATE (R42)	MCA01	299	TYPICAL	
X43	MCA01	303	-	"RABAUL ROAD" - CITY OF CANTERBURY BANKSTOWN STREET SIGN	RELOCATE (R43)	MCA01	299	TYPICAL	
X44	MCA01	303	R1-4	STOP	RELOCATE (R44)	MCA01	303	TYPICAL	
X45	RABAUL ROAD	-	R4-10	SPEED LIMIT 50 AREA	RETAIN	-	-	-	
X46	MCA01	310	R1-4	STOP	RELOCATE (R46)	MCA01	310	TYPICAL	
X47	RABAUL ROAD	-	R4-11	END SPEED LIMIT 50 AREA	RETAIN				
X48	MCA01	319	R1-4	STOP	RELOCATE (R48)	MCA01	319	-	
X49	MCA01	443	G9-22-1	FLOOD DEPTH INDICATORS	RELOCATE	MCA01	448	TYPICAL	
X50	MCA01	465	R4-11	SPEED LIMIT 60 AREA	RELOCATE	MCA01	463	TYPICAL	
X51	MCA01	538	G9-22-1	FLOOD DEPTH INDICATORS	RELOCATE (R59)	MCA01	538	TYPICAL	

NEW SIGN SCHEDULE

SIGN TAG	CODE	LOCATION		SIGN DESCRIPTION	SIGN FACE			MOUNTING	REMARKS
		CONTROL	CHAINAGE		WIDTH A (mm)	HEIGHT B (mm)	AREA (m²)		
N01	R1-2	MCA01	9	GIVE WAY	375	375	0.07	TYPICAL	
N02	R5-400 (L+R)	MCA01	101	NO STOPPING	225	450	0.1	TYPICAL	
N03	R5-400 (L+R)	MCA01	151	NO STOPPING	225	450	0.1	TYPICAL	
N04	R5-400 (L+R)	MCA01	223	NO STOPPING	225	450	0.1	TYPICAL	
N05	R5-400 (L+R)	MCA01	253	NO STOPPING	225	450	0.1	TYPICAL	
N06	R5-400 (L+R)	MCA01	346	NO STOPPING	225	450	0.1	TYPICAL	
N07	G9-15	MCA01	380	FORM 1 LANE	600	800	0.48	TYPICAL	
N08	G9-78	MCA01	380	SUPPLEMENTARY DISTANCE PLATE 60m	600	200	0.12	TYPICAL	SAME POST AS N07
N09	G9-15	MCA01	441	FORM 1 LANE	600	800	0.48	TYPICAL	
N10	R5-400 (L+R)	MCA01	550	NO STOPPING	225	450	0.1	TYPICAL	
N11	R2-6 (R)	MCA01	303	NO RIGHT TURN	450	900	0.41	EXISTING LIGHT POLE	IN WESTERN VERGE
N12	R2-6 (R)	MCA01	302	NO RIGHT TURN	450	900	0.41	TYPICAL	
N13	R2-6 (L)	MCA01	116	NO LEFT TURN	450	900	0.41	TYPICAL	
N14	R9-225	MCA01	116	VEHICLES UNDER 9 m EXCEPTED	450	300	0.135	TYPICAL	
N15	R2-6 (L)	MCA01	116	NO LEFT TURN	450	900	0.41	TYPICAL	IN WESTERN VERGE
N16	R2-225	MCA01	116	VEHICLES UNDER 9 m EXCEPTED	450	300	0.135	TYPICAL	IN WESTERN VERGE

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001102.DWG

DESIGN LOT CODE:

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:06:28 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
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CLIENT: NSW GOVERNMENT Transport for NSW

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GEORGES HALL
SIGNAGE SCHEDULE

A3

SHEET 2 OF 2

TINSW REGISTRATION No. DS2020/000130

PART 1

ISSUE STATUS: DETAILED DESIGN

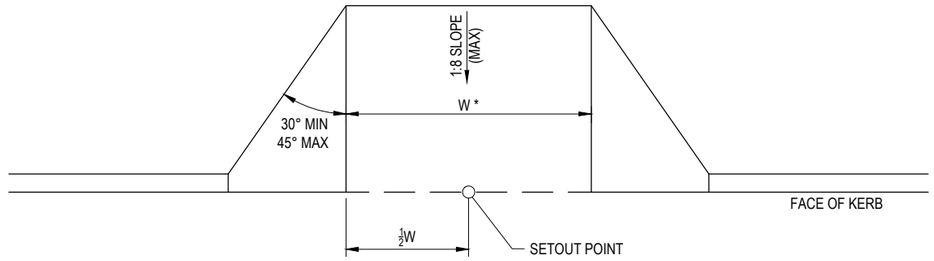
EDMS No.: -

SHEET No.: SHT-RF-001102

ISSUE: 0

ROAD FURNITURE - KERB RAMPS SCHEDULE

LABEL	SETOUT POINT		WIDTH (m) (MEASURED PERPENDICULAR)	PLAN REFERENCE
	EASTING	NORTHING		
KR01	312863.020	6245655.472	1.5	RF-001001
KR02	312835.392	6245355.873	1.2	RF-001003
KR03	312834.098	6245344.538	1.2	RF-001003



KERB RAMP SETOUT
NOT TO SCALE

NOTES:
1. FOR KERB RAMP DETAILS REFER TO CITY OF CANTERBURY BANKSTOWN COUNCIL STANDARD DRAWING S-003.
2. * MEASURED PERPENDICULAR TO TRANSVERSE CROSSWALK LINES.

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-RF-001601.DWG
DESIGN LOT CODE:
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:09:38 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

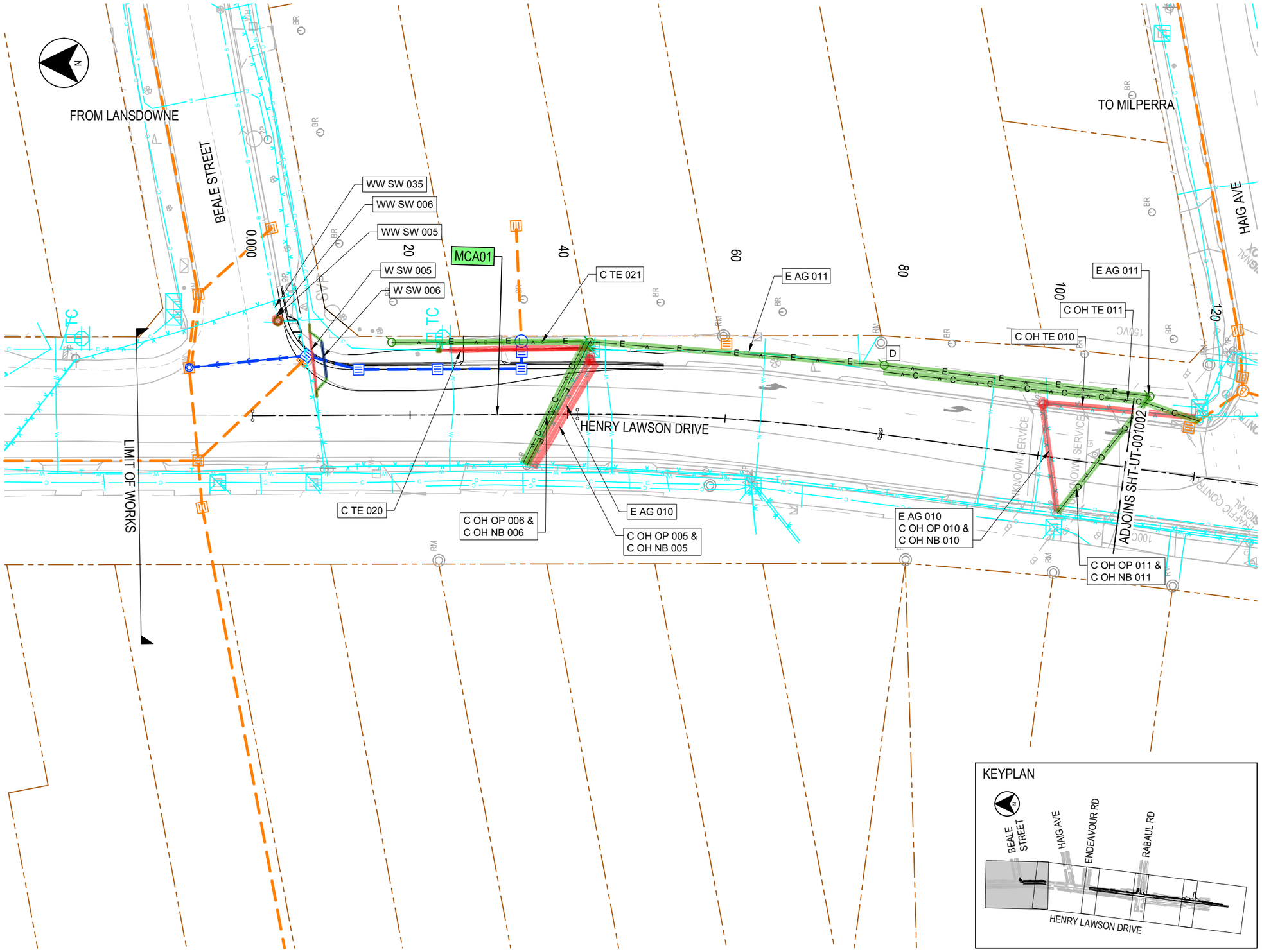
PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
KERB RAMP SETOUT DETAILS

A3
SHEET 1 OF 1

TfNSW REGISTRATION No. DS2020/000130 — PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-RF-001601	0



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

1. CONTRACTOR TO UNDERTAKE THEIR OWN DBYD AND POTHOLING INVESTIGATION PRIOR TO CONSTRUCTION ACTIVITIES.
2. REFER TO UTILITY TABLE ON SHT-UT-002001 AND SHT-UT-002002 FOR MORE INFORMATION AND SHT-GE-000021 TO SHT-GE-000023 FOR GENERAL NOTES.
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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

CHECK PRINT

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-001001.DWG	DESIGN LOT CODE: -	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -	PLOT DATE / TIME: 23-Nov-20 / 9:19:41 PM; PLOT BY: MEGHWARB
CLIENT: NSW GOVERNMENT Transport for NSW	CANTERBURY BANKSTOWN COUNCIL MR508 HENRY LAWSON DRIVE UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL UTILITIES IMPACT ASSESSMENT PLAN	A3 SHEET 1 OF 5	

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD

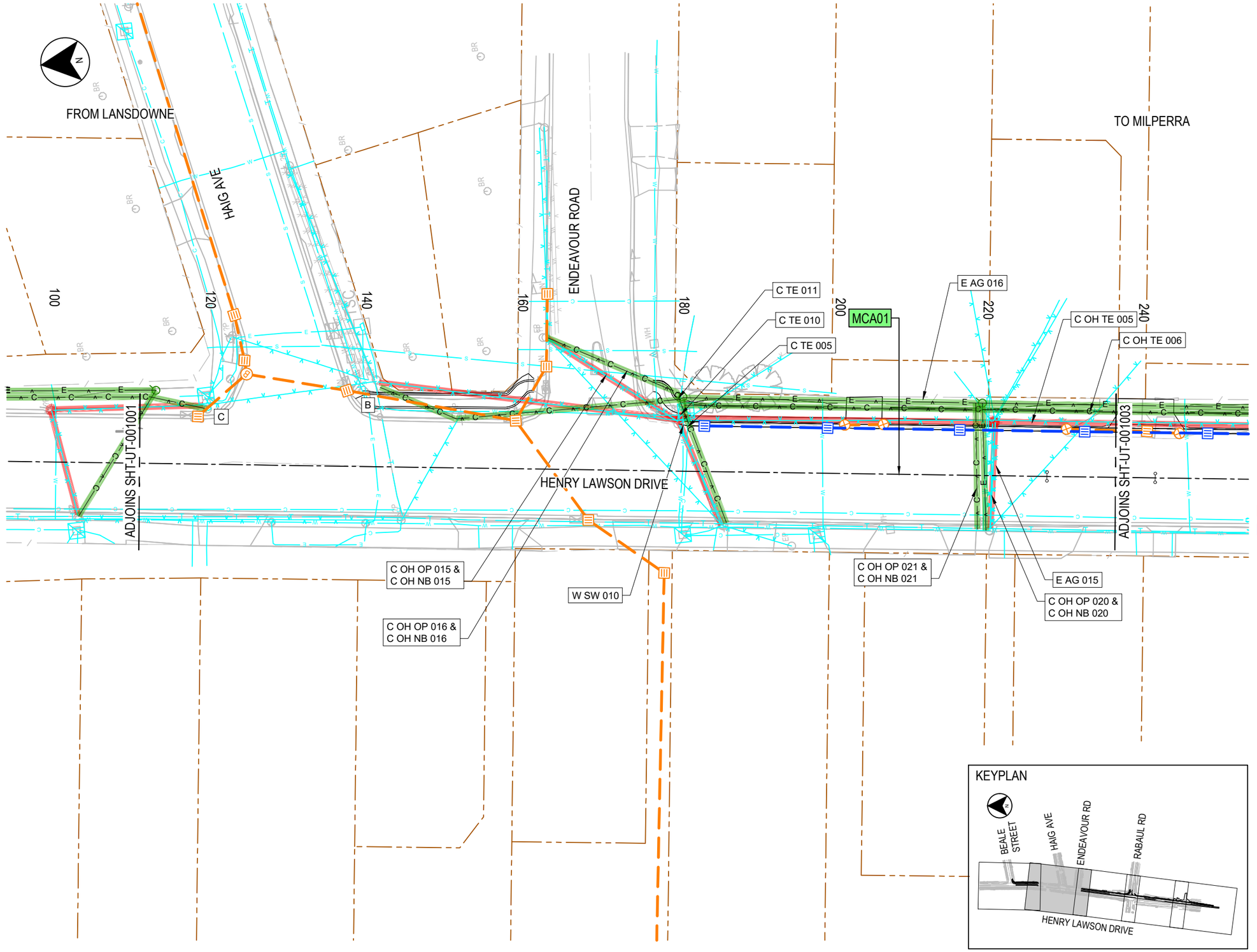
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

TfNSW REGISTRATION No.: DS2020/000130 | PART 1

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	SHT-UT-001001	1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-001002.DWG
EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION
0	10.08.2020	DRAFT ISSUE (DETAILED)
1	06.11.2020	PRE-AFC

REVISION IN PROGRESS

DESIGN LOT CODE: WVR No. | APPROVAL: A. PEREZ, A.PEREZ
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

PLOT DATE / TIME: 23-Nov-20 / 9:19:58 PM | PLOT BY: MEGHWARB

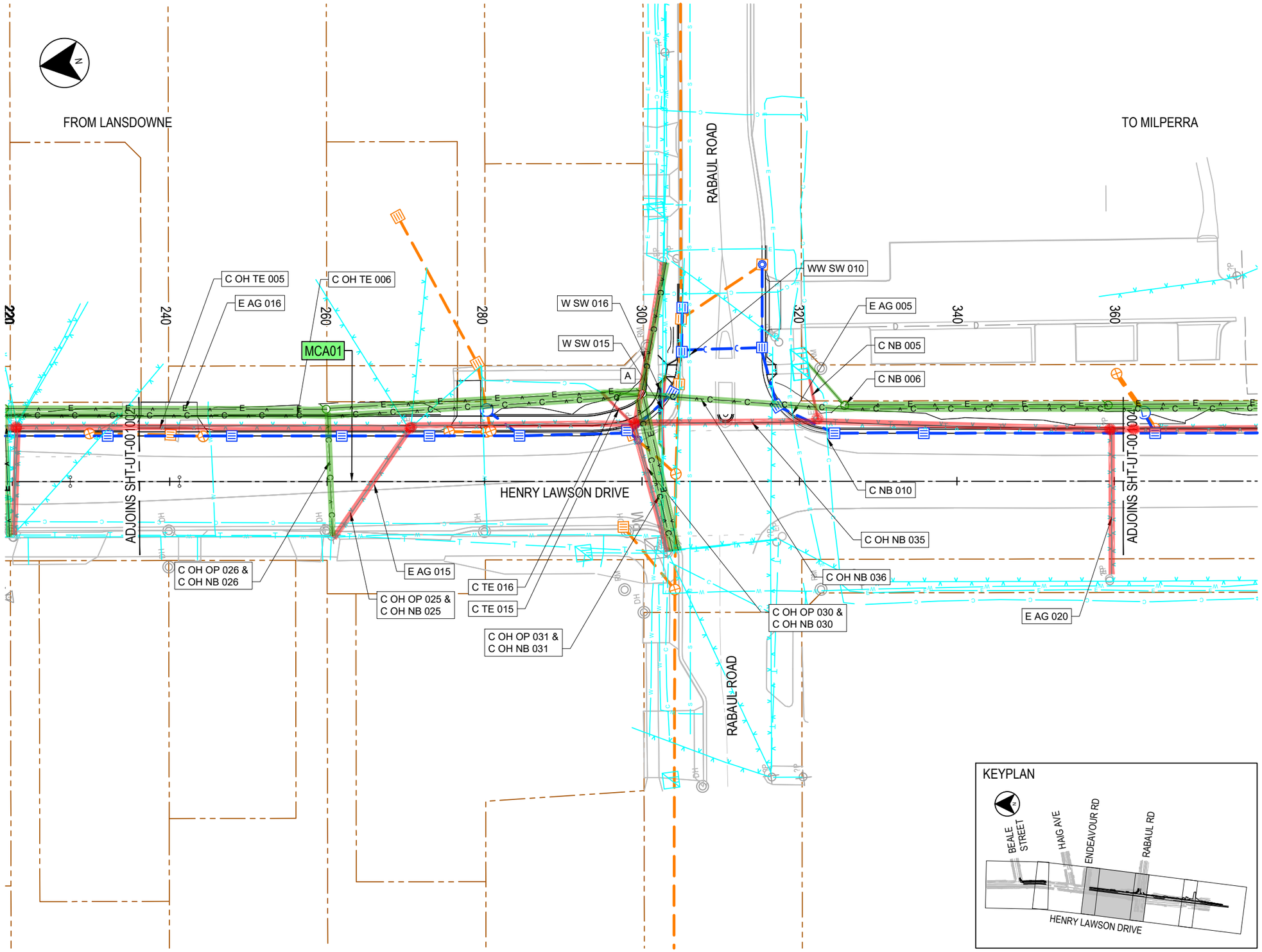
CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT PLAN

A3
SHEET 2 OF 5

TfNSW REGISTRATION No.: DS2020/000130 | PART: 1
ISSUE STATUS: DETAILED DESIGN | EDMS No.: - | SHEET No.: SHT-UT-001002 | ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX — UTILITIES TAG
- MXXX — ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
- STORMWATER FLOW PATH
- ABANDON EXISTING PIPE / PIT
- NEW RETAINING WALL

NOTES

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10. ASSET ID: C TE 030
    - C — UTILITY TYPE
    - TE — SERVICE PROVIDER
    - 030 — SEQUENCIAL NUMBER

KEYPLAN

CHECK PRINT

DRAWING FILE LOCATION / NAME: PW:/P0043031-SHT-UT-001003.DWG
DESIGN LOT CODE: -
DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -
PLOT DATE / TIME: 23-Nov-20 / 9:18:51 PM
PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3
CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT — PRELIM. INITIAL / FINAL DATE

DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

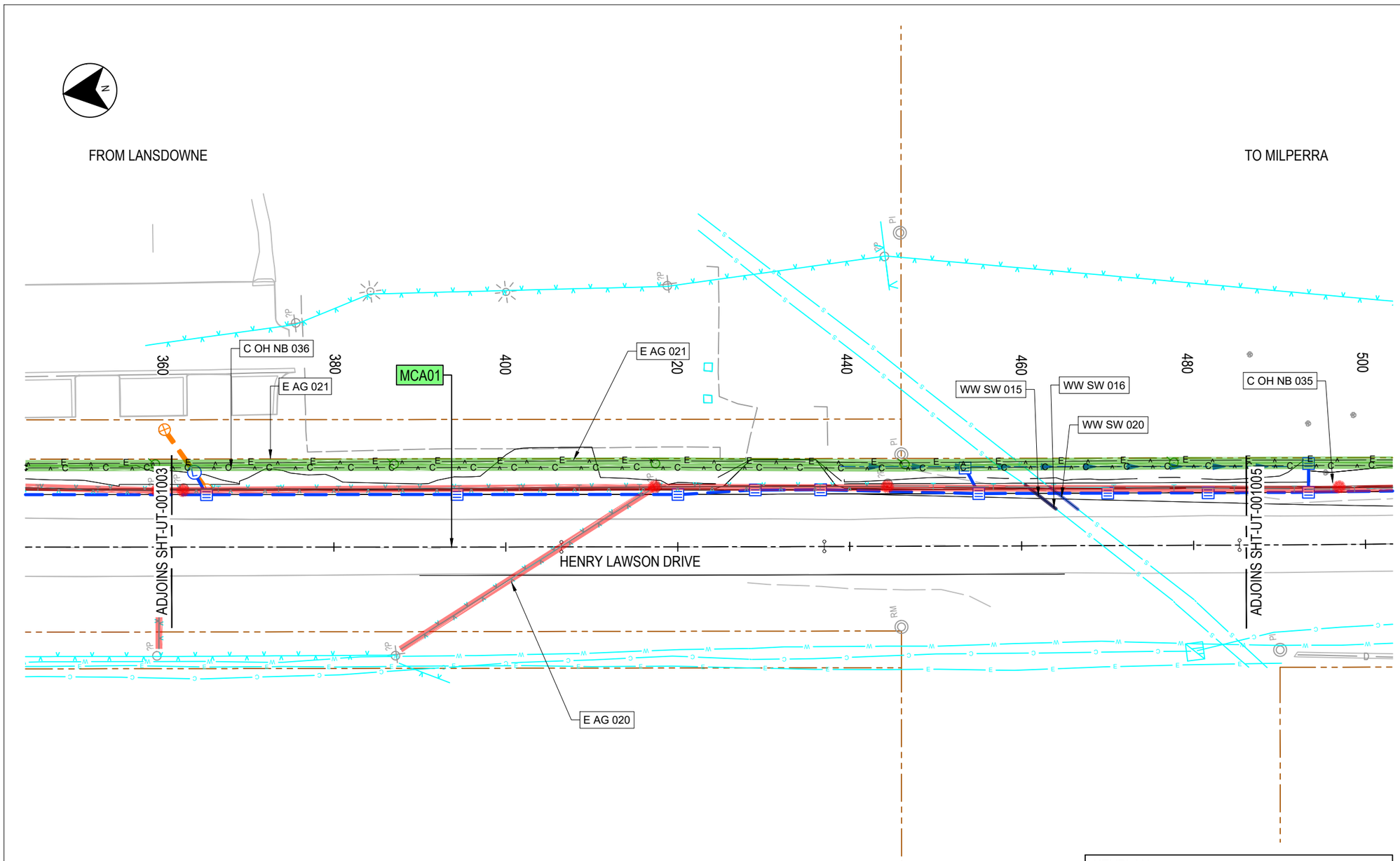
CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT PLAN

A3
SHEET 3 OF 5

TfNSW REGISTRATION No.: DS2020/000130
PART: 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-UT-001003
ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
- DESIGN WATER
- EXISTING COMMUNICATION
- EXISTING COMMUNICATION OH
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL OH
- EXISTING GAS
- EXISTING SEWER
- EXISTING WATER
- PROTECT
- ABANDON
- NEW DESIGN
- PROPOSED BOUNDARY
- XXXX UTILITIES TAG
- MXXX ROAD CONTROL LINE LABEL
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING ELECTRICAL POLE
- EXISTING STREET LIGHT COLUMN
- DESIGN ELECTRICAL POLE WITH LIGHT
- DESIGN ELECTRICAL POLE
- DESIGN STREET LIGHT LOCATION
- ELECTRICAL ASSET TRANSITION POINT
- NEW TCS POSTS & MAST ARMS
- EXISTING STORMWATER PIT AND PIPE
- NEW STORMWATER PIT AND PIPE
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NOTES

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10. ASSET ID: C TE 030
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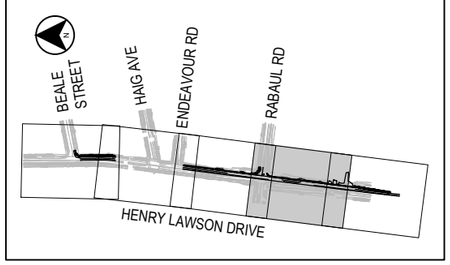
KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:19:10 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL UTILITIES IMPACT ASSESSMENT PLAN

A3

SHEET 4 OF 5

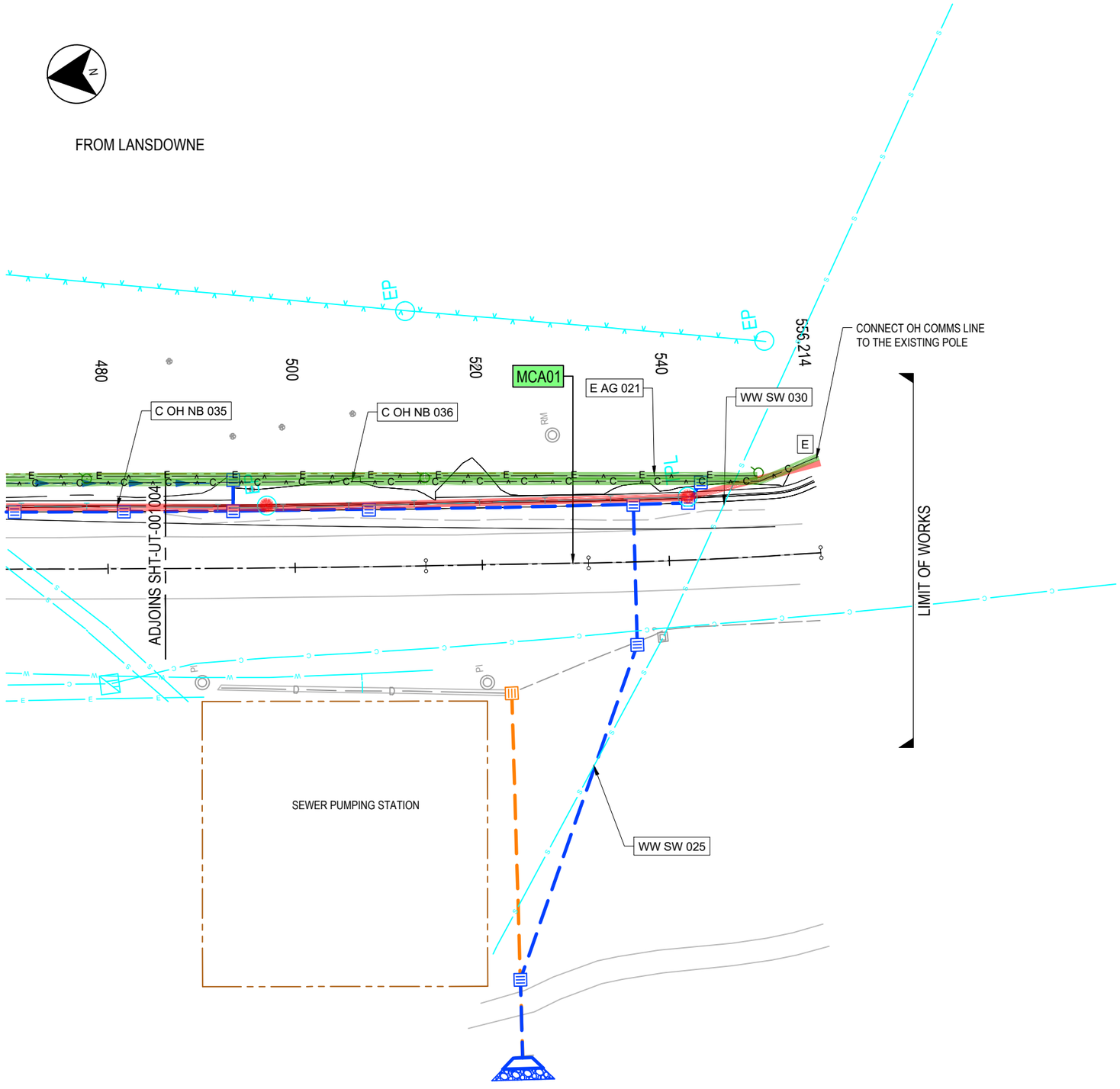
TfNSW REGISTRATION No.: DS2020/000130 PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-001004

ISSUE: 1



LEGEND

- EXISTING PROPERTY BOUNDARY
- DESIGN COMMUNICATION
- DESIGN COMMUNICATION OH
- DESIGN ELECTRICAL
- DESIGN ELECTRICAL OH
- DESIGN GAS
- DESIGN SEWER
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- EXISTING ELECTRICAL
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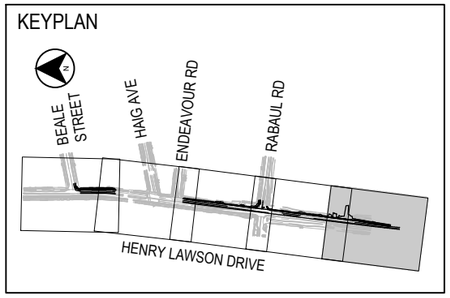
KEYPLAN



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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:18:31 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 2.5 0 2.5 5 7.5m — 1 : 500 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

CHECK PRINT	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT PLAN

A3

SHEET 5 OF 5

TfNSW REGISTRATION No.: DS2020/000130 — PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-001005

ISSUE: 1

S.No	Street 1	Street 2	Utility type	Service Provider	Existing Asset ID.	Service Size & Type	Why modifing asset ? (ie clash with new pavement, new SWD etc)	Treatment Not Affected Protect Abandon	Design route Asset ID	Proposed Scope (ie lower, new route etc)	Remarks / Comments
1	Henry Lawson Drive	Beale Street	SW Water	Sydney Water	W SW 005	100mm dia CICL Water main	Impacted by road widening	ABANDON	W SW 006	Abandon / Remove approximately 12m of water main and lay new with concrete encasement. Refer Sydney Water design drawings CN185892 for details.	
2	Henry Lawson Drive	Endeavour Road	SW Water	Sydney Water	W SW 010	100mm dia CICL Water main	New pavement construction	NOT AFFECTED	-	Water main has approximately 800mm cover and it is within Mill & Correction pavement construction zone. BOA Conditions case CN 185894 to be followed during construction.	
3	Henry Lawson Drive	Rabhul Road	SW Water	Sydney Water	W SW 015	100mm dia CICL Water main	Impacted by road widening	ABANDON	W SW 016	Abandon / Remove approximately 11m of water main and lay new with concrete encasement. Refer Sydney Water design drawings CN185892 for details.	
4	Henry Lawson Drive	Beale Street	WW Sewer	Sydney Water	WW SW 005	Sewer manhole	Within the pavement construction zone	ABANDON	WW SW 006	Remove the existing sewer manhole & construct new at same location. Refer Sydney Water approved drawings CN185893 for details.	
5	Henry Lawson Drive	Rabhul Road	WW Sewer	Sydney Water	WW SW 010	Sewer 300mm dia VC main	Drainage main crossing & New pavement construction.	NOT AFFECTED	-	Drainage main crossing existing sewer main. BOA conditions CN 185894 to be followed during construction.	
6	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 015	Sewer pressure main - 600mm dia CICL	Impacted by road widening & Drainage main crossing	ABANDON	WW SW 016	Sewer main is approximately 850mm deep. Exhume and relay the section of sewer main and concrete encase. Refer Sydney Water design drawings CN185893 for details.	
7	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 020	Sewer pressure main - 600mm dia DICL	Impacted by road widening & Drainage main crossing	PROTECT	-	Sewer main has approximately 900mm cover. Protect the DICL Main by concrete encasement. Refer Sydney Water design drawings CN185893 for details.	
8	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 025	Sewer gravity main - 300mm dia VC	Drainage main crossing	NOT AFFECTED	-	Drainage main crossing, BOA conditions CN185894 to be followed during construction.	
9	Henry Lawson Drive	Henry Lawson Drive	WW Sewer	Sydney Water	WW SW 030	Sewer gravity main - 300mm dia VC	Within the pavement construction zone	NOT AFFECTED	-	Sewer main is within New pavement construction zone, BOA conditions CN185894 to be followed during construction.	
10	Henry Lawson Drive	Beale Street	WW Sewer	Sydney Water	WW SW 035	Sewer gravity main	Within the pavement construction zone	NOT AFFECTED	-	Sewer main is within New pavement construction zone, BOA conditions CN185894 to be followed during construction.	
11	Henry Lawson Drive	Henry Lawson Drive	G Gas	Jemena	-	No Gas main within the project development area	-	NOT AFFECTED	-	No Gas main within the project development area	
12	Henry Lawson Drive	Endeavour Road	C Comms	Telstra	C TE 005	Telstra house connection network - 1x35mm Dia PVC conduit.	Within the pavement construction zone	NOT AFFECTED	-	Mill & Resheet is proposed, No impact to the Telstra road crossing conduit. Telstra DBYD conditions to be followed.	
13	Henry Lawson Drive	Endeavour Road	C Comms	Telstra	C TE 010	Telstra house connection network - 1x35mm Dia PVC conduit - UGOH Connection	Impacted by Electrical Pole relocation.	ABANDON	C TE 011	Abandon the existing connection to the pole and make new connection to proposed pole for Overhead Telstra network. Refer Telstra design drawings for details.	
14	Henry Lawson Drive	Rabhul Road	C Comms	Telstra	C TE 015	Telstra house connection network - 1x35mm Dia PVC conduit - UGOH Connection	Impacted by Electrical Pole relocation.	ABANDON	C TE 016	Abandon the existing connection to the pole and make new connection to proposed pole for Overhead Telstra network. Refer Telstra design drawings for details.	
15	Henry Lawson Drive	Beale Street	C Comms	Telstra	C TE 020	Telstra house connection network - 1x35mm Dia PVC conduit	Impacted by new drainage pit construction.	ABANDON	C TE 021	Abandon the existing Telstra network and place new. 2 No's of existing Telstra pits are to be replaced with new pits as same location. Refer Telstra design drawings for details.	
16	Henry Lawson Drive	Rabhul Road	C Comms	NBN	C NB 005	NBN Owned fibre optic network - 1x100mm dia PVC Conduit	Impacted by road widening works	ABANDON	C NB 006	Remove existing connection to the pole and connect to the new pole (UGOH). Refer NBN Design drawing for details.	
17	Henry Lawson Drive	Rabhul Road	C Comms	NBN	C NB 010	NBN Owned fibre optic network - 1x100mm dia PVC Conduit	Within new pavement construction zone	NOT AFFECTED	-	NBN Conduit has 1m cover. No impact by new pavement works. DBYD Conditions to be followed.	
18	Henry Lawson Drive	Endeavour Road	C Comms	Telstra	C OH TE 005	Telstra Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH TE 006	Reroute / lay new overhead comms cables between A to B (Rabual Rd to Haig Ave). The shown relocation route is indicative only. House connection details are excluded in the drawing. Refer Telstra design drawings for details.	
19	Henry Lawson Drive	Rabhul Road	C Comms	Telstra	C OH TE 010	Telstra Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH TE 011	Reroute / lay new overhead comms cables between C to D. The shown relocation route is indicative only. House connection details are excluded in the drawing. Refer Telstra design drawings for details.	
20	Henry Lawson Drive	Beale Street	C Comms	Optus	C OH OP 005	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 006	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
21	Henry Lawson Drive	Haig Avenue	C Comms	Optus	C OH OP 010	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 011	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
22	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 015	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 016	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	

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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:15:42 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	10.08.2020 06.11.2020	DRAFT ISSUE (DETAILED) PRE-AFC		A. PEREZ A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING:

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION 0 PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
UTILITIES IMPACT ASSESSMENT SCHEDULE

A3

SHEET 1 OF 2

TINSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-002001

ISSUE: 0

S.No	Street 1	Street 2	Utility type	Service Provider	Existing Asset ID.	Service Size & Type	Why modifing asset ? (ie clash with new pavement, new SWD etc)	Treatment Not Affected Protect Abandon	Design route Asset ID	Proposed Scope (ie lower, new route etc)	Remarks / Comments
23	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 020	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 021	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
24	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 025	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 026	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
25	Henry Lawson Drive	Endeavour Road	C Comms	Optus	C OH OP 030	Optus Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH OP 031	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer Optus design drawings and Quote Q23342 for details.	
26	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 005	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 006	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
27	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 010	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 011	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
28	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 015	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 016	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
29	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 020	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 021	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
30	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 025	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 026	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
31	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 030	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 031	Reroute / lay new overhead comms cables. The shown relocation route is indicative only. House connection details are excluded in the drawing.Refer NBN design drawings for details.	
32	Henry Lawson Drive	Henry Lawson Drive	C Comms	NBN	C OH NB 035	NBN Overhead network	Impacted by Electrical Poles relocation.	ABANDON	C OH NB 036	Reroute / lay new overhead comms cables. Dedicated NBN poles will be removed and NBN cables will be rerouted to new Ausgrid poles. The shown relocation route is indicative only (A to E). House connection details are excluded in the drawing.Refer NBN design drawings for details.	
33	Henry Lawson Drive	Rabhul Road	E Electrical	AUSGRID	E AG 005	Ausgrid electrical conduits 6x150mm dia PVC	Within new pavement construction zone	NOT AFFECTED	-	Electrical conduits have 2 m cover. Not affected. DBYD / Ausgrid conditions to be followed.	
34	Henry Lawson Drive	Beale Street & Haig Avenue	E Electrical	AUSGRID	E AG 010	Ausgrid electrical / Street light poles	Due to street light design & Road widening works	NEW	E AG 011	Install 3 new poles. Relocate 1 existing pole and associated overhead conductor between Beale Street & Haig Avenue. Refer Ausgrid design drawings AN21340 for details.	
35	Henry Lawson Drive	Endeavour Road & Rabhul Road	E Electrical	AUSGRID	E AG 015	Ausgrid electrical / Street light poles	Due to street light design & Road widening works	NEW	E AG 016	Install 2 new poles. Relocate 2 existing poles and associated overhead conductors betwee between Endeavour Rd & Rabhul Rd. Refer Ausgrid design drawings AN21340 for details.	
36	Henry Lawson Drive	Rabhul Road	E Electrical	AUSGRID	E AG 020	Ausgrid electrical / Street light poles	Due to street light design & Road widening works	NEW	E AG 021	Install 6 new poles. Relocate 3 existing poles and associated overhead conductors at Rabhul Rd intersections and south of the Henry Lawson drive. Refer Ausgrid design drawings AN21340 for details.	

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PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	0	10.08.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

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CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION 0 PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD
GEORGES HALL
UTILITIES IMPACT ASSESSMENT SCHEDULE

A3

SHEET 2 OF 2

TfNSW REGISTRATION No.: DS2020/000130

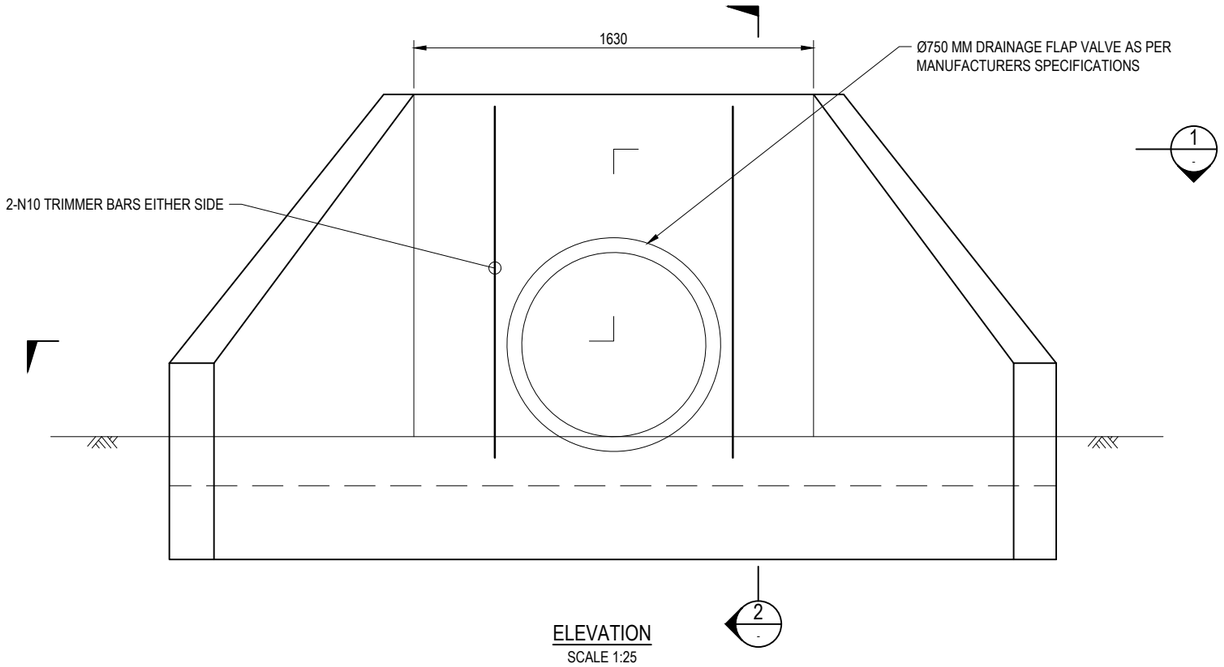
PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-UT-002002

ISSUE: 0



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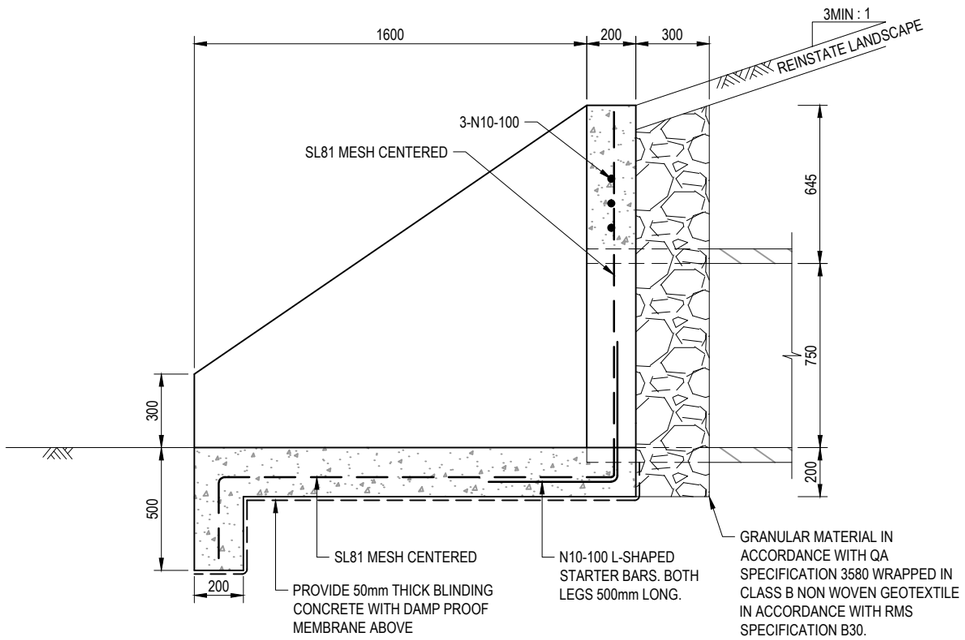
SCALE 1:25



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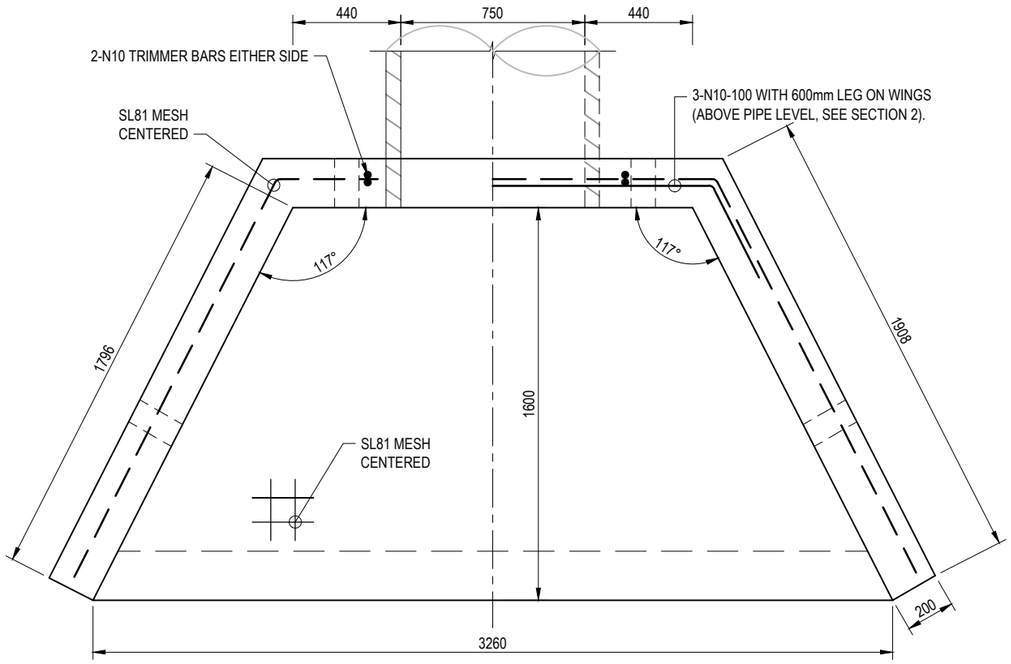

SECTION 1
SCALE 1:25

NOTES:

1. CONCRETE EXPOSURE CLASSIFICATION C2. CONCRETE STRENGTH GRADE SHALL BE 50 MPa. MINIMUM COVER TO REINFORCEMENT SHALL BE 60 mm WITH REPETITIVE PROCEDURES AND INTENSE COMPACTION, UNLESS NOTED OTHERWISE.
2. ALL REINFORCEMENT BARS TO BE GRADE D500N TO AS4671-2001.
3. MESH LAPS SHALL BE MADE SO THAT THE TWO OUTERMOST WIRES OF ONE FABRIC OVERLAP THE TWO OUTERMOST WIRES OF THE SHEET BEING LAPPED BY 2 BAYS.
4. MESH REINFORCEMENT SHOULD BE CUT TO SUIT HEADWALL GEOMETRY.

REFERENCED DOCUMENTS:

AS4671-2001 STEEL REINFORCING MATERIALS
AS3600-2009 CONCRETE STRUCTURES
SPECIFICATION R11 - STORMWATER DRAINAGE
SPECIFICATION B80 - CONCRETE WORK FOR BRIDGES

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PLOT DATE / TIME: 23-Nov-20 / 9:05:32 PM
PLOT BY: MEGHWARB

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1	17.09.2020	PRE-AFC		A. PEREZ

REVISION IN PROGRESS

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CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD
DRAWINGS / DESIGN PREPARED BY: -

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	INITIAL	DATE
DISCIPLINE L.FIRTH		17.09.2020
DISCIPLINE P. MASURKAR		17.09.2020
DISCIPLINE JHON DO		17.09.2020
DISCIPLINE J.CARLOS		17.09.2020
BACKDRAFTED/CORRECTED TUNG LE		17.09.2020
CONFIRMED A. PEREZ		17.09.2020

CLIENT: NSW GOVERNMENT Transport for NSW
PREPARED FOR: EASING SYDNEY'S CONGESTION 1 PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE
UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
HEADWALL DETAIL

A3
SHEET 1 OF 2

TINSW REGISTRATION No. DS2020/000130
PART 1
ISSUE STATUS: DETAILED DESIGN
EDMS No.: -
SHEET No.: SHT-ST-001001
ISSUE 1

LEGEND

EXISTING TREES TO BE REMOVED

EXTENT OF CLEARING

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE GENERAL NOTES AND TFNSW SPECIFICATIONS G36, G38 AND G40.

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DESIGN LOT CODE: -

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PLOT BY: MEGHWARB

CLIENT: NSW GOVERNMENT Transport for NSW

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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	1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 5 0 5 10 15 20m — 1 : 1000 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: -

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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

PREPARED FOR
EASING SYDNEY'S CONGESTION
PINCH POINTS
PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL
LIMITS OF CLEARING

A3

SHEET 1 OF 2

TINSW REGISTRATION No. DS2020/000130

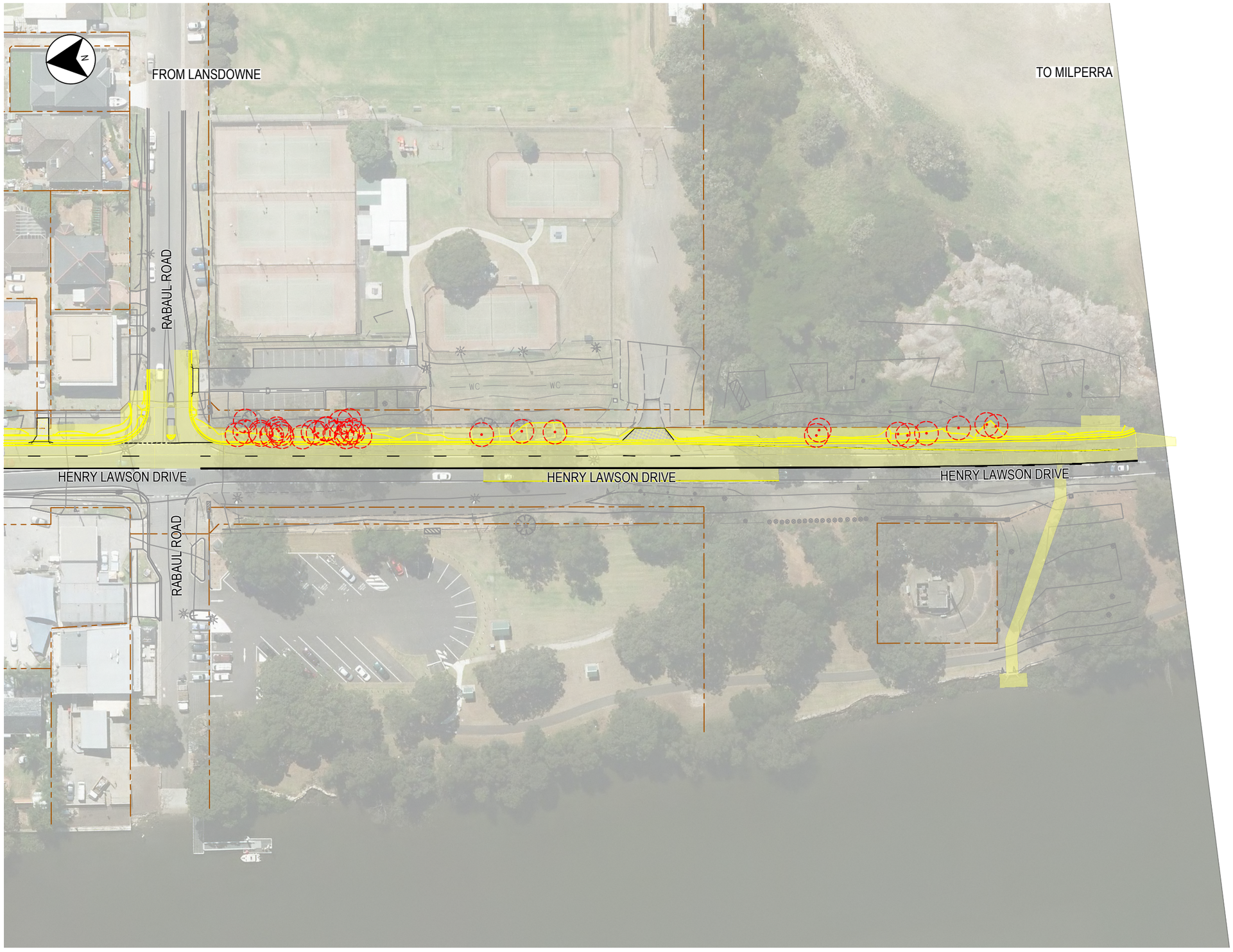
PART 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-MS-001201

ISSUE 1



LEGEND

EXISTING TREES TO BE REMOVED

EXTENT OF CLEARING

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE GENERAL NOTES AND TFNSW SPECIFICATIONS G36, G38 AND G40.

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DESIGN LOT CODE: -

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: -

PLOT DATE / TIME: 23-Nov-20 / 9:04:53 PM

PLOT BY: MEGHWARB

EXTERNAL REFERENCE FILES:

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0	10.08.2020	DRAFT ISSUE (DETAILED)		A. PEREZ
1	06.11.2020	PRE-AFC		A.PEREZ

REVISION IN PROGRESS

SCALES ON A3 SIZE DRAWING: 5 0 5 10 15 20m; 1 : 1000 FULL SIZE A3

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

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	PRELIM. INITIAL	FINAL DATE
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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT Transport for NSW

PREPARED FOR: EASING SYDNEY'S CONGESTION PINCH POINTS PINCH POINTS SOUTH WEST

CANTERBURY BANKSTOWN COUNCIL
MR508 HENRY LAWSON DRIVE

UPGRADE AT THE INTERSECTION OF RABAUL ROAD GEORGES HALL LIMITS OF CLEARING

A3

SHEET 2 OF 2

TfNSW REGISTRATION No.: DS2020/000130

PART: 1

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: SHT-MS-001202

ISSUE: 1

Attachment B – Extent of proposed works figure

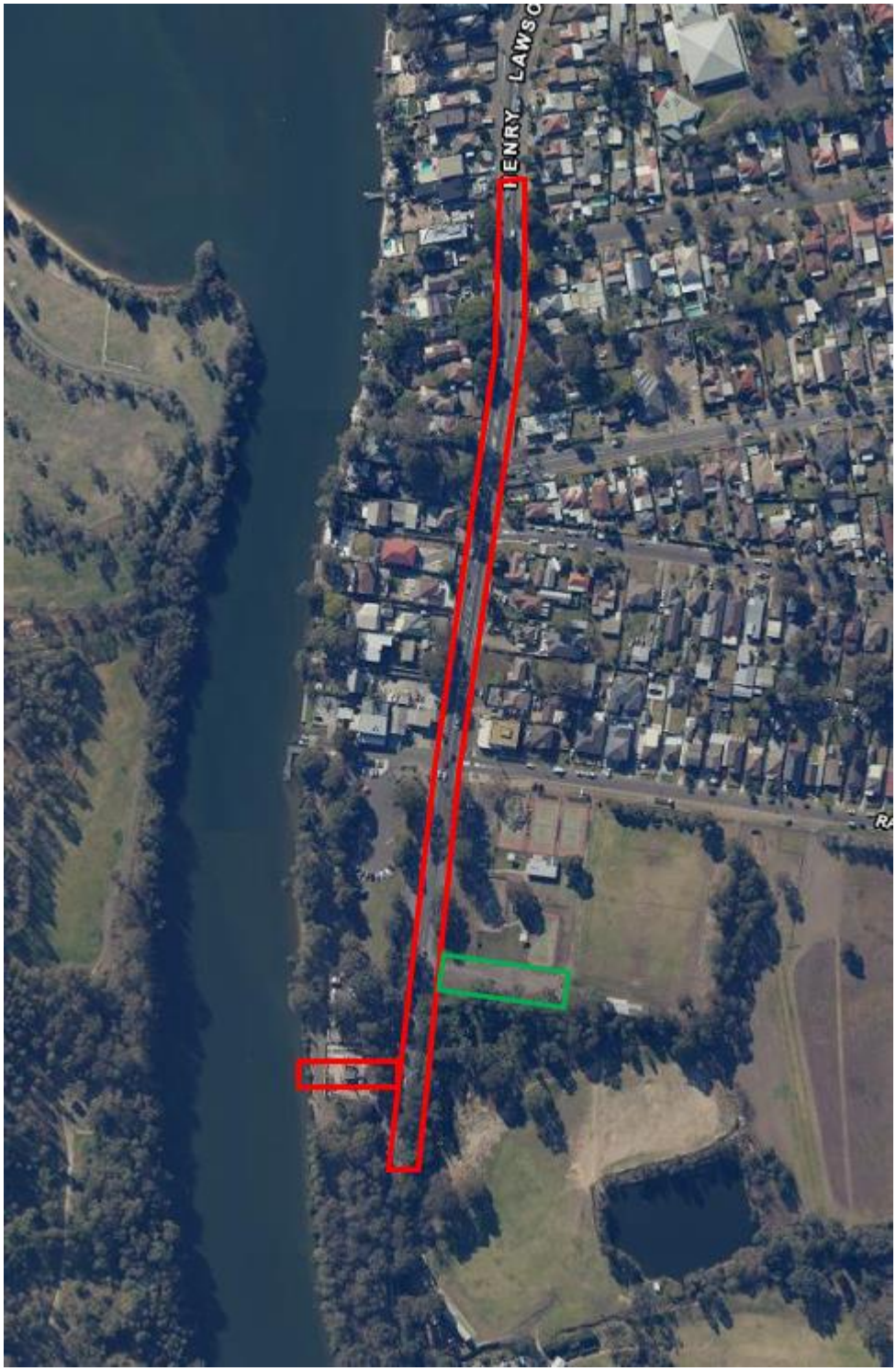


Figure 1 Extent of proposed works (red) and proposed compound site location (green)

Attachment C – AHIMS Basic and Extensive Search Results

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : HenryLawsonDr,GeorgesHall

Client Service ID : 551328

Transport for NSW - Easing Sydney's Congestion Program Office

Date: 20 November 2020

10-14 Smith Street
Parramatta New South Wales 2150

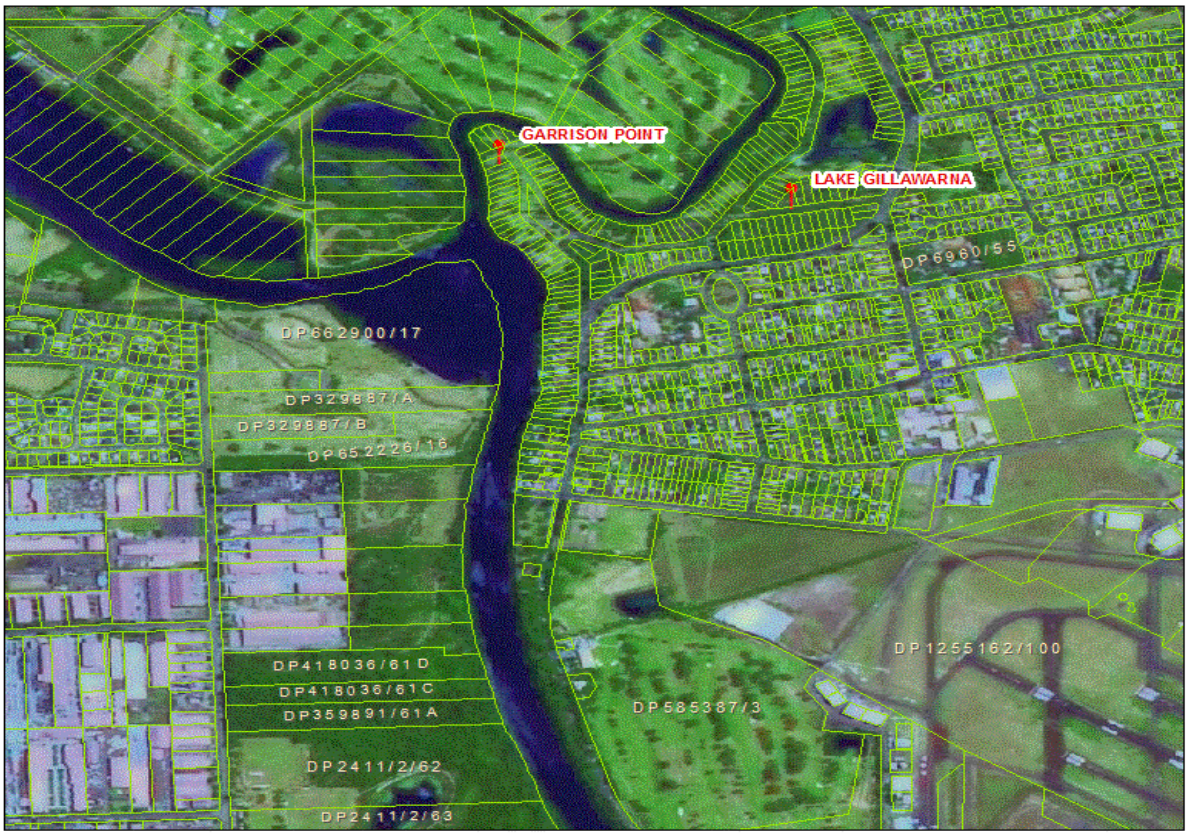
Attention: Katie Round

Email: katie.round@transport.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : A, DP:DP408046 with a Buffer of 1000 meters, conducted by Katie Round on 20 November 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

3	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : HenryLawsonDr,GeorgesHall

Client Service ID : 551328

Transport for NSW - Easing Sydney's Congestion Program Office

Date: 20 November 2020

10-14 Smith Street
Parramatta New South Wales 2150

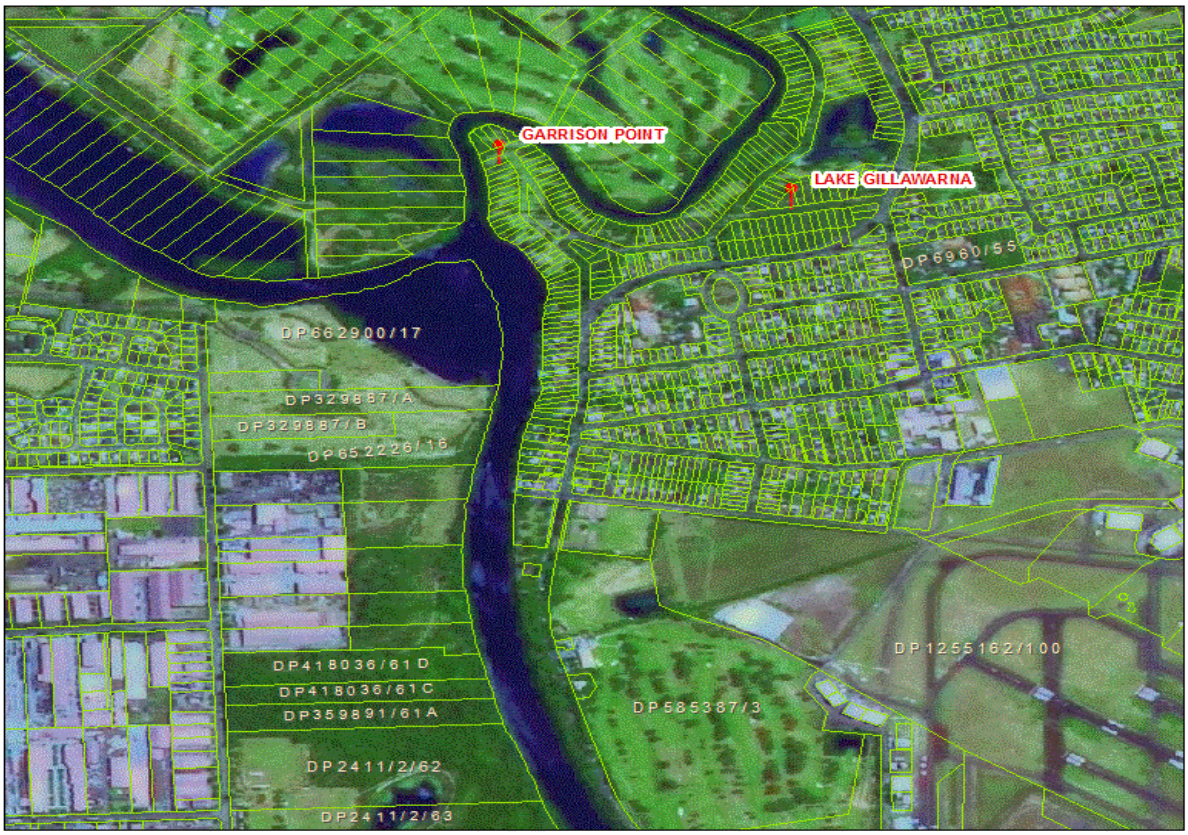
Attention: Katie Round

Email: katie.round@transport.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : A, DP:DP408046 with a Buffer of 1000 meters, conducted by Katie Round on 20 November 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

3	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : HenryLawsonDr,GeorgesHall

Client Service ID : 551328

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-5124	HLD Resource Zone 1 + PAD	GDA	56	312924	6244624	Open site	Valid	Aboriginal Resource and Gathering : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen					**Permits**		
45-5-5121	HLD PAD 4	GDA	56	313291	6246031	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen					**Permits**		
45-5-5122	HLD PAD 5	GDA	56	312899	6244709	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen					**Permits**		

Report generated by AHIMS Web Service on 20/11/2020 for Katie Round for the following area at Lot : A, DP:DP408046 with a Buffer of 1000 meters. Additional Info : For an REF. Number of Aboriginal sites and Aboriginal objects found is 3

Attachment D – Heritage Search Results

National Native Title Tribunal

Search Register of Native Title Claims

The Register of Native Title Claims (RNTC) contains information about all claimant applications that have been registered. The Registrar is responsible for maintaining the RNTC.

Further information about the RNTC is available.

Tribunal file no.

Federal Court file no.

Application name

State or Territory: New South Wales

Representative A/TSI body area

Local government area: Canterbury-Bankstown Council

Date filed between and

Sort by: Date filed

Search

Your search returned **1** matches.

Application name	Date filed	Tribunal file no	Federal Court file no	Date claim entered on register
South Coast People	03/08/2017	NC2017/003	NSD1331/2017	31/01/2018

National Native Title Tribunal

Register of Native Title Claims Details

Back to search results

NC2017/003 - South Coast People

Tribunal file no.	NC2017/003
Federal Court file no.	NSD1331/2017
Application name	South Coast People
State or Territory	New South Wales;
Representative A/TSI body area(s)	New South Wales
Local government area(s)	Bega Valley Shire Council,Campbelltown City Council,Canterbury-Bankstown Council,Eurobodalla Shire Council,Georges River Council,Goulburn Mulwaree Council,Liverpool City Council,Queanbeyan-Palerang Regional Council,Shellharbour City Council,Shoalhaven City Council,Snowy Monaro Regional Council,Sutherland Shire Council,The Council Of The Municipality Of Kiama,Wingecarribee Shire Council,Wollondilly Shire Council,Wollongong City Council
Date filed	03/08/2017
Date claim entered on Register	31/01/2018

Register extract and attachments

Register extract	**RNTCExtract_NC2017_003.pdf**
Register extract attachment/s	**NNTT Map of the application area RNTC.pdf** **Attachment B Description RNTC.pdf** **Attachment C Map RNTC.pdf**

View this map in NTV: **NC2017/003**

National Native Title Tribunal

Extract from the Register of Native Title Claims

Application Information

Application Reference:	**Federal Court number:** NSD1331/2017
	NNTT number: NC2017/003
Application name:	The Applicant on behalf of the South Coast People v Attorney General of New South Wales (South Coast People)
Registration History:	Registered from 31/01/2018

Register Extract (pursuant to s. 186 of the *Native Title Act 1993*)

Application filed with:	Federal Court of Australia
Date application filed:	03/08/2017
Date claim entered on Register:	31/01/2018
Applicants:	Marilyn Pickalla Campbell, Aileen Blackburn (nee Mongta), William Campbell, Wally Stewart, John Brierley, Mark Tinelt Parsons, Dean Kelly, Cathy Thomas, Leslie Simon, Taressa Mongta, Gwenda Jarrett, Paul McLeod

Address for service:
NTSCORP Limited
Unit 1a Suite 2.02
44-70 Rosehill Street
REDFERN NSW 2016
Phone: (02) 9310 3188
Fax: (02) 9310 4177

Additional Information:

Not Applicable

DESCRIPTION OF THE AREA COVERED BY THE CLAIM:

(A) Area covered by application

The area covered by the application ('the Application Area') comprises all the land and waters within the external boundaries described in Attachment B and depicted in the map at Attachment C.

The Application Area description and map have been prepared with the assistance of the Geo-Spatial Unit of the National Native Title Tribunal. The area covered by this application does not include the areas described at point B below.

(B) Areas within the external boundaries not covered by the application

1. The area covered by the application excludes any land and waters covered by past or present freehold title or by previous valid exclusive possession acts as defined by section 23B of the Native Title Act 1993 (Cth). That is, the area covered by the application excludes any land and waters which are:
a) a Scheduled interest;
b) a freehold estate;
c) a commercial lease that is neither an agricultural lease nor a pastoral lease;
d) an exclusive agricultural lease or an exclusive pastoral lease;
e) a residential lease;
f) a community purpose lease;
g) a lease dissected from a mining lease and referred to in s 23B(2)(c)(vii) of the Native Title Act (1993) (Cth); and
h) any lease (other than a mining lease) that confers a right of exclusive possession over particular land or waters.

2. Subject to paragraphs 4 and 5, the area covered by the application excludes any land or waters covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996.

3. Subject to paragraphs 4 and 5, exclusive possession is not claimed over areas which are subject to valid previous non-exclusive possession acts done by the Commonwealth, State or Territory.

4. Subject to paragraph 6 below, where the act specified in paragraphs l, 2 and 3 falls within the provisions of:
a) s 23B(9) - Exclusion of acts benefiting Aboriginal Peoples or Torres Strait Islanders;
b) s 23B(9A) - Establishment of a national park or state park;
c) s 23B(9B) - Acts where legislation provides for non-extinguishment;
d) s 23B(9C) - Exclusion of Crown to Crown grants; and
e) s 23B(10) - Exclusion by regulation;
the area covered by the act is not excluded from the application.

5. Where an act specified in paragraphs 1, 2 and 3 affects or affected land or waters referred to in:
a) s 47 - Pastoral leases etc covered by claimant application;
b) s 47A - Reserves covered by claimant application;
c) s 47B - Vacant Crown land covered by claimant application; the area covered by the act is not excluded from the application.

6. The area covered by the application excludes land or waters where the native title rights and interests claimed have been otherwise extinguished.

PERSONS CLAIMING TO HOLD NATIVE TITLE:

The South Coast People are the native title claim group on whose behalf the Applicant makes this application.

The South Coast People native title claim group comprises all the descendants of the following apical ancestors:
Mary Ann, mother of Emily and Joseph Johnson
Charles ADGERY
Robert ANDY
Maria BILLYBOY (aka Coommee Nullanga)
Arthur BLOXSOME
Richard BOLLOWAY
Alick BOND
Charlotte BOND
Oswald BRIERLEY
William BROUGHTON
Jane BROWN
Thomas Golden BROWN
James BUNDLE
Jerry BUNGIL
Louisa BURROWS
William CAMPBELL
John CARPENTER
Johnny CARTER
Henry CHAPMAN
Henry COOLEY
Tom COOLEY
Bob CURRAN
Henry DAVIS
Ellen DEMESTRE
Julia DIXON

William DIXON
Jimmy Coombala FRIDAY
Biddy GILES
James GOLDING
Patrick HADDIGADDI
Jessie JENKINS
Donald JOHNSON
Annie JOHNSTON
Judy KENNY
John KERRY
Lucy LYONS
Mary Ann LYONS
Richard MARSHALL
Caroline MATHEWS
Elizabeth MATTHEWS
Annie MCGRATH
Edward MOORE
MUMBLER
Jenny NIMEBUR
George NIPPLE
Margaret Ann NIXON
Harry PICKALLA
John PITTMAN
Mary Ann ROSE
Minnie ROWLEY
John SIMS
Sally of Wandandian, spouse of Dan Parsons
Governor STEWART
Mary Ann STEWART
Peter THOMAS
George TIMBERY
Mary TURNER
Edward WALKER
William WALKER
and persons adopted and incorporated into the families of those persons in accodance with the South Coast People's traditional laws and customs (and the biological descendants of any such persons).

REGISTERED NATIVE TITLE RIGHTS AND INTERESTS:

The following Native Title Rights & Interests were entered on the Register on 31/01/2018

The South Coast People claim the following native title rights and interests in relation to the claim area, subject to the valid laws of the State of New South Wales and the Commonwealth (including the right to conduct activities necessary to give effect to them):

1. Where exclusive native title can be recognised, the South Coast People, as defined in Schedule A of this application, claim the right to possession, occupation, use and enjoyment of the lands and waters of the application area to the exclusion of all others subject to the valid laws of the Commonwealth and State of New South Wales.

2. Where exclusive native title cannot be recognised, the South Coast People as defined in Schedule A of this application, claim the following non-exclusive rights and interests including the right to conduct activities necessary to give effect to them:
i. the right to access, to remain in and to use the land and waters for any purpose;
ii. the right to access and to take resources from the land and waters for any purpose;
iii. the right to maintain and protect places and objects of significance;
iv. the right to be accompanied onto those areas by persons who, though not native title holders, are:
a) spouses, partners or parents of native title holders, together with their children, grandchildren, great-grandchildren and their descendants;
b) people required under traditional laws and customs for the performance of cultural activities, practices or ceremonies; and
c) people requested by the native title holders to assist in, observe or record cultural activities, practices or ceremonies.

The native title rights and interests are subject to and exercisable in accordance with:

a) the valid laws of the State of New South Wales and the Commonwealth;
b) the rights (past of present) conferred upon persons pursuant to the laws of the Commonwealth and the laws of the State of New South Wales; and
c) the traditional laws acknowledged and traditional customs observed by the South Coast People.

REGISTER ATTACHMENTS:

1. Attachment B Description of the area covered by the application, 6 pages - A4, 03/08/2017

2. Attachment C Map of the area covered by the application, 2 pages - A4, 03/08/2017

3. NNTT Map of the application area, 1 page - A4, 31/01/2018

Note: The Register of Native Title Claims may, in accordance with s. 188 of the Native Title Act 1993, contain confidential information that will not appear on the Extract.

Attachment B

Description of the Area covered the application

South Coast Claim

External boundary description

The application area covers all the land and waters within the external boundary described as: Commencing at a point in Bate Bay (being eastern corner of the Parish of Wattamolla and the Parish of Sutherland - located approximately 800m south east of Glaisher Point on the Cronulla Peninsula and approximately 550m north west of Port Hacking Point) at Longitude 151.162708° East, Latitude 34.072597° South and extending east, along that latitude, to a point on a three (3) nautical mile buffer east of the High Water Mark of the New South Wales Coastline; then generally southerly and generally south westerly and generally southerly along a three (3) nautical mile buffer east of the High Water Mark (including Montague Island) to its intersection with Latitude 37.111800° South (being a point east southeast of Red Point); then west along that Latitude to a point on the High Water Mark of the coastline; then generally north westerly, and generally south westerly along that high water mark to the eastern bank of Towamba River (crossing the mouths of any waterways between the seaward extremities of each of the opposite banks of each such waterway); then south westerly across the mouth of that river to the centreline of that river; then generally south westerly and generally north westerly along that river centreline to its intersection with an elevation line 650m above Mean Sea Level of the eastern face of the Great Dividing Range (at approximately Longitude 149.416095° East, Latitude 36.885207° South); then generally north westerly and generally north easterly along that elevation line (approximated by the coordinates listed in Table 1) of the eastern face of the South Coast Range, Kybeyan Range, Minuma Range, Mulway Ridge, Bendoura Range, Benmanang Range, Murrengenburg Mountain, Sugarloaf Mountain, Budawang Range, Wirritin Ridge and again Budawang Range to its intersection with the centreline of Freeman Creek at approximately Longitude 150.110218° East, Latitude 35.290191° South (in the vicinity of Corang Peak); then generally north easterly along that creek centreline to its source at Longitude 150.110833° East, Latitude 35.289659° South; then north easterly to a source of an unnamed creek at Longitude 150.111762° East, Latitude 35.288930° South then generally north easterly and generally northerly along that creek centreline, the centreline of Canowie Brook and Corang River to an intersection with an unnamed creek at Longitude 150.110474° East, Latitude 35.263498° South then generally

northerly along that creek centreline to its intersection with again an elevation line 650m above Mean Sea Level on the north western face of the Budawang Range (at approximately Longitude 150.111019° East, Latitude 35.262446° South); then generally westerly, generally north westerly and generally north easterly along that elevation line (approximated by the coordinates listed in Table 2) to its intersection with the centreline of an unnamed creek at Longitude 150.128847° East, Latitude 35.158495° South); then generally easterly, generally northerly and generally north easterly along that creek centreline, the centrelines of Running Creek, Endrick River, Shoalhaven River, Kangaroo River, Yarrunga Creek and Wildes Meadow Creek to its intersection with an elevation line 650m above Mean Sea Level (at approximately Longitude 150.481773° East, Latitude 34.648234° South in the vicinity of Fitzory Falls); then generally southerly along that elevation line (approximated by the coordinates listed in Table 3) to its intersection with an unnamed creek at Longitude 150.478210° East, Latitude 34.681336° South; then generally north easterly along that creek centreline to its intersection with again an elevation line 650m above Mean Sea Level (at approximately Longitude 150.479475° East, Latitude 34.680049° South), then generally southerly, generally north easterly and generally north westerly along that elevation line (approximated by the coordinates listed in Table 4) to its intersection with an unnamed creek south west of Mount Butler at Longitude 150.596888° East, Latitude 34.534582° South; then generally north westerly, generally northerly and generally north easterly along the centreline of that creek, the Nepean River, Lake Nepean, Nepean Dam and again the Nepean River to its intersection with the Cordeaux River (in the vicinity of Pheasants Nest Weir); then generally south easterly along that river centreline to an unnamed creek at Longitude 150.683360° East, Latitude 34.257635° South; then generally easterly and south easterly along that creek centreline and another unnamed creek centreline to intersect with an elevation line 250m above Mean Sea Level (at approximately Longitude 150.690194° East, Latitude 34.257669° South); then generally northerly, generally south easterly and generally north easterly along that elevation line (approximated by the coordinates listed in Table 5) to approximately Longitude 150.729325° East Latitude 34.243953° South; then north easterly to the centreline of Cascade Creek at Latitude 34.243125° South; then generally north easterly along the centreline of that creek, centreline of Cataract River and Back Gully to intersect with an elevation line 250m above Mean Sea Level (at approximately Longitude 150.793569° East, Latitude 34.230623°

South); then generally north westerly and generally north easterly along that elevation line (approximated by the coordinates listed in Table 6) to approximately Longitude 150.793689° East, Latitude 34.204647° South ; then north easterly to the centreline of an unnamed creek at Longitude 150.793937° East, Latitude 34.204469° South; then generally northerly and generally north easterly along that creek centreline and the centreline of Georges River to Latitude 34.000429° South; then generally south easterly along the centreline of an unnamed creek to its intersection with an elevation line 50m above Mean Sea Level (at approximately Longitude 150.918133° East, Latitude 34.003273° South); then generally north westerly, generally easterly and generally southerly along that elevation line (approximated by the coordinates listed in Table 7) to intersect an unnamed creek at approximately Longitude 151.924571° East, Latitude 34.001859° South; then generally easterly and generally north easterly along the centreline of that unnamed creek, the centrelines of Harris Creek and Williams Creek to again the centreline of the Georges River; then generally south easterly and generally easterly along the centreline of that river to the northernmost corner of the intersection of the common boundary between the suburbs of Como and Oyster Bay; then generally southerly along the eastern boundary of the suburb of Como to Latitude 34.001928° South; then south easterly to the intersection of the foreshore of Carina Bay and the centreline of Carina Gully; then generally southerly along the centreline of that gully to its headwaters at Wiak Road; then southerly to a point on an elevation line 50m above Mean Sea Level at approximately Longitude 151.065283° East, Latitude 34.014152° South; then generally north easterly and generally south easterly along that elevation line (approximated by the coordinates listed in Table 8) to intersect Coonong Creek at Longitude 151.084732° East, Latitude 34.044781° South; then generally south easterly along that creek centreline to the foreshore of Gymea Bay; then south easterly to a point on the eastern boundary of the suburb of Gymea Bay at Latitude 34.051792° South; then generally southerly along that suburb boundary to the northern boundary of the Parish of Wattamolla; then generally easterly along the northern boundary of that parish back to the commencement point.

Exclusions:

This application area excludes the following Native Title Determinations

1. NSD1631/2004 Nowra Local Aboriginal Land Council (NND2005/001) as determined by the Federal Court on 15/6/2005 – being:

- Lot 264 in Deposited Plan 751273.

2. NSD1766/2005 Eden Local Aboriginal Land Council (NND2006/001) as determined by the Federal Court on 23/08/2006- being:
   - Lot 31 of Section 20 in Deposited Plan 758379;
   - Lot 32 of Section 20 in Deposited Plan 758379;
   - Lot 33 of Section 20 in Deposited Plan 758379;
   - Crown Parcels - CADID 105536766 (Proposed Lots 1 to 7);
   - Part Allotment 3 in Section 33, (DP758379) Town of Eden (Maling and Curalo Streets).

3. NSD1826/2005 Ulladulla Local Aboriginal Land Council (NND2006/004) as determined by the Federal Court on 13/12/2006 – being:
   - Lot 171 in DP 1081810, Parish of Woodburn, County of St Vincent.

4. NSD1272/2005 Illawarra Local Aboriginal Land Council (NND2007/001) as determined by the Federal Court on 6/02/2007- being:
   - Lot 323 DP823189

5. NSD1246/2007 Eden Local Aboriginal Land Council (NND2008/001) as determined by the Federal Court on 17/12/2008 – being:
   - Part of Lot 98 in Deposited Plan DP1036338 being an area 5 metres wide following the line of an existing water pipe.
   - Part of Lots 99 and 100 in Deposited Plan DP1040981 being an area 5 metres wide following the line of an existing water pipe
   - Part of Lot 108 on DP 1199859 (Part of former Lot 101 in Deposited Plan DP1040981 being an area 20 metres wide marked "A" on the plan "A3");
   - Part of Lot 108 on DP 1199859 (Part of Former Lot 99 in Deposited Plan DP1040981 being an area marked "B" on the plan "A3").

6. NSD1839/2008 Gandangarra Local Aboriginal Land Council (NND2009/002) as determined by the Federal Court on 30/09/2009 – being:
   - Lot 101 in Deposited Plan 1028645, located in the Local Government Area of Sutherland, Parish of Holsworthy, County of Cumberland, State of New South Wales.

7. NSD1199/2009 Eden Local Aboriginal Land Council #2 (NND2010/001) as determined by the Federal Court on 15/07/2010 – being:
   - Lot 98 of Deposited Plan 1036338.

8. NSD1200/2009 Eden Local Aboriginal Land Council #3 (NND2010/002) as determined by the Federal Court on 15/07/2010 – being:
   - Lot 207 of Deposited Plan 728018

9. NSD19/2010 Gandangara Local Aboriginal Land Council (NND2011/001) as determined by the Federal Court on 15/04/2011 – being:
   - Lot 200 in Deposited Plan 1136781, Lucas Heights, south west of Sydney

10. NSD240/2010 Jerrinja Local Aboriginal Land Council (NND2013/001) as determined by the Federal Court on 31/05/2013 – being:
    - Lot 96 in Deposited Plan 1069334 and located in the Local Government Area of Shoalhaven, Parish of Coolangatta, County of Camden, State of New South Wales.

11. NSD164/2012 Gandangara Local Aboriginal Land Council (NND2013/002) as determined by the Federal Court on 30/07/2013 – being:
    - Lot 3 of Deposited Plan 807482 in the Parish of Holsworthy, County of Cumberland in the Shire of Sutherland in New South Wales

Note

Data Reference and source

- Application boundary compiled by National Native Title Tribunal based on information or instructions provided by the applicants.
- High water mark sourced from the Digital Topographic Database, Land and Property Information, NSW (Aug 2016).
- Cadastre data sourced from Land and Property Information, NSW (Aug 2016).
- Creek and rivers data sourced from the Digital Topographic Database, Land and Property Information, NSW (Aug 2016).

Reference datum

Geographical coordinates have been provided by the NNTT Geospatial Services and are referenced to the Geocentric Datum of Australia 1994 (GDA94), in decimal degrees and are based on the spatial reference data acquired from the various custodians at the time

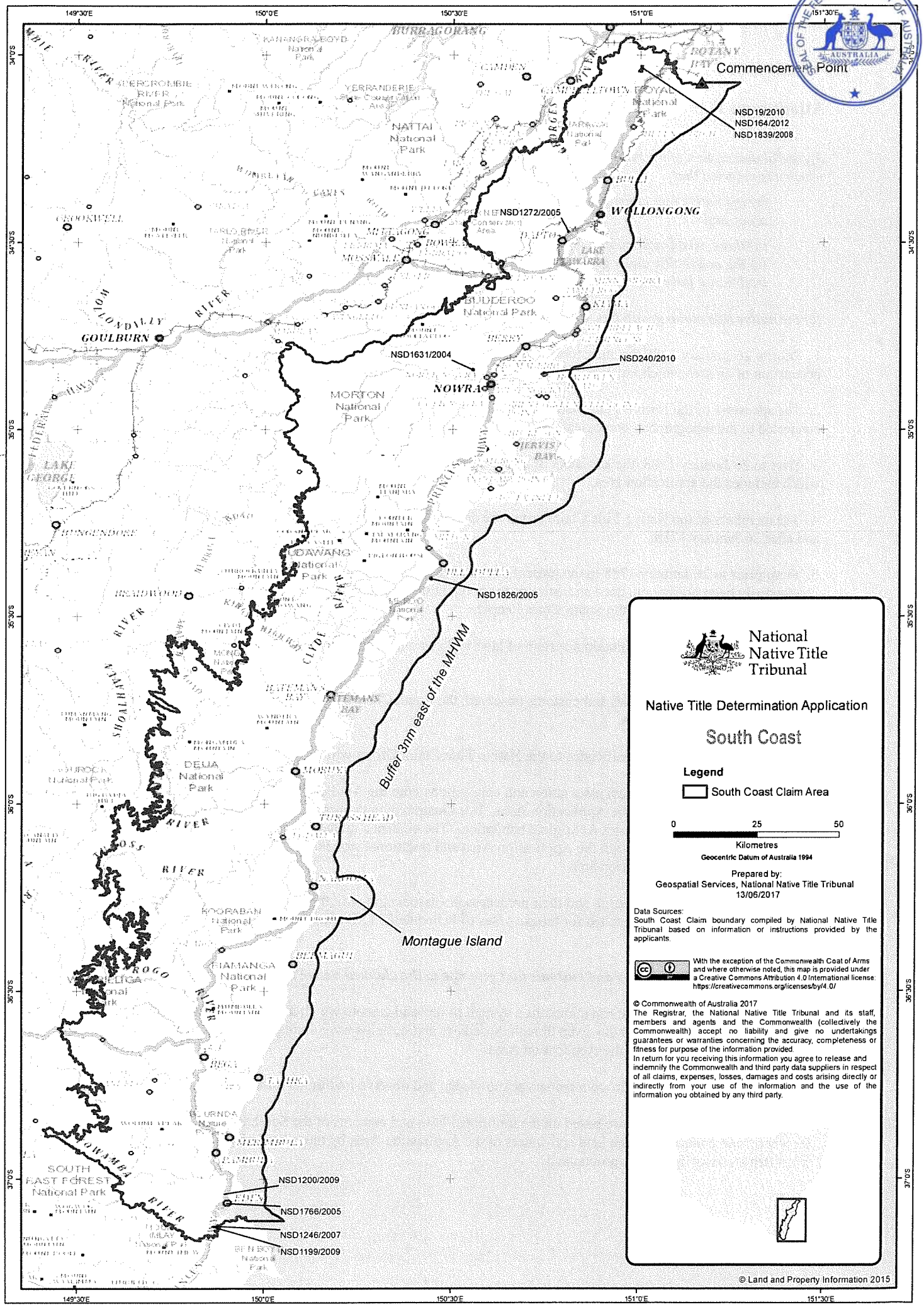
Use of Coordinates

Where coordinates are used within the description to represent cadastral or topographical boundaries or the intersection with such, they are intended as a guide only. As an outcome of the custodians of cadastral and topographic data continuously recalculating the geographic position of their data based on improved survey and data maintenance procedures, it is not possible to accurately define such a position other than by detailed ground survey.

Prepared by Geospatial Services, National Native Title Tribunal (13 June 2017)

Attachment C [Section 62(2)(b) NTA]

Map of the Area covered by the application



National Native Title Tribunal

Native Title Determination Application

South Coast

Legend

South Coast Claim Area

0 25 50

Kilometres

Geocentric Datum of Australia 1994

Prepared by:
Geospatial Services, National Native Title Tribunal
13/06/2017

Data Sources:
South Coast Claim boundary compiled by National Native Title Tribunal based on information or instructions provided by the applicants.

Filepath: P:\GEO_INFO\Products\NSW\NTDA\Proposed\South_Coast\Mapping\GT2017_0862_Map\20170613_Proposed_South_Coast_Topo_A3P.mxd

Geotrack Number: GT2017/0862

NSW Department of Planning, Industry and Environment

Home > Topics > Heritage places and items > Search for heritage

Search for NSW heritage

Return to search page where you can refine/broaden your search.

Statutory listed items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into three sections.

- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by the Heritage Division.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the NSW Heritage Act. This information is provided by the Heritage Division.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act, 1979 and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the NSW Heritage Act.

Your search returned 7 records.

Item name	Address	Suburb	LGA	SHR
Air Defence Headquarters Ruin Sydney (former)		Condell Park	Bankstown	01857
Bankstown Reservoir (Elevated)	Beresford Avenue	Bankstown	Bankstown	01316
Homestead, The	1a Lionel Street	Georges Hall	Bankstown	00448
Lansdowne Bridge	Hume Highway	Lansvale	Fairfield	01472
Potts Hill Reservoirs 1 & 2 and Site	Cooper Road	Potts Hill	Bankstown	01333
Pressure Tunnel and Shafts		Potts Hill	Bankstown	01630
Pressure Tunnel Shaft No.1 & associated infrastructure	189 Rookwood Road	Chullora	Bankstown	01334

Section 3. Items listed by Local Government and State Agencies.

Your search returned 92 records.

Item name	Address	Suburb	LGA	Information source
Air Defence Headquarters Ruin Sydney (former)	Edgar Street (cnr)	Condell Park	Bankso	LGOV

			wn	
Allder's Farmhouse	49 Hill Road	Birrong	Bankstown	LGOV
Bankstown Aerodrome	345 Marion Street	Georges Hall	Bankstown	LGOV
Bankstown Chinese Baptist Church	26 Stanley Street	Bankstown	Bankstown	LGOV
Bankstown Civic Centre	375 Chapel Road	Bankstown	Bankstown	LGOV
Bankstown Hotel	102 Bankstown City Plaza	Bankstown	Bankstown	LGOV
Bankstown North Public School - Building B00A	322 Hume Highway	Bankstown	Bankstown	SGOV
Bankstown Parcels Office (Former)	143 Bankstown City Plaza	Bankstown	Bankstown	LGOV
Bankstown Primary School	61 Restwell Street	Bankstown	Bankstown	LGOV
Bankstown Public School - Buildings B001-B005	Restwell Street	Bankstown	Bankstown	SGOV
Bankstown Railway Platform Terminus Building	143 North Terrace	Bankstown	Bankstown	LGOV
Bankstown Railway Station Group	North Terrace	Bankstown	Bankstown	SGOV
Bankstown Railway Station Platform and Building	143 Bankstown City Plaza	Bankstown	Bankstown	LGOV
Bankstown Reservoir	300 Hume Highway	Bankstown	Bankstown	LGOV
Bankstown Reservoir (Elevated) (WS 0007)	Beresford Avenue	Bankstown	Bankstown	SGOV
Bankstown West Public School	141 William Street	Bankstown	Bankstown	LGOV
Bankstown West Public School - Buildings B00A-B00C and B00E	141 William Street	Bankstown	Bankstown	SGOV
Bungalow	89 Restwell Street	Bankstown	Bankstown	LGOV

Cairds Wharf	574A Henry Lawson Drive	East Hills	Bankstown	LGOV
Cattle Duffers Flat	925B Henry Lawson Drive	Revesby	Bankstown	LGOV
Chester Hill Railway Station Group	Chester Hill Road	Chester Hill	Bankstown	SGOV
Chullora - Winsor Park Remembrance Drive & War Memorial	Hume Highway, Crn Brunker Road	Greenacre	Bankstown	SGOV
Chullora Railway Workshops	Beaufort Place	Chullora	Bankstown	SGOV
Chullora Railway Workshops Substation	(north of) Worth Street	Chullora	Bankstown	SGOV
City Tunnel	Potts Hill Reservoir to Waterloo Pumping Station	Potts Hill To Waterloo	Bankstown	SGOV
City Tunnel	Potts Hill Reservoir to Waterloo Pumping Station	Potts Hill To Waterloo	Marrickville	SGOV
Ckf 27469 - Flat Wagon	Chullora Railway Workshops	Chullora	Bankstown	SGOV
East Hills (Georges River) Underbridge	Henry Lawson Drive	East Hills	Bankstown	SGOV
East Hills Reservoir (Elevated) (WS 0042)	Dilke Road	Padstow Heights	Bankstown	SGOV
Electricity Substation No. 1226	21 Doyle Road	Revesby	Bankstown	SGOV
Electricity Substation No. 1235	14D Glassop Street	Bankstown	Bankstown	SGOV
Electricity Substation No. 1240	1A Henry Street	Punchbowl	Bankstown	SGOV
Electricity Substation No. 1257	70A Noble Avenue	Greenacre	Bankstown	SGOV
Electricity Substation No. 1278	2A Vimy Street	Bankstown	Bankstown	SGOV
Farmhouse in the grounds of Crest Baptist Church	59 Johnson Road	Bass Hill	Bankstown	LGOV
Greenacre Methodist Church Hall	2 Mimosa Road	Greenacre	Bankstown	LGOV

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Greenacre Public School	105 Waterloo Road	Greenacre	Bankstown	LGOV
Greenacre Public School - Buildings B00A, B00B and B00E	105 Waterloo Road	Greenacre	Bankstown	SGOV
House	525 Chapel Road	Bankstown	Bankstown	LGOV
House (former Bankstown Police Station)	76 Powell Street	Yagoona	Bankstown	LGOV
House, Ferndale Cottage	31 Ferndale Road	Revesby	Bankstown	LGOV
House, Lansdowne	7 Henry Lawson Drive	Lansvale	Bankstown	LGOV
House, The Arches	33 Catherine Street	Punchbowl	Bankstown	LGOV
House, The Pah	4 Tompson Road	Revesby	Bankstown	LGOV
Hudson's Design Cottage	25 Old Kent Road	Greenacre	Bankstown	LGOV
Karningul School - Building B00A	2A Bagdad Street	Regents Park	Bankstown	SGOV
Leightonfield Railway Station Group	Christina Road	Leightonfield	Bankstown	SGOV
Locomotive, Diesel Shunting 7301	Chullora Railway Workshops	Chullora	Bankstown	SGOV
Locomotive, Diesel Shunting 7301	Chullora Railway Workshops	Chullora	Bankstown	SGOV
Locomotive, Steam 3801	Thirlmere Railway Precinct	Thirlmere	Wollondilly	SGOV
Milestone - Hume Highway	Hume Highway	Lansvale	Bankstown	SGOV
Milestone, Sydney XV Liverpool V [Bass Hill]	Hume Highway	Bass Hill	Bankstown	LGOV
Milestone, Sydney XVI Liverpool V [Lansdowne]	Hume Highway	Lansdowne	Bankstown	LGOV

Milperra Soldier Settlement (Roads)	Ashford Avenue	Milperra	Bankstown	LGOV
Nurse Schwarzel Fountain	77 Anderson Avenue	Panania	Bankstown	LGOV
Nvmf 2939 - Bogie Guard's Van	Chullora Railway Workshops	Chullora	Bankstown	SGOV
Padstow Railway Station Group	Memorial Drive	Padstow	Bankstown	SGOV
Panania Railway Station Group	Anderson Street	Panania	Bankstown	SGOV
Pipehead to Potts Hill Pipelines	Frank Street (Pipehead) to Cooper Road (Potts Hill)	Guildford West To Birrong Via Sefton	Bankstown	SGOV
Pipeline (water)		Potts Hill	Bankstown	LGOV
Potts Hill - Crown St 48"/42" Mains	Pipeline easement	Potts Hill To Waterloo (Via Greenacre,ashfield,pet	Sydney	SGOV
Potts Hill Booster Station (WP0004)	Rookwood Road	Potts Hill	Bankstown	SGOV
Potts Hill Pumping Station (remains)	Rookwood Road	Potts Hill	Bankstown	SGOV
Potts Hill Reservoir	146 Rookwood Road	Yagoona	Bankstown	LGOV
Potts Hill Reservoirs Site	Cooper Street	Birrong	Bankstown	SGOV
Pressure Tunnel and Shafts	Potts Hill Road to Waterloo Pumping Station	Potts Hill To Waterloo	Bankstown	SGOV
Railcorp Moveable Heritage Collection	'Igloo', Chullora Workshops Beaufort Place	Chullora	Bankstown	SGOV
Regents Park Public School	2A Bagdad Road	Regents Park	Bankstown	LGOV
Revesby Public School	84 The River Road	Revesby	Bankstown	LGOV
Revesby Public School - Building B00E	84 The River Road	Revesby	Bankstown	SGOV
Revesby Railway Station Group	Blamey Street	Revesby	Bankstown	SGOV

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Salt Pan Creek Sewage Aqueduct	Clarendon Road	Riverwood	Hurstville	SGOV
Salt Pan Creek Sewage Aqueduct	Clarendon Road	Riverwood	Bankstown	SGOV
Sefton Junction Former Sub-station	Sefton Triangle, Wellington Road	Sefton	Bankstown	SGOV
Sefton Junction Sub-Station	96 Wellington Road	Sefton	Bankstown	LGOV
Sefton Railway Station Group	Wellington Road	Sefton	Bankstown	SGOV
Shop	290 South Terrace	Bankstown	Bankstown	LGOV
Shop (former Accommodation House)	109 Bankstown City Plaza	Bankstown	Bankstown	LGOV
Shop (former Brancourt's Garage and Motor Showroom)	401 Hume Highway	Yagoona	Bankstown	LGOV
Shop and Residence (attached)	65 William Street	Condell Park	Bankstown	LGOV
Shop, Rosen Chambers	346-350 Chapel Road	Bankstown	Bankstown	LGOV
Site of Crooked Billet Inn	724-734 Hume Highway	Yagoona	Bankstown	LGOV
Site of Liebentritt's Pottery	355 Waterloo Road	Chullora	Bankstown	LGOV
Site of Ranah	201A Rodd Street	Sefton	Bankstown	LGOV
Site of Royal Arms Inn	2-2A Hume Highway	Chullora	Bankstown	LGOV
Site of Speed the Plough Inn	321 Hume Highway	Bankstown	Bankstown	LGOV
Site of the Globe Inn	656 Hume Highway	Yagoona	Bankstown	LGOV
St Felix de Valois Pioneer Cemetery	347A Hume Highway	Bankstown	Bankstown	LGOV

The Homestead Building and Site	1a Lionel Street	Georges Hall	Bankstown	LGOV
Villawood Immigration Detention Centre	80-100 Miller Road	Chester Hill	Bankstown	LGOV
WSHC House, The Nest	22 Vimy Street	Bankstown	Bankstown	LGOV
WSHC House, Weymouth	10 Vimy Street	Bankstown	Bankstown	LGOV

There was a total of 99 records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study, LGOV = Local Government, SGOV = State Government Agency.
Note: While the Heritage Division seeks to keep the Inventory up to date, it is reliant on State agencies and local councils to provide their data. Always check with the relevant State agency or local council for the most up-to-date information.

Search Results

4 results found.

Bankstown Airport Airport Av	Bankstown Airport, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Bankstown Airport Air Traffic Control Tower Tower Rd	Bankstown, NSW, Australia	(Listed place) Commonwealth Heritage List
Bankstown Urban Conservation Area	Bankstown, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Vietnamese Boat People Monument Rickard Rd	Bankstown, NSW, Australia	(Nomination now ineligible for PPAL) National Heritage List

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