



Ordinary Meeting of Council

Wednesday 25 November 2020

4.00pm

Council Chambers

209 Comur Street, Yass

**ATTACHMENTS TO REPORTS
ITEMS UNDER SEPARATE COVER**

Ordinary Meeting of Council

Attachments to Reports
Items Under Separate Cover

Page No.

9.3	Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861	
	Attachment B. Wellington Road SPS Review of Environmental Factors	3



Wellington Road Sewage Pump Station and Rising/Gravity Main Stage 1

Review of Environmental Factors

July 2020

Report Number ISR18084

Prepared for Yass Valley Council



*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Wellington Road Sewage Pump Station and Rising/Gravity Main Stage 1- Review of Environmental Factors

July 2020

Report Number ISR18084

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All references to Public Works Advisory are taken to be references to the Department of Regional NSW for and on behalf of the State of New South Wales.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Declaration


This Review of Environmental Factors (REF) has been prepared by Public Works Advisory, Department of Regional New South Wales (DRNSW) on behalf of Yass Valley Council (YVC). The report presents the assessment of potential impacts that may result from activities associated with the Wellington Road sewage pump station and rising/gravity main Stage 1 proposal.

YVC is a public authority and a determining authority as defined in the *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposal satisfies the definition of an activity under the Act, and as such YVC must assess and consider the environmental impacts of the proposal before determining whether to proceed.

This REF has been prepared in accordance with Sections 5.5 and 5.7 of the EP&A Act and Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Reg). It provides a true and fair assessment of the proposed activity in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed activity. On the basis of the information available at the time of REF preparation it is concluded that:

- (1) the proposed activity is not likely to have a significant impact on the environment. An Environmental Impact Statement is not required.
- (2) the proposed activity is not likely to significantly affect threatened species, populations, ecological communities, or critical habitat. A Species Impact Statement (SIS) is not required.
- (3) the proposed activity is not likely to affect or being carried out on any Commonwealth land, or significantly affect any Matters of National Environmental Significance.

Subject to implementation of the measures to avoid, minimise or manage environmental impacts listed in this REF, the proposed activity is recommended to proceed.

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Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

Verification and Determination

Verifier

I have examined this REF and the Declaration by Michelle Moodley (the author) and accept the report on behalf of YVC.

Name	
Designation	
Organisation	
Signature	

Determination

I accept the report and determine that the activity may proceed.

Name	
Designation	
Organisation	
Signature	

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Table of Contents

	PAGE
DECLARATION	II
VERIFICATION AND DETERMINATION	III
TABLE OF CONTENTS	IV
LIST OF ABBREVIATIONS	VI
1 INTRODUCTION	1
1.1 Background to the Proposal.....	1
1.2 Proposal Objectives.....	1
1.3 Overview of the Proposed Works.....	1
1.4 Land Ownership.....	1
2 STATUTORY PLANNING FRAMEWORK	4
2.1 Environmental Planning Instruments.....	4
2.2 NSW Statutes.....	6
2.3 Commonwealth Statutes.....	9
2.4 Relevant Policies, Guidelines and Standards.....	10
2.5 Summary of Statutory Approvals.....	11
2.6 Consultation.....	12
3 PROJECT JUSTIFICATION AND OPTION EVALUATION	16
3.1 Project Justification.....	16
3.2 Option Evaluation.....	16
4 DESCRIPTION OF THE PROPOSAL	17
4.1 Design Principles.....	17
4.2 Description of the Proposed Works.....	17
4.3 Construction Methodology.....	25
4.4 Construction Environmental Management.....	26
4.5 Operation.....	26
5 ENVIRONMENTAL ASSESSMENT	27
5.1 Assessment Methodology.....	27
5.2 Land Use.....	27
5.3 Topography, Geology and Soils.....	31
5.4 Water.....	34
5.5 Flora and Fauna.....	37
5.6 Aboriginal and Historic Heritage.....	42
5.7 Noise and Vibration.....	46
5.8 Air Quality.....	50
5.9 Traffic and Access.....	51
5.10 Waste Management.....	52
5.11 Visual Amenity.....	53
5.12 Utilities and Infrastructure.....	53
6 ENVIRONMENTAL MANAGEMENT	55
6.1 Construction Environmental Management Plan.....	55
6.2 Environmental Management Measures.....	56
7. CONCLUSIONS	67
REFERENCES	68
APPENDIX A – PLANS	70

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

APPENDIX B – CONSIDERATION OF CLAUSE 228	71
APPENDIX C – CONSULTATION RESPONSES.....	73
APPENDIX D – DUE DILIGENCE HERITAGE ASSESSMENT	74
APPENDIX E – GEOTECHNICAL INVESTIGATION	75
APPENDIX F – DATABASE SEARCHES.....	76

LIST OF TABLES

	PAGE
Table 2-1 Odour Unit Criteria and Population Density	10
Table 2-2 Summary of Approvals and Requirements	12
Table 2-3 Agency Consultation	13
Table 4-1 Design Loads for the Wellington Road SPS	17
Table 5-1 Threatened Fauna Species Recorded within 10 km	38
Table 5-2 Construction Equipment Sound Power Level.....	46
Table 5-3 Intrusiveness and Amenity Noise Levels	49
Table 6-1 Construction Environmental Management Plan Structure.....	55

LIST OF FIGURES

	PAGE
Figure 1-1 Location Map of Yass.....	2
Figure 1-2 Locality of Wellington Road SPS and Rising/Gravity Main	3
Figure 2-1 Yass Valley LEP Zoning Map Extract.....	4
Figure 2-2 Yass Valley LEP Terrestrial Biodiversity Map Extract.....	5
Figure 2-3 Extract from Plan of Management for Yass Gorge	11
Figure 4-1 Wellington SPS and Rising Main Site Plan.....	20
Figure 4-2: Wellington Road Pumping Station Section	21
Figure 4-3: General Pipework Arrangement	22
Figure 4-4: Wellington Road SPS Section and Details	23
Figure 4-5: Wellington Road Rising/Gravity Main Proposed Route.....	24
Figure 5-1: General view of the Wellington Road SPS site.....	28
Figure 5-2: General view of the alignment within Meehan Street, looking north-east.....	29
Figure 5-3: General view of the alignment looking south-west from Therry Street and Meehan Street crossing	29
Figure 5-4: General view of the alignment, looking south-west at Plunkett Street and Meehan Street crossing	30
Figure 5-5: General view of the alignment looking north-east from Plunkett Street and Meehan Street crossing	30
Figure 5-6: View of rock outcrop near the drainage course/gully floor, looking north-west..	32
Figure 5-7: Yass Probable Maximum Precipitation Generalised Short Duration Method 0.5 Hr Critical Duration at the proposed SPS site	35
Figure 5-8: General view of the vegetation on the Wellington Road SPS site	38
Figure 5-9: Yass Valley LEP Heritage Map Extract Heritage	42
Figure 5-10: Aboriginal heritage sites in the vicinity of the proposed Wellington Road SPS and Rising/Gravity Main.....	44

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

List of Abbreviations

ADWF	Average Dry Weather Flow
AOBV	Areas of Outstanding Biodiversity Value
BC Act	<i>Biodiversity Conservation Act 2016</i>
BC Regulation	<i>Biodiversity Conservation Regulation 2017</i>
BOS	Biodiversity Offset Scheme
CEMP	Construction Environmental Management Plan
DICL	Ductile Iron Pipe
DN	<i>diametre nominal</i>
DPIE	Department of Planning, Industry and Environment -division (Water, Biodiversity and Conservation (formerly OEH)
EEC	Endangered Ecological Community
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ET	Equivalent Tenements
FM Act	<i>Fisheries Management Act 1994</i>
ICNG	Interim Construction Noise Guideline (DECCW, 2009)
LEP	Local Environmental Plan
LGA	Local Government Area
MH	Manhole
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	Office of Environment and Heritage (now DPIE)
OEMP	Operation Environmental Management Plan
OLAC	Onerwal Local Aboriginal Land Council

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

PS	Pump Station
POEO Act	<i>Protection of The Environment Operations Act 1997</i>
PWA	Public Works Advisory
PWWF	Peak Wet Weather Flow
REF	Review of Environmental Factors
SCA	Switchgear and Control Gear Assembly
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
SPS	Sewage Pump Station
SWMP	Soil and Water Management Plan
RMS	Roads and Maritime Services
SWMP	Soil and Water Management Plan
TMP	Traffic Management Plan
WM Act	<i>Water Management Act 2000</i>
YVC	Yass Valley Council

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

1 Introduction

This section provides an overview of the proposal.

1.1 Background to the Proposal

The town of Yass is located on the Hume Highway approximately 280km south-west of Sydney and 59km northwest from Canberra within the Southern Tablelands of NSW (see Figure 1-1). The Yass River, which is a tributary of the Murrumbidgee River, flows past the town. The population of the local government area (LGA) is approximately 16,500 (2011 Census).

YVC proposes to provide sewerage infrastructure to approved developments and new development areas (re-zonings) around Wellington Road in Yass. This development would facilitate the need for a new Wellington Road Sewage Pump Station (SPS) and transfer mains to transfer sewage from these new areas into the existing collection system.

The proposed new SPS and rising/gravity main is Stage 1 of a two-stage development proposed by YVC to provide sewerage infrastructure to service new developments in the Wellington Road area. The SPS is to be designed to accommodate the initial Stage 1 load of 200 Equivalent Tenement (ET) and ultimate Stage 2 load of 400 ET. Development would occur in two stages, with Stage 2 likely to occur in 20 years' time. It is noted that this REF does not assess the Stage 2 works.

1.2 Proposal Objectives

The principal objective of the proposal is to provide a SPS and transfer mains to transfer sewage from approved developments and new development areas around Wellington Road in Yass into the existing collection system.

1.3 Overview of the Proposed Works

The Wellington Road SPS would be constructed on Lot 9 DP1160355 between Meehan Street and Grand Junction Road. The proposed rising/gravity main would be located in the southern nature strip of Meehan Street, up to its intersection with Pritchett Street. The location of works is shown in Figure 1-1 and Figure 1-2.

The Stage 1 SPS and rising/gravity main works includes the following components:

- A 15 m x 38 m SPS comprising a wet well which would house 3 pumps;
- Outdoor type electrical switchboard;
- ADWF emergency storage;
- A 900m long transfer rising main and pressure/gravity main;
- Access road to the SPS;
- Additional associated infrastructure such as retaining walls for the SPS and fencing; and
- All associated works including roadworks, power supply upgrades and protected water supply to the site.

1.4 Land Ownership

The SPS and rising/gravity main would be located on land owned and managed by YVC.

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

Figure 1-1 Location Map of Yass

Source SIX Maps, 2018

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*



Figure 1-2 Locality of Wellington Road SPS and Rising/Gravity Main

Source: SIX Maps, 2018

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

2 Statutory Planning Framework

This section presents the statutory planning and strategic policy context for the proposal.

2.1 Environmental Planning Instruments

2.1.1 Yass Valley Local Environmental Plan 2013

Zoning

The proposal is located within the YVC local government area and are subject to the provisions of the Yass Valley Local Environmental Plan 2013 (LEP). The Wellington Road SPS site is zoned R2 Low Residential and RE1 Public Recreation under the LEP (see Figure 2-1). The route for the alignment of the proposed rising/gravity main is zoned R1 General Residential (see Figure 2-1). The proposed works are prohibited in these zones under the LEP.

However, development consent is not required for the pump station and rising/gravity main under *State Environmental Planning Policy (Infrastructure) 2007* (SEPP (Infrastructure) 2007), as per Section 2.1.2 below.

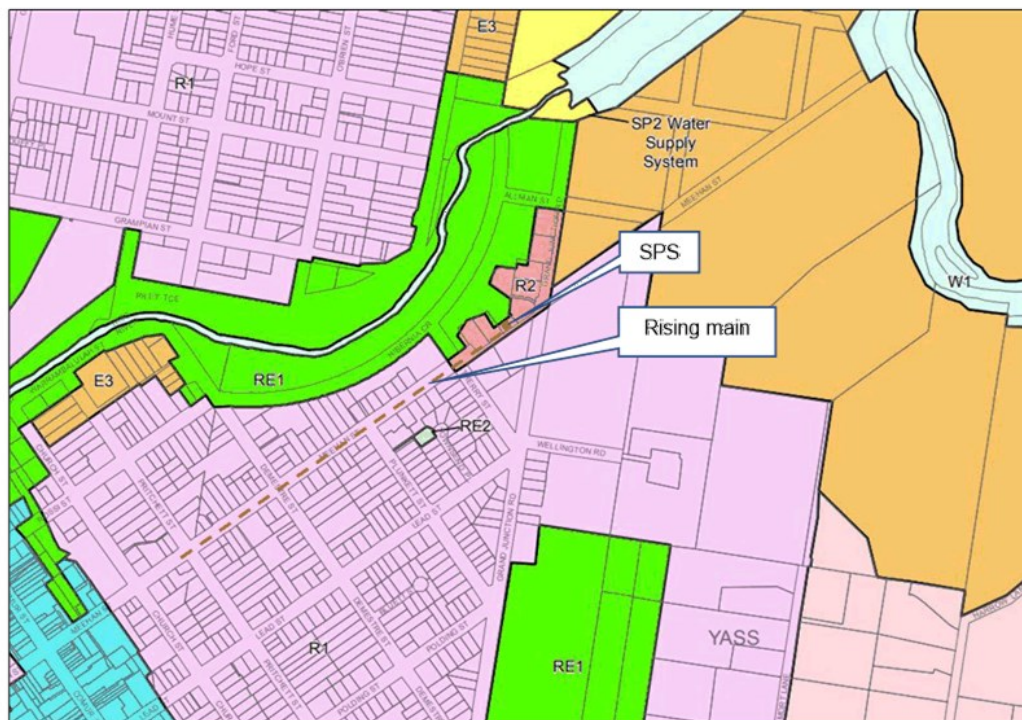


Figure 2-1 Yass Valley LEP Zoning Map Extract

Source: Yass Valley LEP 2013 Land Zoning Map 001H

Terrestrial Biodiversity Area

In accordance with the LEP, the proposed Wellington Road SPS is located within a terrestrial biodiversity area (see Figure 2-2). The proposal does not require development consent under the LEP and therefore LEP provisions in relation to terrestrial biodiversity do not apply.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Nevertheless, the issue of terrestrial biodiversity as relevant to the proposal is discussed in Section 5.5.



Figure 2-2 Yass Valley LEP Terrestrial Biodiversity Map Extract

Source: Department of Planning and Environment Planning Portal, accessed July 2018

2.1.2 State Environmental Planning Policy (Infrastructure) 2007

SEPP (Infrastructure) 2007 aims to assist in the effective delivery of public infrastructure throughout the State by improving certainty and regulatory efficiency through a consistent planning assessment and approvals regime for public infrastructure and services across NSW. The SEPP provides clear definition of environmental assessment and approval process for public infrastructure and services facilities.

Clause 106(3) of SEPP (Infrastructure) 2007 allows development for the purpose of sewage reticulation systems to be carried out by or on behalf of a public authority without consent on any land. Sewage reticulation systems are defined under clause 105 to include pipelines and pumping stations.

SEPP (Infrastructure) 2007 therefore allows the proposed Wellington Road SPS and rising/gravity main to proceed without the need for development consent.

2.1.3 State Environmental Planning Policy (Koala Habitat Protection) 2019

State Environmental Planning Policy (Koala Habitat Protection) 2019 aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

current trend of koala population decline. The SEPP does not apply to proposals assessed under Part 5 of the EP&A Act, however it has been taken into consideration for this proposal as the SEPP applies to the Yass LGA.

The proposed SPS and rising/gravity main would be located on previously disturbed land and is not considered potential or core Koala habitat under the SEPP. As such the provisions of the SEPP are not considered to apply to the proposal.

2.1.4 State Environmental Planning Policy 33 Hazardous and Offensive Development (SEPP 33)

The policy applies to any proposal that falls under the definition of “potentially hazardous (or offensive) industry” and aims to ensure that proposals are adequately assessed in relation to potential off-site risk. The Wellington Road SPS is considered potentially offensive due to the potential for emission of odours. The impact on air quality is addressed in Section 5.8 of this REF, including the management of odour generated at the SPS and consideration of the EPA's *Assessment and Management of Odour from Stationary Sources NSW* (2006).

However, it is noted that *State Environment Planning Policy (SEPP 33) Hazardous and Offensive Development* only applies to proposals that are assessed under Part 4 of the EP&A Act and require development consent. The proposal has been assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and therefore SEPP 33 does not apply.

2.2 NSW Statutes

2.2.1 Environmental Planning and Assessment Act 1979

The relevant environmental planning instrument for the proposal is SEPP (Infrastructure) 2007 which removes the requirement to obtain development consent. Therefore, the proposal has been assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). YVC is the proponent and the determining authority for the development.

This REF has been prepared in accordance with Section 5.5 of the EP&A Act, which requires that the proponent take into account to the fullest extent possible all matters affecting or likely to affect the environment due to the proposed activity. Consideration of the factors listed under Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) has been used to assist in assessing the significance of the proposal (see Appendix B).

2.2.2 Local Government Act 1993

The *Local Government Act 1993* principally deals with the legal and governance framework of local councils and county councils in NSW. Section 60 of the *Local Government Act 1993* (LG Act) states that a Council must seek approval from DPIE - Water to provide for sewage from its area to be discharged, treated or supplied to any person. The proposed works does not include the discharge, treatment or supply of sewage to any person and therefore a section 60 approval would not be required from DPIE – Water.

The Wellington Road SPS site is classified in the YVLEP as community land under the LG Act. For land which is classified “Community”, a draft Plan of Management (POM) is required. The proposal area is covered by the Plan of Management which applies to the land known as Yass Gorge. This is discussed further in Section 2.4.3.

2.2.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the statutory protection of Aboriginal cultural heritage places, objects and features.

A Due Diligence Heritage Assessment was undertaken by Past Traces Heritage Consultants for the proposal. The report is summarised in Section 5.6 and the full report is provided in Appendix D. The assessment identified no registered AHIMS sites within the proposal area or the immediate vicinity and concluded that the proposal has low potential to impact on unrecorded Aboriginal heritage sites or areas of potential archaeological deposit. No new Aboriginal heritage sites or areas of PAD were recorded or identified as a result of the assessment. Accordingly, no impact to Aboriginal heritage is expected as a result of this proposal and therefore no approval under the NPW Act would be required.

2.2.4 Heritage Act 1977

The *Heritage Act 1977* protects and aims to conserve the environmental heritage of New South Wales. Environmental heritage is broadly defined under Section 4 of the *Heritage Act 1977* as consisting of "those places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance" (*Heritage Branch, DoP 2009:4*). Aboriginal places or objects that are recognised as having high cultural value (potentially of local and State significance) can be listed on the State Heritage Register and protected under the provisions of the *Heritage Act 1977*.

The Due Diligence Heritage Assessment undertaken for the proposal (see Appendix D) included a review of heritage registers that revealed no recorded heritage sites within the proposal area. One locally significant item under the LEP – A288 the Riverside Camp, identified as a place of Aboriginal significance is located to the north of the proposal area at a distance to the proposed works and will not be impacted within the registered site boundaries. Accordingly, no impact to heritage sites is expected as a result of this proposal and therefore no approval under the *Heritage Act 1977* would be required.

2.2.5 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) regulates air, noise, land and water pollution. The Environment Protection Authority (EPA) is generally responsible for implementing the POEO Act, and would be the appropriate regulatory authority for the proposal.

The proposal is a Scheduled Activity under Schedule 1 of the POEO Act and as such, Yass Valley Council requires an environmental protection license (EPL) for the Wellington Road SPS. As the activity is both scheduled under the POEO Act and being undertaken by a Public Authority, the EPA would be the Appropriate Regulatory Authority in relation to environmental pollution matters.

The EPA has advised that the proposed Wellington Road SPS and rising/gravity main would be captured under Environment Protection Licence No. 1730 granted by the EPA under the POEO Act for the Yass Sewage Treatment Plant and associated reticulation system (see Section 2.6 of this REF).

Section 120 of the POEO Act states that it is an offence to pollute waters without a licence. Any discharges from the Wellington Road SPS would be licenced under the operational Environment Protection Licence. The construction works can proceed without causing water pollution and a licence under s120 of the POEO Act would therefore not be required.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Other relevant provisions of the POEO Act include:

- Section 115 – It is an offence to dispose of waste in a manner that harms or is likely to harm the environment.
- Section 116 – It is an offence to cause any substance to leak, spill or otherwise escape (whether or not from a container) in a manner that harms or is likely to harm the environment

2.2.6 Protection of the Environment Operations (Waste) Regulation

The *Protection of the Environment Operations (Waste) Regulation 2014* sets out the provisions with regards to non-licensed waste activities and non-licensed waste transporting, in relation to the way in which waste must be stored, transported, and the reporting and record-keeping requirements. The disposal of construction and any operational waste would be required to comply with this regulation.

2.2.7 Water Management Act 2000

The objects of the *Water Management Act 2000* (WM Act) are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations. It is considered that no approval or licence under this Act would be applicable to the development.

2.2.8 Roads Act 1993

Section 138(1) of the *Roads Act 1993* requires the consent of the appropriate roads authority to (generally) undertake works over a public road. Subsection (3) states that if the applicant is a public authority, the roads authority must consult with the applicant before deciding whether or not to grant consent or concurrence.

The works require trenching and installation of the rising/gravity main within the Meehan Street road reserve, for which Council is the appropriate roads authority.

2.2.9 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) protects species of threatened flora and fauna, endangered populations and endangered ecological communities and their habitats in NSW.

Under the BC Act, proponents of activities assessed under Part 5 of the EP&A Act must apply the test of significance to assess biodiversity impacts. The test of significance (under s.7.3) determines whether the proposed activity is likely to significantly affect threatened species or ecological communities, or their habitats. If the activity is likely to have a significant impact, or will be carried out in a declared Area of Outstanding Biodiversity Value (AOBV), the proponent must either apply the Biodiversity Offsets Scheme (BOS) or prepare a species impact statement (SIS).

Biodiversity Offset Scheme

The BC Act establishes the Biodiversity Offset Scheme (BOS). The BOS Threshold is a test used to determine when it is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (the BAM) to assess the impacts of a proposal.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

The *Biodiversity Conservation Regulation 2017* (BC Regulation) sets out threshold levels for when the BOS will be triggered. The threshold has two elements:

- Whether the amount of native vegetation being cleared exceeds a threshold area, or
- Whether the impacts occur on an area mapped on the Biodiversity Values Map:

The BOS applies to development assessed under Part 4 of the EP&A Act that is likely to significantly affect threatened species or triggers the **BOS threshold**, or activities assessed and determined under Part 5 of the EP&A Act, if proponents chooses to 'opt in' to the Scheme. The proposal is being assessed under Part 5 of the EP&A Act and YVC have not opted in on the BOS. Furthermore, the proposal would not involve the clearing of native vegetation that would exceed the thresholds listed under Clause 7.23 of the BC Regulation and the proposed new SPS and rising/gravity main are not located on land mapped as an AOBV on the Biodiversity Values Map published under the BC Regulation.

A test of significance under section 7.3 of the BC Act has been prepared to determine whether the proposal is likely to significantly affect threatened species or ecological communities and is provided in Section 5.5.1. The test of significance confirmed that the proposed works would not have a significant impact on threatened species or ecological communities. As such, no approval under the BC Act or SIS is therefore required.

2.3 Commonwealth Statutes

2.3.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for Commonwealth involvement in development assessment and approval in circumstances where there exist 'matters of national environmental significance'. Matters of national environmental significance include:

- world heritage properties
- national heritage places
- wetlands of international importance
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas development and large coal mining development.

No matters of national environmental significance as listed under the EPBC Act would be impacted by the proposal (see Section 5.5 of this REF).

2.4 Relevant Policies, Guidelines and Standards

2.4.1 Licensing Guidelines for Sewage Treatment Plants (EPA, 2003)

These guidelines have been prepared by the NSW Environment Protection Authority (EPA) to help licensees in non-metropolitan areas, generally local councils and other water authorities, understand the process for licensing whole sewage treatment systems.

The guideline is largely concerned with reducing overflows from sewerage systems. The design of the proposed SPS has been based upon the review of the existing sewer catchment ensuring that it has sufficient capacity and emergency storage to minimise the risk of any discharges to the environment.

2.4.2 Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DECCW, 2006)

The framework adopts odour performance criteria, which are based on a sliding scale relating to the population density of an area, as the response to an odour impact, can vary significantly over a given population. The criteria assumes that within a densely populated area there would be a greater potential for individuals within the community to be 'annoyed' by a given odour event as detailed in Table 2-1 below.

Table 2-1 Odour Unit Criteria and Population Density

Population of Affected Community	Criteria (OU)
Urban (>~2000) and/or schools and hospitals	2
~ 500	3
~ 125	4
~ 30	5
~ 10	6
Rural single residence (≤ 2)	7

Source: Department of Environment, Climate Change and Water Technical framework: assessment and management of odour from stationary sources in NSW November 2006

The SPS site is located within a grassed paddock. The SPS site is located within 20 m of residential developments. Based on the distance to and the density of the community potentially affected by the SPS, it is considered that criterion of 5-6 OU at surrounding residents would apply. (see Section 5.8).

2.4.3 Plan of Management for Yass Gorge 2017-2027

The Plan of Management for Yass Gorge states that the core objectives for management of the Yass Gorge, under s36J of the *Local Government Act 1993*, are:

- a) *To ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and*

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

- b) To protect the aesthetic, heritage, recreational, educational and scientific values of the land, and
- c) To promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and
- d) To restore degraded bushland, and
- e) To protect existing landforms such as natural drainage lines, watercourses and foreshores, and
- f) To retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and
- g) To protect bushland as a natural stabiliser of the soil surface.

The core objectives listed above and the Management Actions listed in Table 1 of the Plan of Management (for Natural Areas) relate specifically to the three types of land described, being natural features, land containing threatened species/communities, and Crown Land. The SPS site is not considered to be one of these land types. Furthermore, the SPS is located on the very edge of the nominal Gorge boundary, with the works to be temporary with a small area of disturbance and subject to mitigation measures to minimise impacts on the surrounding environment. Accordingly, these works are not expected to contravene any of the stated objectives for the Gorge in the Plan of Management.

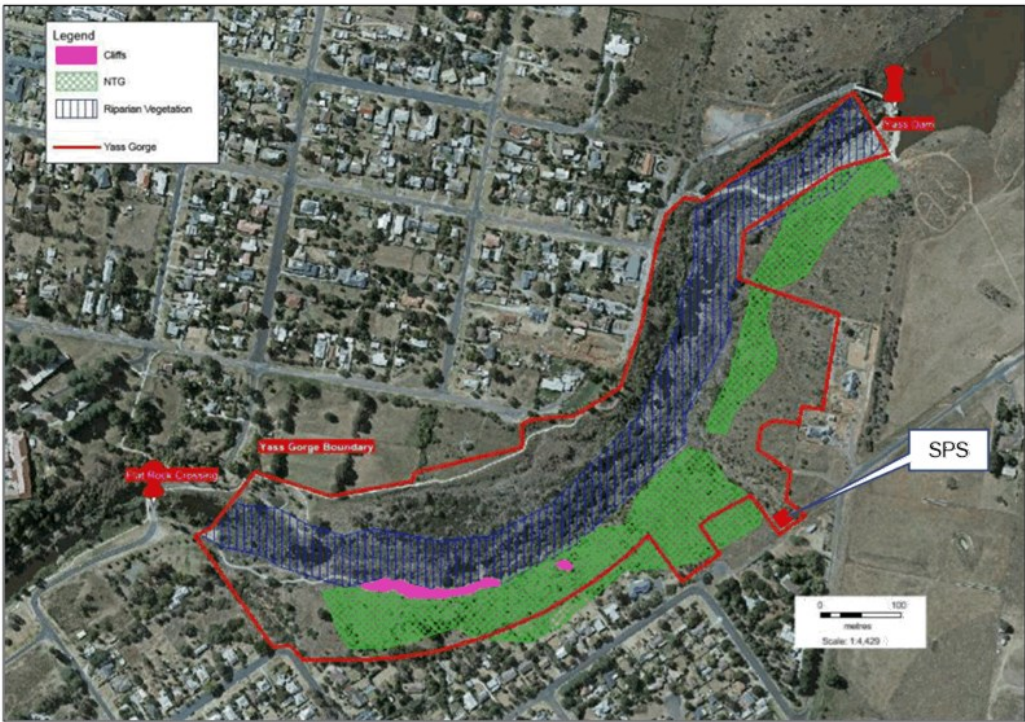


Figure 2-3 Extract from Plan of Management for Yass Gorge

2.5 Summary of Statutory Approvals

The following table provides a summary of the statutory approvals required for the proposal.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Table 2-2 Summary of Approvals and Requirements

Agency	Requirements	Reference
YVC	Determination of the proposal Rising/gravity main installation in road reserve	Pt 5 of EP&A Act s138 of Roads Act consent
EPA	Variation to Environment Protection Licence No. 1730	Section 58 of POEO Act

2.6 Consultation

Relevant government agencies were consulted during the preparation of the REF. A list of agencies contacted and a summary of their response is provided in Table 2 3 below. Copies of the responses received are contained in Appendix C.

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

Table 2-3 Agency Consultation

Agency	Summary of Comments	Addressed in REF
Environment Protection Authority (EPA)	Proposed works would be captured under EPL No. 1730 for the Yass STP	Section 2.2.5
	Construction Construction activities should be carried out with due diligence and use best environmental management practices. Council should be aware of provisions of POEO Act. Works are in close proximity to residential areas and should consider impacts to community, especially noise and dust. Personnel involved in construction should be aware of details of construction plans, relevant legislation and pollution controls and environmental sensitivity of surrounding area.	Sections 2.2.5 and 2.2.6 Sections 5.2, 5.7, 5.8 5.9 and 5.11 Section 6
	Water pollution, sediment and erosion controls Under the POEO Act it is an offence to pollute water. REF must consider and detail all potential water pollution control measures including sediment and erosion controls as well as operational procedures required to prevent pollution of waters. Measures should be in accordance with volumes 1 and 2A of the "Managing Urban Stormwater – Soils and Construction" (Landcom, 2004) document.	Sections 5.3, 5.4 and 6.2.2
	Noise Management Works are in close proximity to residential areas therefore best practices to mitigate noise should be undertaken. REF to consider all potential impacts of construction noise to nearby sensitive receptors in accordance with "Interim Construction Noise Guideline" (DECC., 2009) and detail mitigation measures. Should REF identify any potential noise impacts on nearby sensitive receivers from ongoing operation of the SPS, these impacts would need to be addressed in accordance with the EPAs <i>Noise Policy for Industry</i> (2017).	5.7 6.2.5

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

Agency	Summary of Comments	Addressed in REF
	Air quality impacts and dust management The REF should detail dust mitigation and management procedures to reduce potential pollution to any sensitive receivers in accordance with the POEO Act and the "Managing Urban Stormwater – Soils and Construction" (Landcom, 2004) document. REF to also detail potential odour impacts to nearby sensitive receivers from proposal and measures to mitigate impacts. Odour impacts to be assessed in accordance with the <i>Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW</i> (DEC, 2006)	Section 5.8
	Waste Management REF to consider potential waste produced by construction works which should be classified under <i>Waste Classification Guidelines Part 1: Classifying Waste</i> and managed and disposed of in accordance with the POEO Act and POEO Waste Regulation (2014). All wastes generated by the proposed works must be disposed of lawfully and at appropriate waste facilities.	Sections 5.10 and 6.2.8
Office of Environment and Heritage (OEH)	Flooding The Yass Flood Study 2016 indicates that the SPS is located within flood prone land, immediately adjacent to a minor tributary of the Yass River. Designs for infrastructure on flood prone land should involve Council and PWA considering and being satisfied that the floodplain risk management risks have been adequately addressed in the REF.	Section 5.4
	Biodiversity The REF should assess ecological impacts in accordance with the <i>Biodiversity Conservation Act 2016</i> . It is recommended that impacts be addressed in accordance with the avoid, minimise and offset hierarchy established in the OEH offsetting principles and relevant legislation. There are records of Superb parrot (<i>Polytelis swainsonii</i>), a threatened species under the BC Act 2017. Parts of the site are likely to be Natural Temperate Grassland, which is listed in the EPBC Act 1999. The project may need to be referred to the Commonwealth Department of Energy and Environment for consideration.	Sections 2.3.1 and 5.5

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Agency	Summary of Comments	Addressed in REF
	It is recommended that the appropriate surveys are completed to identify impacts on threatened species, including threatened birds and reptiles which may be present in the Natural temperate Grassland.	
	Aboriginal Cultural heritage A Due Diligence Assessment by a qualified archaeologist is supported. The proposed works are located within an archaeologically sensitive landform because they are within 200m of the Yass River. The potential for Aboriginal objects to occur within the project footprint must be considered. If aboriginal objects are likely to be harmed an AHIP would be required from OEH under the NPW Act 1974.	Section 5.6
Department of Planning, Industry and Environment- Water Division (DPIE - Water)	No response received.	N/A

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

3 Project Justification and Option Evaluation

This section provides the justification for the proposal and a summary of the water supply options considered. It has been summarised from the Wellington Road Sewage Pump Station Rising Main Concept Design report, Public Works Advisory, July 2017.

3.1 Project Justification

3.1.1 New Developments

The justification for the proposed SPS and rising/gravity main is linked to new developments in the local government area that would require additional sewage infrastructure. YVC has committed to provide sewerage infrastructure to such approved developments and re-zonings. Wellington Road SPS would be required to cater for residential development including future development to the east of the proposed SPS and the connection of 8 lots in Meehan Street and Guginya Place.

Ultimately the proposed SPS would cater for 400 equivalent tenements (ET) in 20 years' time.

3.1.2 Flow Capacity

The gravity mains downstream of the discharge from the new Wellington Road SPS have been assessed to determine whether it can accommodate the new inflows. Assessment has indicated that the capacity of the receiving gravity network directly downstream has sufficient capacity for Stage 1 flows of 14.0 L/s from the Wellington Road SPS.

3.2 Option Evaluation

3.2.1 Rising/Gravity Main Options

Two rising/gravity main options were considered to handle the initial and future Stage 2 flows. Either one *diametre nominal* (DN) 150 pipe or twin DN100 pipes could be provided. It is understood from YVC that the pumping station ultimate load of 400 ET would only be reached in 20 years' time.

As such, to achieve self-cleansing velocities in the interim, two DN 100 rising/gravity mains would be provided in a common trench rather than one main. One main would be filled with water and would not be used to transfer sewage until Stage 2 is required.

Pipe materials such as Ductile Iron (DICI), Polyethylene and Modified Poly vinyl chloride has been considered. Since the length is relatively short and in order have a higher self-cleansing velocity (> 0.6 m/s for DN 100 pipe), DICI pipe material has been selected for the rising/gravity main.

3.2.2 Do Nothing Option

The 'do nothing' option does not meet the proposal objectives and is therefore not considered acceptable.

3.2.3 Preferred Option

The preferred option is the construction of the new SPS and two DN 100 DICI rising/gravity mains.

4 Description of the Proposal

This section provides a description of the proposal which is assessed in this REF. Information in this section has been summarised from the Wellington Road Sewage Pump Station Rising Main Concept Design report, Public Works Advisory, July 2017.

4.1 Design Principles

The SPS is to be designed to accommodate the initial Stage 1 load of 200 Equivalent Tenement (ET) and ultimate Stage 2 load of 400 ET. Development would occur in two stages, with Stage 2 (which is not assessed in this REF) likely to occur in 20 years' time. The pumps and electrical designs would be based on meeting Stage 1 loads, whereas the civil structures and rising/gravity mains would be designed for the ultimate Stage 2 loads. The design loads are listed below in Table 4-1.

Table 4-1 Design Loads for the Wellington Road SPS

Design	Stage 1 Design Loading	Stage 2 Ultimate Loading
Design ET	200 ET	400 ET
Average Dry Weather Flow Rate (ADWF) (L/s)	2.22	4.44
Peak wet weather flow (PWWF) (L/s)	14.5	27.6
Pumped flow rate (L/s)	14.5	28

4.2 Description of the Proposed Works

The following infrastructure and staging is proposed for the for the new SPS and rising/gravity main:

- A 3.6 m diameter wet well is being proposed to house three pumps (2 duty/1 standby) and to cater for Stage 2 loading and to provide part of the emergency storage. The wet well would be 4.65 m deep with the lower 2.8 m within rock.
- Sewage pumps in the following stages:
 - Stage 1: Two pumps with a smaller trimmed impeller operating in duty/standby configuration for 14 L/s with provision to increase capacity to 20 L/s.
 - Stage 2: Install a third pump (two duty, one standby) to handle the ultimate flows for 400 ET capacity to 28 L/s.
- An outdoor type electrical switch board for Stage 1 (two pumps). A new switchboard compartment is to be added to the switchboard to facilitate the installation/operation of the 3rd pump for Stage 2.
- Provision for an 8 hours ADWF emergency storage (within the precast concrete storage structures and within the wet well).
- A new 900m long transfer rising main and pressure/gravity main

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

- 350 m rising main with a manhole (MH) at the high point. The rising main would consist of two pipes in a common trench (Stage 1 a single main and Stage 2 both mains).
- A gravity main with manholes which would discharge into a new manhole which would connect to the existing downstream manhole at the corner of Pritchett Street and Meehan Street.
- A vehicular access road to the pumping station site to facilitate with operation and maintenance.
- Retaining walls to provide a level surface around the SPS and roadworks due to the site topography.
- Ancillary works including fencing and protected water supply to the site.
- Power supply upgrade works.

Concept drawings for the SPS and rising/gravity main are provided below in Figure 4-1 to Figure 4-5 and Appendix A.

4.2.1 Emergency Storage

The storage tank would be located adjacent to the access road. An automatic flushing facility would be provided for the emergency storage tanks. It is a common accepted practice to provide 8 hours of emergency storage based on the ADWF. This has been adopted in the Wellington Road SPS. The ADWF is 4.44 L/s, therefore, the 8-hour storage volume would be 128 kL.

4.2.2 Mechanical and Electrical Works

Stage 1 would comprise two pumps (one duty and one standby pump) with a pump rate of 14 L/s. Stage 2 would comprise three pumps (two duty and one standby pump) with a rate of 28 L/s.

The power supply to the site shall be obtained from the nearby high voltage line approximately 50 m away from the pump station location. The pump station operation would utilise 2 x 15 kW submersible pump motors. Telemetry control would not be required since there is a direct line of sight to a radio tower approx. 3 km away when a radio antenna is mounted on a pole.

The electrical works would include the following:

- a 100-kVA pole mounted transformer
- switchgear and control gear assembly (SCA) – weather proof, sheltered, IP56 rated system to be located 1000 mm above ground level on a platform
 - a 63 A rated connection socket for the SCA
 - a temporary back up power generator for the SCA
- telemetry system with radio communication back to base for monitoring.

4.2.3 Rising Main

The proposed rising main would be from the SPS to a new MH at the high point, approximately chainage 350 m from the SPS. The proposed route for the rising main is provided in Figure 4-4.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

4.2.4 Gravity Main

From the high point at chainage 350 m to chainage 900 m, the design would be a gravity sewer main with manholes in between with a maximum spacing of 100m, and the last manhole would be located at chainage 900 m.

The new gravity section would be designed to handle the ultimate flow rate of 28 L/s.

4.2.5 Access Road

The proposed access road and hardstand area would be surfaced with two coats bitumen seal. The design would provide adequate space for small trucks (5.6m long) to do a 3-point turn and vehicles would access the storage area in reverse if required.

4.2.6 Earthworks and Geotechnical Considerations

SPS

Excavations in ignimbrite bedrock would be required for the construction of the wet well, storages and inter-connecting pipeline. At the proposed wet well, excavations in bedrock would require a large hydraulic excavator (minimum 20 tonne) with assistance from a rock breaker. Below 2.5m, blasting or use of non-explosive demolition agents would be required in slightly weathered, very strong bedrock, with unfavourable defect spacing.

The topsoil is not considered to be suitable for re-use as engineered fill and should be put to spoil or stockpiled for landscaping purposes. Fill would need to be imported from a suitable borrow area.

For the pumping station well, the proposed structure would be founded some 3.5m to 3.8m below existing surface level and within slightly weathered dacitic ignimbrite bedrock. In case of the emergency storages, the founding levels would be some 1.5m to 2.8m below existing levels and within moderately weathered to slightly weathered bedrock. Consequently, bearing capacity is many orders higher than the proposed loading while settlement is not an issue.

Rising/Gravity Main

Construction difficulties associated with permanent groundwater are not envisaged. However, it should be noted that presence of seepage is subject to prevailing weather conditions at the time of construction and may vary from that recorded on the borehole logs.

Excavations in extremely weathered to highly weathered volcanic bedrock should be possible using a large hydraulic excavator (minimum 20 tonne). Some assistance from ripper/rock breaker may be required in highly weathered bedrock. Furthermore, the possibility of encountering some less weathered interbeds within the likely excavation depths should not be totally discounted. If encountered, excavation within these zones is also likely to require assistance from a ripper/rock breaker.

Very difficult excavations in moderately weathered or better-quality bedrock may be expected on the approaches to the sewage pumping station, where this quality bedrock was encountered at 0.7m depth. Depths in the order of 2m are likely to be achieved with assistance from a rock breaker.

Use of non-explosive demolition agents would be required in areas where defect spacing is unfavourable.

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

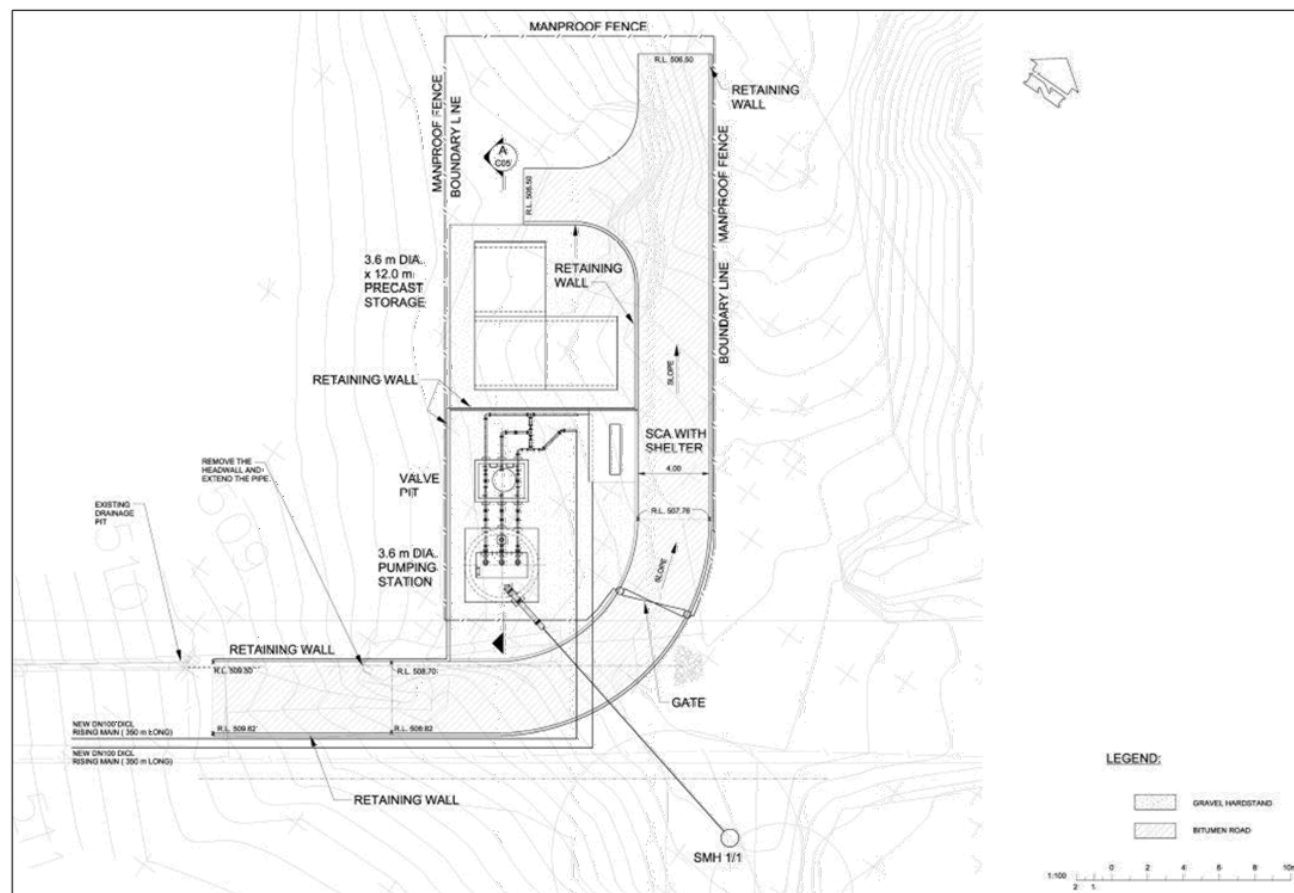


Figure 4-1 Wellington SPS and Rising Main Site Plan

Source: PWA 2018

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

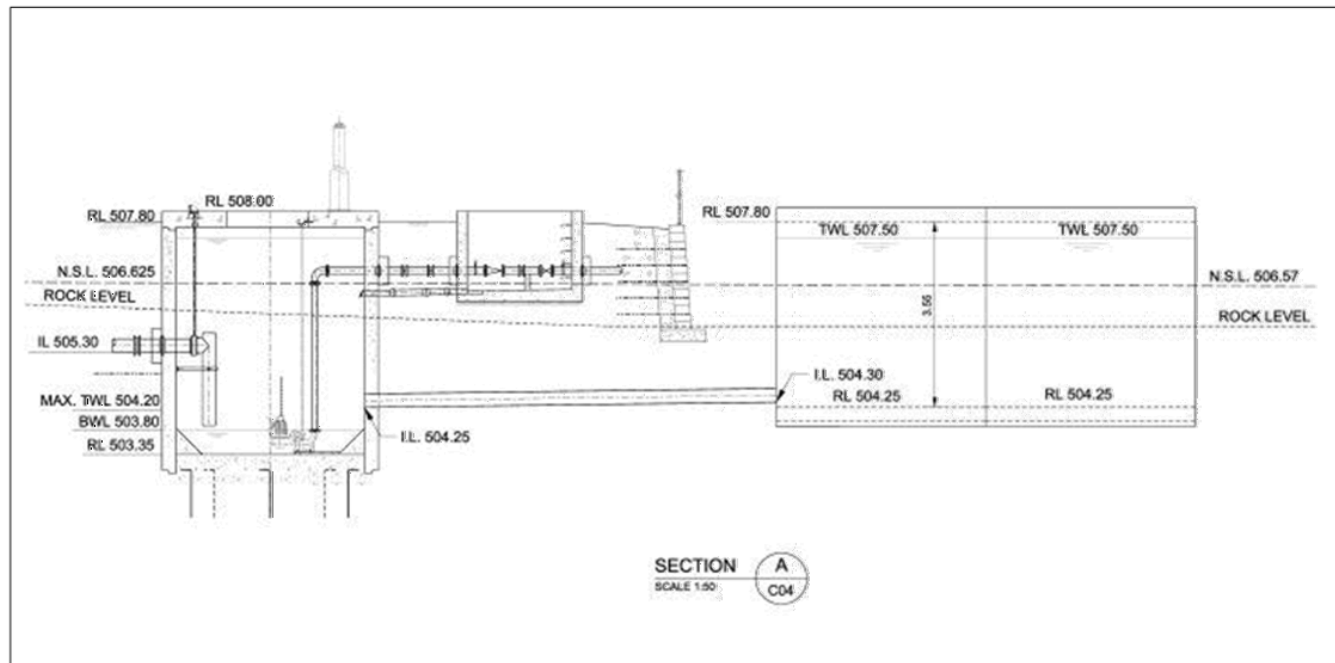
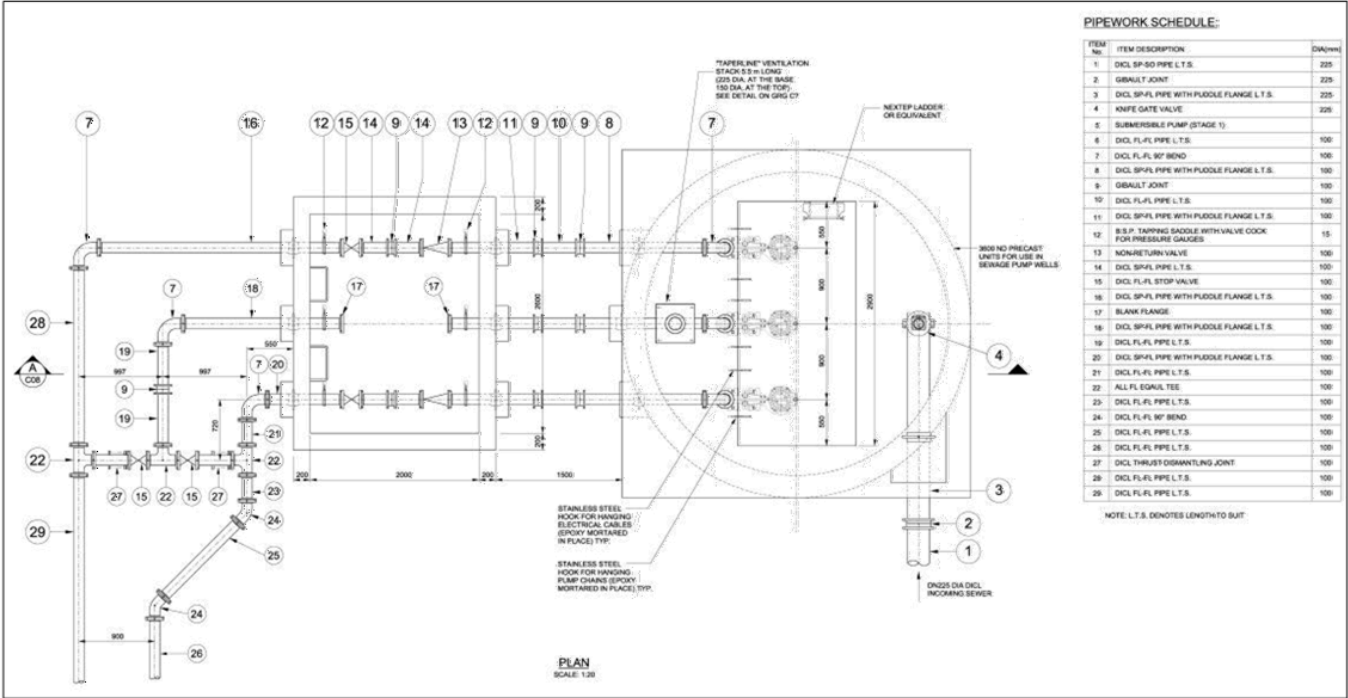


Figure 4-2: Wellington Road Pumping Station Section

Source: PWA 2018

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors



Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors

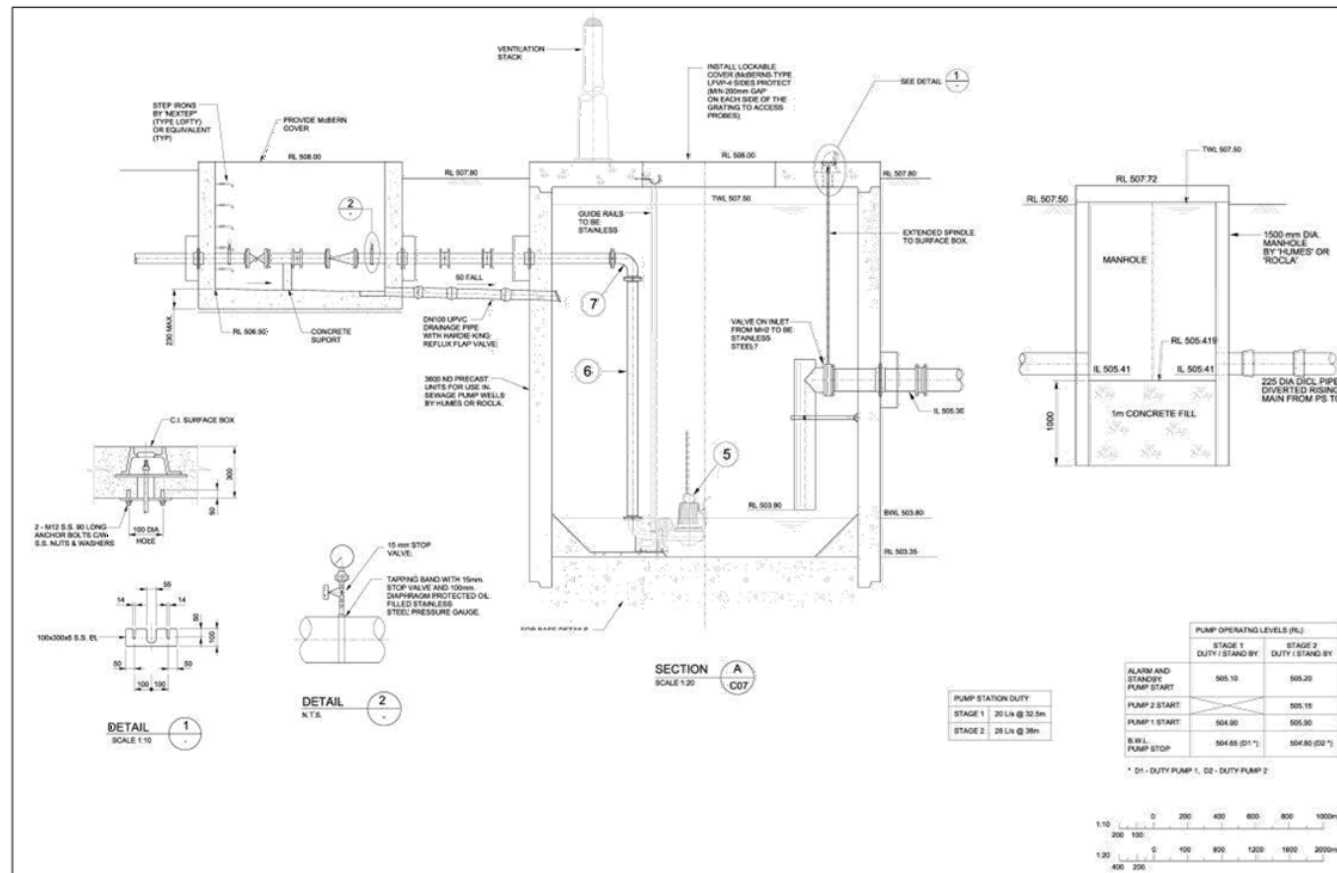


Figure 4-4: Wellington Road SPS Section and Details

Source: PWA 2018

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*



Figure 4-5: Wellington Road Rising/Gravity Main Proposed Route

Source: PWA 2018

4.3 Construction Methodology

The proposed construction methodology would be dependent on several factors including the contractor's chosen method, equipment, and program. A construction methodology has been predicted based on previously constructed similar sized projects.

Works are anticipated to start in July/August 2019 with a construction period up to 50 weeks.

The rising/gravity mains would be constructed using traditional open-cut trench excavation, pipe laying and trench backfilling similar to the requirements for sewer construction. For open-cut trench lengths of pipeline and around scour points/air valves, restoration of the surface to as near as possible the preconstruction condition would be required. Thrust boring or directional drilling would be undertaken at the Therry Street, Plunket Street, Demestre Street and Pritchett Street road crossings.

The general methodology for SPS and the rising/gravity main works is likely to involve the following steps:

- Establish environmental and traffic controls and site fencing;
- Establish worker compound, storage and set down areas;
- Removal of existing fencing around the SPS site;
- Excavate trenches/wells;
- Stockpile excavated topsoil separately;
- Construction of concrete sewer wet wells, valve wells and macerator wells;
- Construction and extension of curtain walls around the perimeter of the site;
- Construction of concrete slabs for SPS lids;
- Installation of SPS covers, grates and frames;
- Installation of permanent onsite lifting and access gantry;
- Provide all pipework and associated fittings relating to sewer drainage for the project;
- Installation drainage pipework and associated fixtures and fittings to complete the upgrade works;
- Installation of sewage pumps, associated equipment and electrical control panels;
- Construction of rising/gravity main;
- Backfill using excavated soil and topsoil. The disturbed areas would be stabilised;
- Restore disturbed areas;
- Remove environmental controls only once the site is stabilised.

4.3.1 Construction Equipment

The following construction equipment may be required:

- Bobcat
- Backhoe/excavator
- Trenching machine

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

- Small trucks carrying construction materials
- Compressor, concrete vibrator, concrete mixer
- Dewatering pump (to pump out stormwater and groundwater if required)
- Concrete cutter/ jackhammer/ rock breaker
- Boring machine and ancillary pumps and holding tanks
- Passenger vehicles to transport construction workers.

4.4 Construction Environmental Management

Construction of the proposal would be undertaken in accordance with a Construction Environmental Management Plan (CEMP) that would be prepared by the construction contractor/s and approved by YVC prior to commencement. The CEMP would incorporate all of the mitigation measures identified in this REF as well as any conditions of approval and any other licence/approval conditions. The CEMP would also incorporate an emergency response plan in case of a pollution incident, a complaints handling procedure and a 24-hour telephone contact number. The complete list of the mitigation measures recommended in this REF is provided in Section 6.

4.5 Operation

During operation of the SPS and rising/gravity main, access may be required for inspections and maintenance. Submersible pumps would need to be lifted out of the wet well from time to time for maintenance. Either a truck mounted crane or a monorail beam with removable chain block lifting system can be used to remove the pump for maintenance, when required.

The pumping station components are expected to have a design life of 15 to 20 years.

5 Environmental Assessment

This section identifies and characterises the existing environment, the likely potential impacts associated with the construction and operational phases of the project and any associated mitigation measures. Where considered necessary, feasible mitigation measures are identified for implementation as part of the YVC's environmental management.

5.1 Assessment Methodology

The key objectives of this assessment are to:

- Identify those facets of the environment likely to be affected by the proposal during both construction and operation;
- Identify the sensitivity of the site;
- Identify and characterise the associated impacts; and
- Identify and evaluate feasible mitigation measures for the identified impacts.

Environmental issues of potential relevance to the proposal include:

- Land use and ownership
- Topography, geology and soils
- Surface water quality and hydrology
- Groundwater
- Flora and fauna
- Heritage (Aboriginal and historic)
- Noise and vibration
- Air quality
- Traffic and access
- Waste management
- Visual amenity
- Utilities and infrastructure

5.2 Land Use

The Wellington Road SPS would be constructed on Lot 9 DP1160355 between Meehan Street and Grand Junction Road on the eastern periphery of the town's built-up area. The proposed rising/gravity main would be located in the southern nature strip of Meehan Street, up to its intersection with Pritchett Street. The location of works is shown in Figure 1-2.

The SPS site is located within a grassed paddock. To the north-east/east, the site is bounded by a drainage course/gully which collects stormwater run-off from surrounding slopes and drains to Yass River. The site has a lush grass cover (see Figure 5-1) with a stand of trees lining the drainage gully. The greater lot (Lot 9 DP1160355) on which the proposed SPS is located is one of many parcels of land comprising Yass Gorge, with the SPS to be located on the edge of Gorge area. The Yass Gorge is located on the Yass River, between Flat Rock

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Crossing and Yass Dam, and is utilised for passive recreation activities such as hiking and bird watching as it overlooks the Yass River. The Yass Gorge is covered under the Yass Gorge Plan of Management (see Section 2.4.3).

The proposed alignment of the rising/gravity main from the SPS site to the new sewer manhole in vicinity of Meehan Street and Pritchett Street intersection is shown in Figure 4-5. Generally, the alignment is located within the southern road reserve of Meehan Street, apart from some 60m section which is in the road.

The alignment crosses Therry Street, Plunkett Street, Demestre Street and Pritchett Street, as well as numerous concrete and gravel driveways. Generally, the road reserve is grassed with occasional mature trees in vicinity of the alignment (see Figure 5-3, Figure 5-4 and Figure 5-5).



Figure 5-1: General view of the Wellington Road SPS site

Source: PWA, 2018

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*



Figure 5-2: General view of the alignment within Meehan Street, looking north-east

Source: PWA 2018



Figure 5-3: General view of the alignment looking south-west from Therry Street and Meehan Street crossing

Source: PWA 2018

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*



Figure 5-4: General view of the alignment, looking south-west at Plunkett Street and Meehan Street crossing

Source: PWA 2018



Figure 5-5: General view of the alignment looking north-east from Plunkett Street and Meehan Street crossing

Source: PWA 2018

5.2.1 Impact Assessment

Construction

The proposed SPS works would be located within Lot 9 DP1160355 which is currently vacant and owned by YVC. The proposed rising/gravity main would be generally located within a road reserve that is owned and managed by YVC. The alignment would also be required to cross driveways. The main impacts to land use in the vicinity of the SPS site and the rising/gravity main alignment would be related to construction noise and access (discussed in Section 5.7 and 5.9 below), including some temporary disruption to residents accessing driveways along the rising/gravity main alignment. However due the temporary nature of the works, these impacts are not anticipated to be significant, assuming the proper implementation of the mitigation measures provided in Section 5.2.2.

Operation

No impact to land use is expected post construction.

5.2.2 Mitigation Measures

- Prior to commencement of construction activities, all necessary approvals, permits, licences and agreements would be obtained from the relevant authorities.
- No construction activities (e.g. vegetation removal, stockpiling etc.) would be undertaken on private property adjoining the alignment without prior approval. Appropriate security, supervision and access controls would be put in place and properly monitored to ensure no access by unauthorized personnel, either to the work area or via the work area to adjoining areas not under the ownership of YVC.
- Consultation would be undertaken with all affected landowners or the community for the potential impact on land uses during construction and any safeguards or mitigation measures that need to be implemented during the works.
- The contractor would be required to ensure the necessary care and maintenance of property facilities and operations including fences and gates. However, if any damage did occur to property it would be restored to a condition equivalent to the original condition. Any temporary fencing or gates no longer required would be removed at the completion of the construction works.

Operation

- Council could provide a 24-hour telephone number so that any issues relating to the operation of the new infrastructure can be clarified and complaints dealt with by those able to respond.

5.3 Topography, Geology and Soils

The following description of the proposal area is summarised from the Geotechnical Investigation undertaken by PWA in April 2018.

Topography

The SPS site is located within a sloping grassed paddock. To the north-east/east, the site is bounded by a drainage course/gully which collects stormwater run-off from surrounding slopes and drains to Yass River. The site slopes at low to moderate gradients to the north-east. Bedrock crops out intermittently on the lower slope approaching the gully floor, especially in

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

the northern/north-western parts of the site (see Figure 5-6). The outcrop on the lower slope/banks of this drainage course becomes more evident and massive to the north-west of the site, on the approaches to the Yass River.



Figure 5-6: View of rock outcrop near the drainage course/gully floor, looking north-west

Source: PWA, 2018

The topography along the alignment rises at gentle gradients, from the SPS site to a topographic high point. It then descends at similar gradients, with a relatively flat portion in-between until it reaches the terminating point.

Regional Geology

Published geological maps (Yass, 1:100,000 Geological Series Sheet 8628, 2nd Edition) compiled by the NSW Geological Survey indicates that the SPS site and rising/gravity main alignment are located within the Hawkins Volcanics (Douro Group). The formation is Siluro-Devonian in age and comprises medium to coarse grained, often welded, rhyolitic to dacitic ignimbrite with occasional quartz and diorite xenoliths. Flow-banded, vesicular rhyodacitic to dacitic lava, volcanic sandstone, minor rhyodacitic agglomerate and rhyolitic lapilli tuff are also present.

Site Geology and Soil

SPS

Generally, the site is located within intrusive, igneous bedrock of the Hawkins Volcanics, which occurs at very shallow depths. Bedrock crops out in the central north-eastern extremity of the site.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

The soil profile is very shallowly developed and comprises a 0.1m/0.15m cover of clayey sand topsoil followed by silty sandy clay to depths of 0.6m and 0.7m. At a depth of 0.6m, the residual sandy clay is of hard consistency and grades to extremely weathered bedrock. Dacitic ignimbrite bedrock underlies the sandy clays. The weathering profile of the bedrock is also very shallow. Within the interval from 0.7m to 2.5m depth, the ignimbrite is assessed as being moderately weathered with a strong rock substance strength. Between 2.5m and borehole termination depth of 4.9m, the ignimbrite becomes slightly weathered with a very strong rock substance strength.

Rising/gravity Main

The alignment is located within a suite of intrusive igneous rocks of the Hawkins Volcanics. Other volcanic types that may be encountered include rhyolitic ignimbrite and dacite.

From 0.1m to 0.2m the surficial horizons comprise either variable fill or a veneer of clayey topsoil. The surficial deposits are typically underlain by variably weathered bedrock to borehole termination depths of 2.5m. The bedrock is assessed to be extremely weathered with extremely weak rock substance strength. This quality bedrock generally behaves as very dense silty clayey sand or very stiff to hard silty sandy clay, with evident rock fabric and structure, and typically extends to vee bit refusal levels.

5.3.1 Impact Assessment

The construction of the proposal would result in ground disturbance due to excavation required for the installation of the SPS and the rising/gravity main. For the pumping station well, the proposed structure would be founded some 3.5m to 3.8m below existing surface level and within slightly weathered dacitic ignimbrite bedrock. In case of the emergency storages, the founding levels would be some 1.5m to 2.8m below existing levels and within moderately weathered to slightly weathered bedrock. Consequently, bearing capacity is many orders higher than the proposed loading while settlement is not an issue. The rising/gravity main would be founded at shallow depths in the order of 1.0m to 1.3m, locally increasing up to 2m depth. The proposed main would be founded within variably weathered volcanic bedrock. Consequently, the bearing capacity is more than adequate while settlement is of no concern.

There is the potential for erosion and movements of excavated materials off-site. Therefore, erosion and sediment controls would be required during construction works in the form of a Soil and Water Management Plan (SWMP), and stabilisation following the works, for activities in these areas to prevent any impacts off-site, including sedimentation of drainage lines and waterbodies. It should be noted that although a number of mitigation measures to protect water quality have been listed in this REF, further site-specific plans and construction details would be included in the CEMP for the works when further detail regarding the construction methodology is known. It is assessed that the earthwork impacts can be adequately managed through the implementation of appropriate mitigation measures and therefore the overall impact is assessed to be low.

5.3.2 Mitigation Measures

- A detailed Soil and Water Management Plan (SWMP) shall be prepared as part of the CEMP. The SWMP would describe the site-specific measures to be implemented for all works areas, in accordance with the guidelines outlined in the 2004 Landcom publication *Managing Urban Stormwater: Soils and Construction*, 4th edition ("The Blue Book") and *Volume 2a Installation of Services*. The SWMP would need to be site-specific and would

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

need to address the following issues to prevent erosion, sediment loss and water quality impacts:

- Minimisation of disturbance to soil and water adjacent to, and within, all watercourses in the works area.
 - Identification of site-specific sediment and erosion control measures wherever erosion is likely to occur.
 - Identification of any environmentally sensitive areas on or near construction sites to ensure runoff is diverted away from sensitive areas.
 - Requirements for vegetation clearing to be kept to a minimum.
 - Retention of all surface runoff on-site and where possible stormwater from off site would be diverted around the construction site.
 - Backfilling and stabilising of trenches once the rising/gravity main is installed.
 - Location of construction compounds (at least 50m from any drainage lines).
 - Location and management of stockpiles, such as locating stockpiles away from any drainage lines near the works areas.
 - All erosion and sediment controls would be regularly inspected, especially when rain is expected and directly after any rain events. Records of inspections would be maintained.
- All areas where ground disturbance has occurred would be stabilised following completion of works to ensure there is no erosion hazard and restored to their pre-construction condition. This would involve, where required, reshaping the ground surface, covering it with topsoil excavated from the site and re-establishing an appropriate vegetation cover.
 - Any excess spoil would either be spread across the ground in nearby areas (excluding native grassland areas) in such a manner as to avoid creating an erosion hazard, or removed off site for disposal in accordance with relevant YVC and EPA requirements.
 - Imported fill materials should be suitable materials (preferably granular for controlled fill) as described in Section 4 of AS 3798-2007 "*Guideline on Earthworks for Commercial and Residential Development*". Also, imported fill materials should be validated in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM). The fill material should not contain asbestos, and not be acid sulfate soil or saline soil. The imported fill material should be 'virgin excavated natural material' (VENM) and 'excavated natural material' (ENM), as defined in the DECC's waste guidelines because of their low risk of contamination.
 - If any excavations in excess of 1.5m depth are proposed, then the trench would need to be either benched or adequately supported, as required for safety purposes.

5.4 Water

5.4.1 Surface Water

To the north-east/east, the SPS site is bounded by a drainage course/gully which collects stormwater run-off from surrounding slopes and drains to Yass River. The SPS site slopes at low to moderate gradients to the north-east. The Yass River is located approximately 250m to the north of the site.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

5.4.2 Flooding

The Yass Flood Study 2016 indicates that the SPS is located within flood prone land, immediately adjacent to a minor tributary of the Yass River (see Figure 5-7). The riparian area of this tributary is subjected to minor flooding.

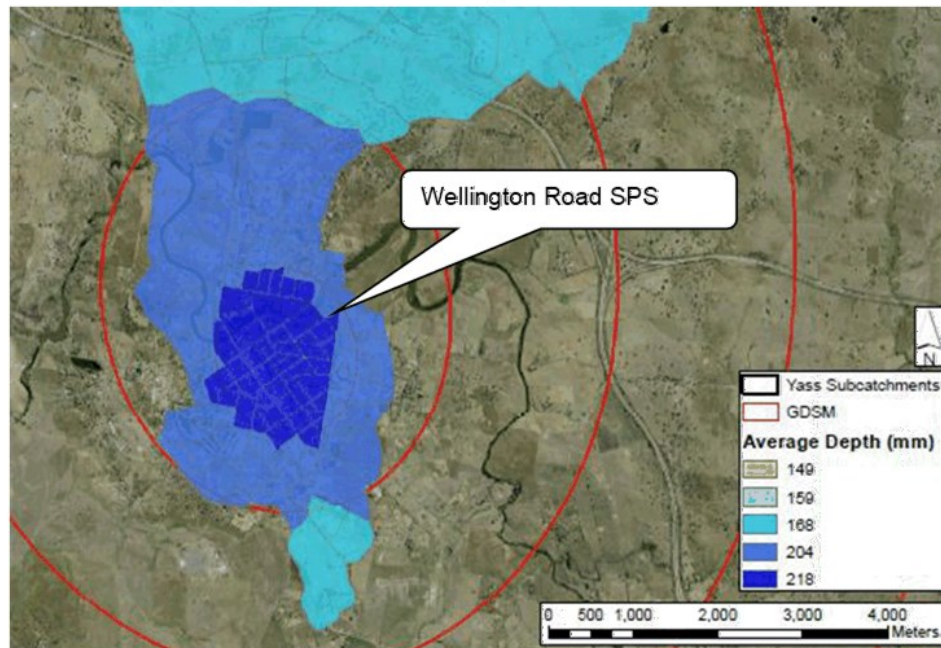


Figure 5-7: Yass Probable Maximum Precipitation Generalised Short Duration Method 0.5 Hr Critical Duration at the proposed SPS site

Source Yass Flood Study Report 2016

5.4.3 Groundwater

During the geotechnical investigation groundwater was not encountered in any of the boreholes within the depths of drilling at the SPS site and along the proposed rising/gravity main alignment (PWA, April 2018). However, it was noted that during rock coring at the SPS site, water was used as a drilling medium which has the tendency to disguise the presence of groundwater (if any). The presence of iron-staining along joint surfaces suggests groundwater movement within the fractured bedrock. Any infiltrated stormwater and stormwater run-off from the elevated slopes to the south-west would be expected to drain through the site and into the adjoining gully on the SPS site.

5.4.4 Impact Assessment

Construction

Surface Water

Construction erosion and sediment controls and stabilisation following the works would be required to prevent any impacts off-site, including sedimentation of drainage lines and waterbodies. It should be noted that although a number of mitigation measures to protect water quality have been listed in this REF, further site-specific plans and construction details would be included in the CEMP (including a Soil and Water Management Plan) for the works when

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

further detail regarding the construction methodology is known. Given the implementation of appropriate mitigation measures, the overall impact is assessed to be low.

Accidental spillage of fuels, hydraulic fluids and lubricating oils used in the operation of construction equipment could result in the release of hydrocarbons and metals to the drainage gully. The significance of the impact would depend on the type of fuel or oil used, the quantity spilt, the prevailing weather conditions (i.e. dilution effect). Several mitigation measures are recommended below to manage and mitigate potential spill incidents.

The works would not result in any disturbance to the surrounding drainage gully or banks of Yass River.

Generally, it is anticipated that the impact on water quality would be minor, given the proper implementation of the mitigation measures provided in Section 5.4.5.

Flooding

It is noted that the proposed SPS would not be located within the riparian area of the land as shown in Figure 2-3. Design of the SPS has incorporated current standards that require the switchgear and control gear assembly (SCA) to be located 0.5 m above the 1 in 100 year flood level and pumping station covers to be 100 mm above the 1 in 100 year flood level unless they are fully sealed. For design purposes, the flood level would be assumed as RL 507.5.

Groundwater

Groundwater was not observed during the investigation, and therefore the excavation is not expected to intercept the groundwater table. However, it is acknowledged that the presence of Fe staining along joint surfaces suggests groundwater movement within the fractured bedrock (PWA, April 2018).

Potential impacts to groundwater quality during construction may be associated with the spillage of construction materials and the management of groundwater in the event that it is encountered during excavation works. Where groundwater is encountered during the construction works, it would need to be managed so that it does not result in pollution, including sedimentation. Groundwater devoid of sediment or contaminants would be disposed of in a way that does not cause erosion.

Provided any groundwater encountered is managed in accordance with the appropriate mitigation measures, and measures are implemented in relation to spill management, groundwater is not anticipated to be adversely affected by the works.

Operation

The potential for adverse water quality impacts during operation of the new infrastructure has been minimised by the inclusion of emergency storage within the SPS (see Section 4.2.1).

5.4.5 Mitigation Measures

- The works are to be undertaken in accordance with all recommendations from the site specific geotechnical investigation.
- All personnel involved in construction works should be aware of the details of the works plans, legislation and associated pollution controls before any works.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

- Adequate procedures would be established and detailed in the CEMP, including notification requirements to the EPA, for incidents that cause material harm to the environment.
- A site-specific spill management plan would be prepared and include the following requirements:
 - Emergency spill kits are to be kept at the site (vehicle kits).
 - Refueling of machinery to be undertaken, where practicable, in a dedicated area within the construction compound appropriately protected as outlined in the spill management plan.
 - Any chemicals and fuels are to be stored in a bunded area at least 50 metres from any waterway or drainage line.
 - Any hazardous materials stored on site would be stored in the compounds and within impervious and bunded enclosures capable of storing 120% of the volume of material stored there.
 - Workers would be trained in the spill management plan and the use of the spill kits.
- Appropriate management measures should be included in the CEMP and implemented during works to avoid, minimise or mitigate the impacts of the works on groundwater (should it be encountered during construction). The CEMP should address the following in relation to groundwater:
 - Dewatering techniques during excavation;
 - Techniques to settle, treat or filter groundwater encountered during excavation works i.e. diverting groundwater through baffle tanks or filter membranes; and
 - Appropriate treatment and monitoring regimes in the event that groundwater flows come to the surface, including disposal of groundwater in such a way as to prevent adverse impacts (such as erosion and water pollution). Groundwater should not be discharged to a waterway during construction.

5.5 Flora and Fauna

The SPS site is located within a grassed paddock. To the north-east/east, the site is bounded by a drainage line which drains to Yass River, located approximately 200m north west of the SPS site. The site has a lush grass cover with a stand of trees lining the drainage gully (see Figure 5-8).

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors



Figure 5-8: General view of the vegetation on the Wellington Road SPS site

Source: PWA 2018

YVLEP 2013 maps vegetation on parts of the SPS site as a Terrestrial Biodiversity Area. However, the proposed SPS would be located outside the Terrestrial Biodiversity area, as shown in Figure 2-2. Within the Yass Gorge, the riparian vegetation along the Yass River forms a unique wildlife corridor through a residential area.

A search of the EPBC Protected Matters Search Tool (accessed in July 2018) identified 3 threatened ecological communities, 29 threatened species and 13 migratory birds may, are likely to or are known to occur within a 10 km radius of the site. A copy of the records is attached in Appendix F.

Threatened fauna species previously recorded within 10 km of the study area on the OEH BioNet database and Protected Matters Search Tool is provided in Table 5-1 and Appendix F.

Table 5-1 Threatened Fauna Species Recorded within 10 km

Common Name	Scientific Name	BC Act	EPBC Act
Mammals			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll	<i>Dasyurus maculatus</i> (SE mainland population)		E
Koala	<i>Phascolarctos cinereus</i>		V

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Common Name	Scientific Name	BC Act	EPBC Act
Birds			
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V,P	C
Little Eagle	<i>Hieraaetus morphnoides</i>	V,P	
Black Falcon	<i>Falco subniger</i>	V,P	
Superb Parrot	<i>Polytelis swainsonii</i>	V,P,3	V
Eastern Curlew	<i>Numenius madagascariensis</i>		CE
Reptiles			
Striped Legless Lizard	<i>Delma impar</i>	V,P	V
Insect Species			
Golden Sun Moth	<i>Synemon plana</i>	E1	CE

V: Vulnerable, E: Endangered, CE: Critically endangered and P: Protected

Part of the land within the Yass Gorge contains Natural Temperate Grassland of the South Eastern Highlands (NTG), which is a critically endangered ecological community listed under the EPBC Act. A review of the Yass Gorge Natural Temperate Grassland Management Plan (Peden, L. 2016) prepared for Yass Landcare confirmed that the proposed SPS and rising/gravity main is not located within the extent of the EEC. However, it is noted that NTG in the area provides habitat for the following State and Commonwealth listed threatened species:

- Pink-tailed Worm Lizard (*Aprasia parapulchella*)
- Little Whip Snake (*Suta flagellum*)
- Striped Legless Lizard (*Delma impar*)
- Golden Sun Moth (*Synemon plana*)
- Grassland Earless Dragon (*Tympanocryptis pinguicolla*)

The NTG is also considered to be important foraging habitat for other threatened fauna such as the Superb Parrot (*Polytelis swainsonii*).

5.5.1 Impact Assessment

The proposed SPS and rising main would be located in previously disturbed areas, and no impacts to areas of biodiversity value are anticipated. The proposal is not located within the NTG habitat, and therefore impacts to the NTG habitat and the resultant fauna reliant on the habitat (e.g. the Superb Parrot) are considered low.

No trees would be removed for the proposed works, with vegetation removal, comprising clearing of groundcover during construction of the SPS and the rising main. The SPS and rising/gravity main are not expected to result in any impact to flora and fauna, as the works would result in the removal of a negligible amount of habitat.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Under Clause 7.3 of the BC Act the following test is required (see Section 2.2.9) in order to determine whether the proposal is likely to significantly affect threatened species or ecological communities, or their habitats

- 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 site provides only a small area of marginal foraging habitat for threatened species identified. There are relatively vast areas of similar and better-quality habitat in the local area. The proposal would not have an adverse effect on the life cycle of these species, such that viable local populations would be 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:*

- (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*

N/A - One Endangered Ecological Community (EEC); is located within a section of the Lot 9 DP1160355 property, Natural Temperate Grassland of the South-Eastern Highlands (NTG).. However, a review of the Yass Gorge Natural Temperate Grassland Management Plan (Peden, L. 2016) prepared for Yass Landcare confirmed that the proposed SPS and rising/gravity main is not located within the extent of the EEC.

- (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,*

N/A.

- c) *in relation to the habitat of a threatened species, population 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*

Only a small area (<1ha) of potential marginal habitat for threatened species recorded in the locality the site would be removed.

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

The proposal would not result in fragmentation or isolation of habitat for species identified above in Table 5-1.

- (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,*

The habitat to be removed would have low importance for the long-term survival of any threatened species identified 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 directly or indirectly),*

N/A - The proposal site is not mapped as or in close proximity to a declared AOBV. As such, effects on any declared area of outstanding biodiversity value is not considered likely.

- 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.*

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

The proposed works would not involve the 'clearing of native vegetation' that is identified as a key threatening process are not likely to increase the impact of any key threatening processes under the BC Act.

It is therefore considered that the proposed works are not likely to significantly affect threatened species or ecological communities, or their habitats and an SIS or application of the BOS is not required for the proposal.

5.5.2 Mitigation Measures

- Exposed surface soil would be stabilised as soon as possible, with mulching, covering or replanting with native species, to avoid potential erosion.
- Removal of vegetation in general would be kept to the minimum necessary.
- The pipeline should be aligned wherever possible to avoid areas of native vegetation. Areas of native vegetation required to be cleared must be clearly defined on the ground before any construction takes place. Barriers such as temporary orange bunting fence are to be used to prevent any disturbance outside the construction area.
- The pipeline route should be aligned to avoid trees wherever possible. Importance should be placed on the avoidance of larger trees and those which contain hollows. The removal/trimming of hollow-bearing trees is to be supervised by a suitably qualified and vaccinated ecologist.
- The pipeline should be aligned wherever possible to avoid areas of EECs, particularly grassland and minimize disturbance to groundcover. Care would need to be taken during pipeline construction to prevent any disturbance to EECs outside the designated disturbance zone.
- Small terrestrial vertebrate fauna may become trapped within open pipeline trenches during construction. It is recommended that large lengths of trenching not be left for long periods. If open trenching is to be left for a period of time the trenching would be required to be inspected by an ecologist to rescue any trapped fauna.
- Vehicles and machinery would utilise existing tracks and cleared areas where possible to access the site during construction.
- The works are to be undertaken in accordance with *AS 4970-2009 Protection of trees on development sites*.
- It is recommended that measures be put in place such as plant equipment hygiene to help prevent the spread of noxious weeds along parts of the pipeline route as a result of construction works.
- Post construction, the works area would be monitored for the spread of weeds.
- Post Construction replanting on the site should use only the native species listed on Appendix A Page 58 of the Yass Gorge Plan of Management.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

5.6 Aboriginal and Historic Heritage

Rising Main

A search of the Aboriginal Heritage Information Management System (AHIMS) did not identify any Aboriginal sites or places in or near the alignment of the rising main (Appendix D). The proposed route has been previously disturbed for road works associated with Meehan Street.

There are a number of items of local heritage in, or in close proximity to the route of the rising main with the nearest being the cottage (Item I239) located south of the rising main on 54 Meehan Street Lot 1 DP 713278 (see Figure 5-9). In addition, a section of the rising main is located with the Yass Heritage Conservation (see Figure 5-9).



Figure 5-9: Yass Valley LEP Heritage Map Extract Heritage

Source: Yass Valley LEP 2013 Heritage Map 001HA

SPS

A Due Diligence Heritage Assessment of the proposal was undertaken by Past Traces Heritage Consultants in May 2018 for the SPS site. In June 2020 the Due Diligence Heritage Assessment was revised in order to address concerns that the proposal area may extend into the boundaries of the Riverside Camp heritage site, whose boundaries are incorrectly mapped on the site card and AHIMS register. The following summary of Aboriginal and historic heritage impacts has been taken from this assessment, which is provided in full in Appendix D.

Searches of the State Heritage Inventory and Yass Valley LEP were conducted to determine if any places of Aboriginal significance are located within the vicinity of the current proposal

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

area. The LEP search showed one item – A288 the Riverside Camp (listed in 2013) as a place of Aboriginal significance. This site is located to the north of the proposal area and consists of the remains of the historic 'Blacks Camp' an area which was occupied for huts and houses from the 1800s to the 1900s. The listing covers Lot 1 DP782734 and covers approximately 1.5ha and will not be affected by the proposed works. No listed heritage values are present within the proposal area.

The area is known to hold high importance to the Aboriginal community based on views recorded for previous assessments and the recorded Riverside Camp (51-1-0043). A search of the OEH AHIMS database was undertaken covering the 1km surrounding area centred on the proposal area. The extensive search revealed no previously recorded heritage sites within the proposal area with 9 sites within the wider search area, mostly located on the northern bank of the Yass River. Historically sites were known to exist at the Oak Hill Aboriginal reserve which was used as a camp for Aboriginal people on the northern bank of the Yass River and the Riverside Camp (also known as the Town Camp, Weir Camp or 'Blacks' Camp), located on the southern bank. The sites located in this area consist of small artefact scatters, one area of potential archaeological deposit (PAD) and isolated finds of stone artefacts. A burial site is recorded to the north of the proposal area which is part of site 51-4-0001 (Oak Hill) which has been gazetted as an Aboriginal Place (no 50– Oak Hill). Oak Hill and the Riverside Camp are entered on the Yass LEP 2013. The location of previously recorded sites is shown in Figure 5-10.

Based on the background review and site survey/assessment undertaken by Past Traces accompanied by representatives of the Onerwal Local Aboriginal Land Council (OLALC) and the Buru Ngunawal Aboriginal Corporation, no Aboriginal heritage sites are known to occur within the proposal area or immediate vicinity with the nearest site Riverside Camp located to the northeast of the proposal area. Furthermore, the landform contains low potential to contain unrecorded Aboriginal sites due to the shallow nature of soils, with evident levels of erosion through the proposal area. The thinness of soils in this location would appear to exclude burials and the potential flooding would not have made it conducive for camping or resting. The high levels of previous disturbance in this section, would have also resulted in the destruction of any heritage sites if once present. Landforms to the north and south of the proposal site which would not be impacted by the development are more conducive to Aboriginal site location and based on modelling would have been the focus of activity. This is confirmed by the location of the Riverside Camp amongst these landforms.

The findings of the assessment undertaken by Past Traces were agreed to by the representatives of the OLALC and the Buru Ngunawal Aboriginal Corporation who attended the proposal site with Past Traces; with the understanding that despite the impacts, the area still holds high cultural significance to the community, and that the potential for sites to be present in areas outside of the impacts is retained.

Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors



Figure 5-10: Aboriginal heritage sites in the vicinity of the proposed Wellington Road SPS and Rising/Gravity Main

Source: Past Traces, 2020

5.6.1 Impact Assessment

Rising Main

The proposed rising main would not impact on the heritage values of the adjacent cottage or the Yass Heritage Conservation Area.

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010) has been used in assessing the likelihood of encountering items of Aboriginal cultural heritage during the construction works. The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (2010) requires further assessment for the development on land that has not been previously disturbed and within a landscape feature typically associated with Aboriginal peoples' use of that feature, such as activities within 200 metres of waters.

For the proposal of the rising main construction works would not occur within 200 metres of waters. Furthermore, it is unlikely that these works would disturb any undisturbed Aboriginal objects or sites given the following:

- The area of works would occur within previously disturbed areas on the site, including areas that have been subject to extensive excavation for existing infrastructure; and
- An AHIMS search did not identify any Aboriginal sites or places in these locations.

It is considered that further archaeological investigations and/or an Aboriginal Heritage Impact Permit are not required at this stage and that the proposed development can proceed with caution. In the event that any Aboriginal heritage items are found during the proposed development, works should cease and safeguards listed below should be applied.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

SPS

The impacts from the construction of the SPS would consist of removals of topsoils and subsoils, thereby destroying any heritage sites which exist within the impact footprint. However, the due diligence assessment concluded that no known heritage impacts would occur as a result of works to any recorded site, including the Riverside Camp (51-1-0043). The confined nature of the construction site (15 m x 38 m) has low potential to impact on unrecorded heritage sites. All works are within areas of high previous impacts that would have removed any heritage potential in the area. The landform contains low potential to contain unrecorded Aboriginal sites. Heritage values associated with the recorded Riverside Camp located to the northeast of the proposal site and separated by the housing development on Grand Junction Road have been impacted by the previous construction work in the area and do not pose a constraint within the limited impact footprint.

The due diligence assessment recommended that due to the cultural sensitivity of the Yass River Area, cultural monitoring by the OLALC should be allowed, despite prior impacts affecting the potential for heritage sites within the proposal site. The recommendation to undertake cultural monitoring of works has been included as part of the mitigation measures to minimise impacts on potential heritage sites (see Section 5.6.2 and 6.2.4).

5.6.2 Mitigation Measures

- Cultural monitoring by the OLALC to be allowed where monitors would observe the WHS directions of the excavation director and if the required safety distance precludes observance of soils, works will cease at regular intervals to allow monitors access to the works. Timing of intervals to be agreed by on site workers.
- If Aboriginal material is discovered during works then the steps as outlined below should be followed:
 - All work must cease in the vicinity of the find and project manager notified immediately;
 - A buffer zone of 10m should be fenced in all direction of the find and construction personnel made aware of the 'no go' zone;
 - DPIE (Biodiversity and Conservation division) must be notified of the find and advice sought on the proper steps to be undertaken; and
 - After confirmation with DPIE(Biodiversity and Conservation division) a heritage consultation should be engaged to undertake assessment of the find and provide appropriate management recommendations to the proponent.
- In the highly unlikely event that human remains are discovered during any construction work, then all activity in the vicinity of the find must cease. As a first step the local police must be notified, followed by DPIE (Biodiversity and Conservation division) and advice sought on appropriate next actions. No work can continue on the site until cleared with police and DPIE (Biodiversity and Conservation division).
- If the proposal activity extends beyond the area of the due diligence investigation undertaken by Past Traces, further archaeological assessment would be required.

5.7 Noise and Vibration

The proposed SPS site is surrounded by recreational (open space) and residential developments. The route of the rising/gravity main is aligned within 20m of residential developments and would cross driveways of a number of residences. Background noise levels at the site are considered to be moderate.

Specialist background noise monitoring has not been undertaken as part of the REF. The daytime background level at the site has not been measured but is estimated to be approximately 45 dB(A). The nearest resident to the construction works area is located within 20 m of the area of the rising/gravity main works.

5.7.1 Impact Assessment

Construction Noise

Use of non-explosive demolition agents would be required in areas where defect spacing is unfavourable (PWA, April 2018).

Construction of the proposed SPS upgrade would result in some short-term noise impacts during the construction period. Sensitive noise receivers in the immediate vicinity are described in Section 5.7 above.

Construction of the proposed works is expected to take 50 weeks. The typical A-weighted sound power levels for equipment which may be required to undertake the construction works are listed in Table 5-3 below (it is noted that this list is not definitive and these levels are taken from the Australian Standard AS2436-2010 (*Guide to Noise Control on Construction, Maintenance and Demolition Sites*)).

Table 5-2 Construction Equipment Sound Power Level

Equipment	Typical Sound Power Levels (dB)	Sound Pressure Level at 50m distance (dB(A))	Sound Pressure Level at 100m distance (dB(A))
Excavator/ Backhoe	118	76	70
Truck	117	75	69
Light vehicles	106	64	58
Jackhammer	121	78	72
Rock breaker	118	76	70
Machine mounted drill	116	73	67
Compressor (silenced)	101	59	53

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Equipment	Typical Sound Power Levels (dB)	Sound Pressure Level at 50m distance (dB(A))	Sound Pressure Level at 100m distance (dB(A))
Concrete agitator truck	109	67	61
Concrete pencil vibrator	103	61	56
Concrete cutter	117	75	69

Notes:

1. The method specified in AS2436 suggests that errors are introduced for distances greater than 100m from the sound source.

Construction management levels for noise at residences are listed in Chapter 4 (Table 2) of the *Interim Construction Noise Guideline* (ICNG) (DECCW, 2009). In accordance with the ICNG, the noise level objective would be approximately 55 dB(A) at the boundary of the nearest residence (this being the background level plus 10 dB(A)). This assumes that the estimate above, which is based on the characteristics of the area, is appropriate and reasonable.

Using the methodology in the *Australian Standard Guide to Noise Control on Construction, Maintenance and Demolition Sites* and the ICNG and based on maximum sound power levels of 120 dB(A), the maximum predicted noise levels would be approximately 70 dB(A) at the Wellington Road site. As such, construction noise resulting from the proposed development would exceed the recommended noise criteria (DECCW, 2009) at certain stages of the construction program, such as for the excavation works.

Construction impacts would be temporary and all works would be undertaken within standard EPA working hours, in that no works would occur on Sundays or public holidays.

Overall, construction noise is not anticipated to significantly impact nearby developments and residents.

Control measures would be implemented during construction as part of the contractor's CEMP to minimise noise impacts, with the CEMP required to be submitted for approval prior to commencement of construction. This should include consideration of Tables 4 - 10 of the *Interim Construction Noise Guideline*, which present a summary of options for work practices with lower noise impact. The CEMP for the construction of the proposed development would address site specific issues, including noise reduction practices, so as to minimise impacts to nearby properties.

Mitigation measures required to minimise noise impacts during construction are outlined in Section 5.7.2 below.

Construction Vibration

The vibration generated from construction works would vary depending on the level and type of activity carried out at each site during each activity. Potential vibration generated to receivers for the works would be dependent on separation distances, the intervening soil and rock strata, dominant frequencies of vibration and the receiver structure.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Dominant vibration generating plant include:

- Drilling;
- Bulldozer;
- Excavator;
- Compactor;
- Truck movements along unsealed roads; and
- Rock Breaker (heavy).

There is the potential for the nearest affected receivers to be affected by these plant.

It is recommended that any required site-specific buffer distances for vibration significant plant items (e.g. vibratory rollers, compactors) be determined on site where works are within 10-15m from a building or structure depending on the blow energy used as, unlike noise, vibration cannot be readily predicted.

For any residences located in close proximity to any such works, more accurate buffer distances should be determined on site by measuring vibration emission levels from each plant item prior to its operation or alternative construction methods and equipment are to be used.

Operational Noise

The proposed RSPS may generate some operational noise due to the operation of the pumps. This would be a new noise source in the immediate vicinity, as there is no existing mechanical equipment at this site. However, the pumps would be located within wet wells and located in an acoustically designed building and therefore any noise emitted is anticipated to be minimal and would not significantly impact on surrounding residential or other land users. The detailed design of the pumping station must comply with the requirements of the Noise Policy for Industry (NPI) (EPA, 2017), which contains the relevant noise criteria for operational noise and is designed to assist industry and authorities ensure that potential noise impacts associated with industrial projects are managed effectively. The policy sets out the procedure to determine the project noise trigger levels relevant to a particular industrial development, which is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The project noise trigger level is the lower (that is, the more stringent) value of the project intrusiveness noise level and project amenity noise level. The project intrusiveness noise level aims to protect against significant changes in noise levels, whilst the project amenity noise level seeks to protect against cumulative noise impacts from industry and maintain amenity for particular land uses. Applying the most stringent requirement as the project noise trigger level ensures that both intrusive noise is limited and amenity is protected and that no single industry can unacceptably change the noise level of an area.

Typically, the intrusiveness level will inform the project noise trigger level in areas with little industry (and/or ambient noise levels), whereas the amenity level will inform the project noise trigger level in areas with higher existing background noise levels.

The recommended intrusive and amenity noise levels relevant to the sensitive receivers surrounding the STP are listed in Table 5-3.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Table 5-3 Intrusiveness and Amenity Noise Levels

Receiver	Time of Day	Intrusiveness Noise Level LA _{eq,15min} dB(A)	Amenity Noise Level LA _{eq} , dB(A)	Recommended Noise Mgmt Level LA _{eq} , dB(A)
Residential – Suburban (approx. 20m to the south)	Day (7am – 6pm)	45	55	45
	Evening (6pm – 10pm)	40	45	40
	Night (10pm – 7am)	40	40	40
Passive recreation area (Yass Gorge) (adjacent to the SPS)	When in use	-	50	55

It is anticipated that noise levels would not exceed 75 dB (A) mean sound pressure level at 1m distance, and that noise levels would be below the recommended day, evening and night noise management levels. However, these calculations assume flat ground surfaces and do not account for propagating effects such as ground conditions, atmospheric absorption or weather. Therefore, during detailed design, the Contractor would be required to verify operational noise emissions to demonstrate that selected plant and equipment complies with NPfl requirements at the nearby sensitive receptors listed in Table 5-3.

During operation, vibration from the operation of the SPS would not be discernible at the boundary of the site.

5.7.2 Mitigation Measures

- Community notification would be undertaken where appropriate and where work is likely to cause vibration or offensive noise and impact the public and nearby residents.
- Works would be undertaken during normal work hours i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays; and no work would be undertaken on Sundays, Public Holidays or outside these work hours without notification to affected community and EPA. Notification would provide the following details:
 - The locations and types of surrounding receivers likely to be affected;
 - The nature of the proposed works;
 - The noise characteristics of any powered equipment likely to be used;
 - Measures to be taken to reduce noise emissions; and
 - Any other information EPA may request.
 - All reasonable practical steps shall be undertaken to reduce noise and vibration from the site.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

- Control measures to minimise noise and vibration impacts on adjoining land would be implemented during construction as part of the contractor's CEMP, which would require review by YVC prior to commencement of works. The CEMP would address site-specific issues, including limited work hours and noise and vibration reduction practices, taking into consideration EPA's *Interim Construction Noise Guideline* (in particular Tables 4 – 10) and *Assessing Vibration: A Technical Guideline* (in particular mitigation measures in Section 3). Mitigation measures to minimise noise and vibration impacts may include the following:
 - Optimum siting of work areas, vehicle and plant parking areas, materials stockpiles and equipment storage areas in locations where potential acoustic and vibration impacts would be minimised;
 - Regular maintenance of all plant and machinery used for the project;
 - Identify locations where construction noise and vibration is most intrusive and develop strategies to reduce impacts for these areas.
- The contractor would undertake noise measurements to verify that the operation of the new pumping station complies with the *Noise Policy for Industry* (EPA, 2017).

5.8 Air Quality

Air quality is expected to be moderate to good, with the main influence on air quality in the area being vehicle emissions associated with moderate volumes along Meehan Street and low traffic volumes on the local connector roads. There are no point sources of air pollution in the vicinity of the proposal sites. However, in high wind events, dust from unsealed/bare surfaces can be a major source of air particulates.

5.8.1 Impact Assessment

The main impact to air quality during construction is expected to arise from the generation of airborne localised dust associated with earthworks and from trucks transporting materials to and around the construction sites on unsealed roads. This is not anticipated to cause notable adverse environmental impacts unless the weather is particularly windy. Dust suppression methods, including the use of water carts, would be applied on windy days to prevent dust being transported off site.

Local air quality may be affected by emissions from construction traffic. These emissions would, however, occur only intermittently, and are expected to be minor and temporary. It would be unlikely that they would contribute to a permanent detectable reduction in local air quality.

With implementation of the recommended mitigation measures, potential air quality impacts during construction are considered minor and unlikely to be significant.

Operation

No adverse air quality impacts are anticipated during operation of the SPS and the rising/gravity main. The SPS has been designed to allow retrofitting of an odour control system should it be deemed necessary during operation.

5.8.2 Mitigation Measures

Construction

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

- Construction vehicles and equipment would be suitably serviced within the six-month period prior to commencement of construction activities and all necessary maintenance undertaken during the construction period to meet EPA air quality requirements.
- The excessive use of vehicles and powered construction equipment would be avoided.
- All construction machinery would be turned off when not in use to minimise emissions.
- Construction contractors would monitor dust generation potential.
- Dust suppression methods including the use of water carts would be applied where required (i.e. on windy days when earthworks and vehicle movements are generating dust).
- Any stockpiled spoil/fill would be protected to minimise dust generation to avoid sediment moving offsite.
- Vehicles transporting spoil from the sites would be covered.

Operation

- The SPS is to be regularly maintained in accordance with the operation and maintenance manual and Operational Environmental Management Plan.
- Any complaints with regards to odour are to be investigated and addressed as soon as practicable.

5.9 Traffic and Access

An access road is proposed off Meehan Street to the proposed SPS. The proposed access road would facilitate site access during maintenance of the SPS.

The rising/gravity main alignment is predominantly located within the Meehan Street road reserve and would traverse a number of driveways.

The roads are all local roads under the control of Council, and experiences moderate levels of traffic.

5.9.1 Impact Assessment

The construction of the SPS and rising/gravity main would result in an increase in vehicle movements using Meehan Street over the 50 week construction period, such as for the for delivery of materials, the arrival and departure of construction workers, equipment delivery and the removal of waste.

The anticipated increased traffic movements would be short term and relatively infrequent, and therefore are not expected to result in a significant impact on the road network.

Works would be carried out so as to minimise interruption to access for adjoining landowners and along the local roads. Traffic management measures would be required to ensure the safety of construction personnel and motorists and to minimise disruptions during construction.

During operation, maintenance of access tracks/roads to the SPS would be necessary to ensure ongoing access to the site.

5.9.2 Mitigation Measures

- The contractor would prepare a Traffic Management Plan as part of the CEMP, to be reviewed by YVC prior to commencement of works. The Traffic Management Plan would

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

include measures to minimise traffic impacts ensure public safety and would be prepared in accordance with:

- *RTA's Traffic Control at Work Sites Manual, Issued July 2018, and*
- *Australian Standard 1742.3 - 2009 Traffic Control for Works on Roads.*
- Any temporary access tracks required for the works would be located so as to minimise disturbance to the existing environment. Following completion of the works the temporary tracks would be removed, topsoil provided and re-grassed. Existing tracks would be restored to their condition prior to works.
- All traffic would comply with all applicable traffic laws and regulations including speed limits. All construction vehicles would comply with the speed limits set for the roads accessing the site.
- Site compounds, parking and storage areas are to be established within the SPS property boundary.

5.10 Waste Management

5.10.1 Impact Assessment

The construction of the proposal would result in waste in the form of excess spoil, cleared vegetation and general building wastes such as packaging, off cuts, excess materials and workers wastes such as drinks containers, food scraps, etc. Portable toilets would be provided for workers at the construction site. Excavated material would be used to backfill pipe trenches and minimal excess spoil is predicted.

To ensure that environmental harm does not occur as a result of uncontrolled or inappropriate collection, transport and disposal the relevant provisions of the following Acts would be implemented:

- *Waste Avoidance and Resource Recovery Act 2001*
- *Protection of the Environment Operations Act 1997*
- *Protection of the Environment Operations (Waste) Regulation 2018*

The waste management and contamination control procedures and/or measures listed below would be implemented for the proposed works.

5.10.2 Mitigation Measures

- The contractor undertaking the works would detail waste management procedures in a Waste Management Plan to be incorporated into the CEMP. The contractor is to assume responsibility for the appropriate disposal of any waste generated. Adequate procedures should be established and detailed in the CEMP, including notification requirements to EPA, for incidents that cause material harm to the environment. The WMP would also follow the resource management hierarchy principles embodied in the *Waste Avoidance and Resource Recovery Act 2001*. Namely, to:
 - avoid unnecessary resource consumption;
 - recover resources (including reuse, reprocessing, recycling and energy recovery); and
 - dispose (as a last resort).

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

- All waste generated during construction works, including waste spoil and redundant infrastructure, would be classified and disposed of appropriately in accordance with the *Waste Classification Guidelines* (EPA, 2014) and the *Standards for Managing Construction Waste in NSW* (EPA, 2018).
- If any contaminated material is encountered during earthworks, work shall cease, the site secured and a safe work method statement(s) and appropriate practices shall be implemented. Any contaminated material would be classified first and then stored, transported and disposed of in accordance with EPA requirements at an EPA licensed waste facility.
- Spoil (residual deposits and extremely weathered to highly weathered ignimbrite) from the excavations for the rising/gravity main could be considered for re-use as engineered fill at the SPS site.
- Cleared native vegetation (devoid of weeds) would be mulched and re-used on site as part of site stabilisation and revegetation.

5.11 Visual Amenity

5.11.1 Impact Assessment

There would be minor visual impacts during construction of the proposal due to the presence of construction equipment. This impact is not anticipated to be significant due to the temporary nature of the construction works.

The proposal would result in the construction of a new pumping station (of approximately 15 m x 38 m footprint). The pumping station would be a new element in the visual landscape, as it would be located in a vacant grassed area on Lot 9 DP1160355.

Although it would be visible from vehicles travelling along Meehan Street it is anticipated that it would not have a significant visual impact on the locality due to its small scale.

The proposed rising/gravity main would be located below ground. Therefore, these elements of the proposal are not anticipated to have an impact on the visual amenity of the surrounding area.

There would be a visual impact within vegetated areas cleared in order to construct the rising/gravity main. However, over time as vegetation regenerates these visual impacts are unlikely to be significant.

5.11.2 Mitigation Measures

- The clearing of vegetation would be kept to the minimum required for the works
- Construction compounds and areas for the parking of vehicles and storing of equipment would be located in cleared areas wherever possible.

5.12 Utilities and Infrastructure

5.12.1 Impact Assessment

Relevant authorities have also been consulted regarding the design requirements for the SPS and rising/gravity main infrastructure where it is located in close proximity to, or has the potential to impact on existing services and infrastructure. Those requirements have been incorporated into the design of the proposed infrastructure.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

5.12.2 Mitigation Measures

- Utilities and services which may be impacted by the proposal would be accurately located prior to commencement of works.
- Utility and service providers would be consulted prior to the commencement of and during construction works in the event that impacts on any utilities and services by the proposal are likely.

6 Environmental Management

This section summarises the recommended environmental management measures for the likely potential impacts associated with the construction and operational phases of the project.

6.1 Construction Environmental Management Plan

Preparation of a Construction Environmental Management Plan (CEMP) is mandatory for all projects undertaken by or on behalf of government agencies or where funding is being provided by the government.

The CEMP would be developed to ensure that appropriate environmental management practices are followed during a project's construction and/or operation. YVC would review the CEMP for this proposal, which should include the following elements, as described in the Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004):

Table 6-1 Construction Environmental Management Plan Structure

Background	Introduction to the document
	Description of the proposal and project details
	The context for the CEMP in regards to the overall project
	The CEMP objectives
Environmental Management	The contractor's environmental policy
	Environmental management structure of the organisation and specific team responsibilities with respect to the CEMP and its implementation
	Approval and licensing requirements relevant to the project
	Reporting requirements
Implementation	Environmental training
	Emergency contacts and response
	A project specific risk assessment
	A detailed list of environmental management safeguards and controls
Monitor and Review	CEMP sub plans for specific environmental controls
	A detailed schedule assigning responsibility to each environmental management activity and control
	Environmental monitoring
	Environmental auditing
	Corrective action
	CEMP review and document control procedures

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

The CEMP would include a risk assessment which ensures that the safeguards identified in this REF, as well as any others that are considered relevant, are effectively translated into actual construction techniques and environmental management activities, controls and monitoring/verification to prevent or minimise environmental impacts. The CEMP should also identify the requirements for compliance with relevant legislation and any other regulatory requirements to ensure environmental safeguards described throughout this REF are implemented. The environmental management objectives and supporting actions presented in this section are intended to assist in this process.

The following details the environmental objectives during construction and the proposed mitigation to be included in the CEMP. This list is not definitive, and additional measures detailed as part of the determination of the project and conditions of any other approvals must also be included. Operational safeguards are also included.

6.2 Environmental Management Measures

Implementation of the mitigation measures outlined below would be undertaken during a number of phases of the project. These phases comprise:

- Detailed design – refinement of the design details
- Pre-construction – prior to the contractor arriving on site to carry out the works
- Construction – during construction phase
- Operation – post construction

6.2.1 Land Use and Ownership

Objective

- Minimise impacts to surrounding land users during construction and operation

Actions

Action/Phase	Responsibility
Pre-construction	
Prior to commencement of construction activities, all necessary approvals, permits, licences and agreements would be obtained from the relevant authorities.	YVC / Contractor
Consultation would be undertaken with all affected landowners or the community for the potential impact on land uses during construction and any safeguards or mitigation measures that need to be implemented during the works.	YVC / Contractor
Construction	
No construction activities (e.g. vegetation removal, stockpiling etc.) would be undertaken on property adjoining the works areas without prior approval of the landowner.	Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
Pre-construction	
The contractor would be required to ensure the necessary care and maintenance of property facilities and operations. However, if any damage did occur to property it would be restored to a condition equivalent to the original condition. Temporary fencing and gates would be installed where necessary to exclude the general public from the work sites. Any temporary fencing or gates no longer required would be removed at the completion of the construction works.	Contractor
Operation	
Council could provide a 24-hour telephone number so that any issues relating to the operation of the new infrastructure can be clarified and complaints dealt with by those able to respond.	YVC

6.2.2 Water Quality, Erosion and Sediment Control

Objective

- To effectively manage sediment and erosion control during the construction stage of the project.
- Prevention/minimisation of impacts to the waterways during the construction works.

Actions

Action/Phase	Responsibility
Pre-construction	
A detailed Soil and Water Management Plan (SWMP) shall be prepared as part of the CEMP. The SWMP would describe the site-specific measures to be implemented for all works areas, in accordance with the guidelines outlined in the 2004 Landcom publication Managing Urban Stormwater: Soils and Construction, 4th edition ("The Blue Book") and Volume 2a Installation of Services.:	Contractor
Appropriate management measures should be included in the CEMP and implemented during works to avoid, minimise or mitigate the impacts of the works on groundwater (should it be encountered during construction). The CEMP should address the following in relation to groundwater: <ul style="list-style-type: none"> • Measures to ensure groundwater quality is not impacted during construction, to avoid pollution and sedimentation. Particular care must be taken to avoid adverse groundwater impacts in those areas identified as vulnerable on Council LEP groundwater vulnerability maps, for the protection of key groundwater systems and vulnerable groundwater resources from depletion and contamination as a result of the development. Appropriate environmental safeguards would address the protection of those vulnerable areas to ensure that any 	Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
<p>potentially contaminating material cannot reach local ground surfaces. This may include storage of potentially contaminating materials in hardstand areas only with appropriate bunding.</p> <ul style="list-style-type: none"> • Dewatering techniques during excavation; • Techniques to settle, treat or filter groundwater encountered during excavation works i.e. diverting groundwater through baffle tanks or filter membranes; and • Appropriate treatment and monitoring regimes in the event that groundwater flows come to the surface, including disposal of groundwater in such a way as to prevent adverse impacts (such as erosion and water pollution). Groundwater should not be discharged to a waterway during construction. 	
Construction	
All areas where ground disturbance has occurred would be stabilised following completion of works to ensure there is no erosion hazard and restored to their pre-construction condition. This would involve, where required, reshaping the ground surface, covering it with topsoil excavated from the site and re-establishing an appropriate vegetation cover.	Contractor
Any excess spoil would either be spread across the ground in nearby areas (excluding native grassland areas) in such a manner as to avoid creating an erosion hazard, or removed off site for disposal in accordance with relevant YVC and EPA requirements.	Contractor
Excess spoil would either be spread across the ground in nearby areas (excluding native grassland areas) in such a manner as to avoid creating an erosion hazard, or removed off site for disposal in accordance with relevant YVC and EPA requirements.	Contractor
Imported fill materials should be suitable materials (preferably granular for controlled fill) as described in Section 4 of AS 3798-2007 "Guideline on Earthworks for Commercial and Residential Development". Also, imported fill materials should be validated in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM). The fill material should not contain asbestos, and not be acid sulfate soil or saline soil. The imported fill material should be 'virgin excavated natural material' (VENM) and 'excavated natural material' (ENM), as defined in the DECC's waste guidelines because of their low risk of contamination.	Contractor
If any excavations in excess of 1.5m depth are proposed, then the trench would need to be either benched or adequately supported, as required for safety purposes.	Contractor
The works are to be undertaken in accordance with all recommendations from the site specific geotechnical investigation	Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
All personnel involved in construction works should be aware of the details of the works plans, legislation and associated pollution controls before any works.	Contractor
Adequate procedures would be established and detailed in the CEMP, including notification requirements to the EPA, for incidents that cause material harm to the environment.	Contractor
<p>A site-specific spill management plan would be prepared and include the following requirements:</p> <ul style="list-style-type: none"> • Emergency spill kits are to be kept at the site (vehicle kits). • Refueling of machinery to be undertaken, where practicable, in a dedicated area within the construction compound appropriately protected as outlined in the spill management plan. • Any chemicals and fuels are to be stored in a bunded area at least 50 metres from any waterway or drainage line. • Any hazardous materials stored on site would be stored in the compounds and within impervious and bunded enclosures capable of storing 120% of the volume of material stored there. • Workers would be trained in the spill management plan and the use of the spill kits. 	Contractor

6.2.3 Flora and Fauna

Objective

- Avoidance/minimisation of impacts to flora and fauna
- Minimise clearing of vegetation
- Avoid weed invasion

Actions

Action/Phase	Responsibility
Pre-construction	
The pipeline should be aligned wherever possible to avoid areas of native vegetation. Areas of native vegetation required to be cleared must be clearly defined on the ground before any construction takes place. Barriers such as temporary orange bunting fence are to be used to prevent any disturbance outside the construction area.	Contractor
The pipeline should be aligned wherever possible to avoid areas of EECs, particularly grassland and minimize disturbance to groundcover. Care would need to be taken during pipeline construction to prevent any disturbance to EECs outside the designated disturbance zone.	Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
The pipeline route should be aligned to avoid trees wherever possible. Importance should be placed on the avoidance of larger trees and those which contain hollows.	Contractor
Construction	
To reduce the impact of the proposal in relation to native fauna species, the removal/trimming of hollow-bearing trees is to be supervised by a suitably qualified and vaccinated ecologist.	Contractor
Small terrestrial vertebrate fauna may become trapped within open pipeline trenches during construction. It is recommended that large lengths of trenching not be left for long periods. If open trenching is to be left for a period of time the trenching would be required to be inspected by an ecologist to rescue any trapped fauna.	Contractor
It is recommended that measures be put in place such as plant equipment hygiene to help prevent the spread of noxious weeds along parts of the pipeline route as a result of construction works.	Contractor
Post Construction replanting on the site should use only the native species listed on Appendix A Page 58 of the Yass Gorge Plan of Management	YVC/Contractor
Operation	
Post construction, all of the alignment should be monitored for the spread of weeds.	YVC

6.2.4 Aboriginal and Historic Heritage

Objective

- Minimise potential impacts to items and places of Aboriginal cultural heritage due to the works

Actions

Action/Phase	Responsibility
Construction	
Cultural monitoring by the Onerwal Local Aboriginal Land Council to be allowed where monitors would observe the WHS directions of the excavation director and if the required safety distance precludes observance of soils, works will cease at regular intervals to allow monitors access to the works. Timing of intervals to be agreed by on site workers.	YVC/Contractor
If Aboriginal material is discovered during works then the steps as outlined below should be followed:	Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
<ul style="list-style-type: none"> All work must cease in the vicinity of the find and project manager notified immediately; A buffer zone of 10m should be fenced in all direction of the find and construction personnel made aware of the 'no go' zone; DPIE (Biodiversity and Conservation division) must be notified of the find and advice sought on the proper steps to be undertaken; and After confirmation with DPIE (Biodiversity and Conservation division) a heritage consultation should be engaged to undertake assessment of the find and provide appropriate management recommendations to the proponent. 	
In the highly unlikely event that human remains are discovered during any construction work, then all activity in the vicinity of the find must cease. As a first step the local police must be notified, followed by DPIE (Biodiversity and Conservation division) and advice sought on appropriate next actions. No work can continue on the site until cleared with police and DPIE (Biodiversity and Conservation division).	Contractor
If the proposal activity extends beyond the area of the due diligence investigation undertaken by Past Traces, further archaeological assessment would be required	YVC/Contractor

6.2.5 Noise and Vibration

Objective

- Compliance with relevant recommendations specified in the *Interim Construction Noise Guideline* (DECC, 2009).
- Avoidance/minimisation of noise impacts on nearby sensitive noise receivers.

Actions

Action/Phase	Responsibility
Pre-construction	
The SPS would be designed to ensure they comply with the <i>Noise Policy for Industry</i> (EPA, 2017).	YVC/Contractor
Community notification would be undertaken where appropriate and where work is likely to cause vibration or offensive noise and impact the public and nearby residents.	YVC/Contractor
Construction	
Works would be undertaken during normal work hours i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays; and no work would be undertaken on Sundays, Public Holidays or outside these work hours without notification	Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
<p>to affected community and EPA. Notification would provide the following details:</p> <ul style="list-style-type: none"> The locations and types of surrounding receivers likely to be affected; The nature of the proposed works; The noise characteristics of any powered equipment likely to be used; Measures to be taken to reduce noise emissions; and Any other information EPA may request. All reasonable practical steps shall be undertaken to reduce noise and vibration from the site. 	
<p>Control measures to minimise noise and vibration impacts on adjoining land would be implemented during construction as part of the contractor's CEMP, which would require review by Upper Hunter Shire Council prior to commencement of works. The CEMP would address site-specific issues, including limited work hours and noise and vibration reduction practices, taking into consideration EPA's <i>Interim Construction Noise Guideline</i> (in particular Tables 4 – 10) and <i>Assessing Vibration: A Technical Guideline</i> (in particular mitigation measures in Section 3). Mitigation measures to minimise noise and vibration impacts may include:</p> <ul style="list-style-type: none"> Optimum siting of work areas, vehicle and plant parking areas, materials stockpiles and equipment storage areas in locations where potential acoustic and vibration impacts would be minimised; Regular maintenance of all plant and machinery used for the project; Identify locations where construction noise and vibration is most intrusive and develop strategies to reduce impacts for these areas. 	Contractor
<p>The contractor would undertake noise measurements to verify that the operation of the new pumping station comply with the <i>Noise Policy for Industry</i> (EPA, 2017).</p>	Contractor

6.2.6 Air Quality

Objective

- Avoidance/minimisation of off-site dust nuisance to neighbouring residences and the community.
- Minimisation of air quality impacts resulting from machinery and vehicle emissions.

Actions

Action/Phase	Responsibility
Pre-construction	

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
Construction vehicles and equipment would be suitably serviced within the six-month period prior to commencement of construction activities and all necessary maintenance undertaken during the construction period to meet EPA air quality requirements.	Contractor
Construction	
The excessive use of vehicles and powered construction equipment would be avoided.	Contractor
All construction machinery would be turned off when not in use to minimise emissions.	Contractor
Construction contractors would monitor dust generation potential.	Contractor
Dust suppression methods including the use of water carts would be applied where required (i.e. on windy days when earthworks and vehicle movements are generating dust).	Contractor
Any stockpiled spoil/fill would be protected to minimise dust generation to avoid sediment moving offsite.	Contractor
Vehicles transporting spoil from the sites would be covered.	Contractor
Operation	
The SPS is to be regularly maintained in accordance with the operation and maintenance manual and Operational Environmental Management Plan.	YVC
Any complaints with regards to odour are to be investigated and addressed as soon as practicable.	YVC

6.2.7 Traffic and Access

Objective

- Ensure that construction vehicles do not cause excessive inconvenience to road and pedestrian users.
- Ensure the safety of road users and construction personnel for the duration of the works.
- Minimise the pollution impacts resulting from the use of vehicles during construction.

Actions

Action/Phase	Responsibility
Pre-construction	
The contractor would prepare a Traffic Management Plan as part of the CEMP, to be reviewed by YVC prior to commencement of works. The Traffic	YVC/Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
Management Plan would include measures to minimise traffic impacts ensure public safety and would be prepared in accordance with: <ul style="list-style-type: none"> RTA's <i>Traffic Control at Work Sites Manual, Issued July 2018, and Australian Standard 1742.3 - 2009 Traffic Control for Works on Roads</i> 	
Construction	
Any disturbance to landowners as a result of vehicle movements and noise would be minimised by adhering to the working hours outlined in Section 5.7.2 of the REF. The contractor would avoid any inconvenience to residences/landowners, and all access gates would be in their original condition following completion of the works.	Contractor
Any temporary access tracks required for the works would be located so as to minimise disturbance to the existing environment. Following completion of the works the temporary tracks would be removed, topsoil provided and re-grassed. Existing tracks would be restored to their condition prior to works.	Contractor
All traffic would comply with all applicable traffic laws and regulations including speed limits. All construction vehicles would comply with the speed limits set for the roads accessing the site.	Contractor
Site compounds, parking and storage areas are to be established within the SPS property boundary.	Contractor

6.2.8 Waste Management

Objective

- Compliance the provisions of the *Protection of the Environment Operations (Waste) Regulation 201*.
- Maximise reuse/recycling of waste material and minimise waste disposed of to landfill.

Actions

Action/Phase	Responsibility
Pre-construction	
The contractor undertaking the works would detail waste management procedures in a Waste Management Plan to be incorporated into the CEMP. The contractor is to assume responsibility for the appropriate disposal of any waste generated. Adequate procedures should be established and detailed in the CEMP, including notification requirements to EPA, for incidents that cause material harm to the environment. The WMP would also follow the resource management hierarchy principles embodied in the <i>Waste Avoidance and Resource Recovery Act 2001</i> . Namely, to: <ul style="list-style-type: none"> avoid unnecessary resource consumption; 	YVC/Contractor

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Action/Phase	Responsibility
<ul style="list-style-type: none"> recover resources (including reuse, reprocessing, recycling and energy recovery); and dispose (as a last resort). 	
Construction	
All waste generated during construction works, including waste spoil and redundant infrastructure, would be classified and disposed of appropriately in accordance with the Waste Classification Guidelines (EPA, 2014) and the Standards for Managing Construction Waste in NSW (EPA, 2018).	Contractor
If any contaminated material is encountered during earthworks, work shall cease, the site secured and a safe work method statement(s) and appropriate practices shall be implemented. Any contaminated material would be classified first and then stored, transported and disposed of in accordance with EPA requirements at an EPA licensed waste facility.	Contractor
Spoil (residual deposits and extremely weathered to highly weathered ignimbrite) from the excavations for the rising/gravity main could be considered for re-use as engineered fill at the SPS site.	Contractor
Cleared native vegetation (devoid of weeds) would be mulched and re-used on site as part of site stabilisation and revegetation.	Contractor

6.2.9 Visual Amenity

Objective

- Protect the visual amenity of the locality for neighbouring land users and the local community.

Actions

Action/Phase	Responsibility
Construction	
The clearing of vegetation would be kept to the minimum required for the works.	Contractor
Construction compounds and areas for the parking of vehicles and storing of equipment would be located in cleared areas wherever possible.	Contractor

6.2.10 Utilities and Infrastructure

Objective

- Prevention/minimisation of impacts to utilities and services infrastructure during the construction works.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Actions

Action/Phase	Responsibility
Construction	
Utilities and services which may be impacted by the proposal would be accurately located prior to commencement of works.	Contractor
Utility and service providers would be consulted prior to the commencement of and during construction works in the event that impacts on any utilities and services by the proposal are likely.	Contractor

7. Conclusions

The proposed Wellington Road SPS and rising/gravity main works would provide sewerage infrastructure to approved developments and new development areas (re-zonings) around Wellington Road in Yass. Ultimately the proposed SPS would cater for 400 equivalent tenements (ET) in 20 years' time.

The proposal would potentially cause short term impacts such as increased noise and traffic and a reduction in community amenity for the residents and users of local streets during the construction phase. However, the works are temporary and are able to be managed to minimise impacts.

Due diligence heritage assessment has concluded that there would be no significant impacts to Aboriginal cultural or historic heritage are anticipated associated with the proposed works.

There would be a need to remove some groundcover vegetation for the proposed works. However, the proposal would be unlikely to significantly affect any listed threatened species, fauna populations or ecological communities, provided appropriate mitigation measures are implemented.

Given that the works predominantly comprise an underground rising/gravity main, adverse environmental impacts potentially associated with the operation phase of the proposal are considered to be minimal. Potential operational impacts have been mitigated as part of the design.

This REF has been prepared in accordance with Sections 5.5 and 5.7 of the *Environmental Planning and Assessment Act 1979* and Clause 228 of the *Environmental Planning and Assessment Regulation 2000*. It provides a true and fair assessment of the proposed activity in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed activity.

On the basis of the information presented in this REF it is concluded that:

- (1) The proposed activity is not likely to have a significant impact on the environment and therefore an Environmental Impact Statement is not required.
- (2) The proposed activity is not likely to significantly affect threatened species, populations, ecological communities, or critical habitat. Therefore, a Species Impact Statement (SIS) is not required
- (3) The proposed activity is not likely to affect any Commonwealth land, is not being carried out on Commonwealth land, or significantly affect any Matters of National Environmental Significance.

The proposed activity is recommended for approval subject to implementation of the measures to avoid, minimise or manage environmental impacts listed in this REF.

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*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

*Parks and Wildlife Service and Department of Conservation and Natural Resources, NSW
National Parks & Wildlife Service and Vic. Dept Conservation & Natural Resources*

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Appendix A – Plans



YASS SEWERAGE SCHEME

CONSTRUCTION OF WELLINGTON ROAD SEWAGE PUMPING STATION, RISING MAIN AND GRAVITY MAIN

CONTRACT No. 10014861
VOLUME 2 - DRAWINGS



FOR REVIEW

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861

Attachment B Wellington Road SPS Review of Environmental Factors

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A	<div><h3>DRAWING LIST</h3><h4>GENERAL</h4><table border="1"><thead><tr><th>DRAWING No.</th><th>TITLE</th></tr></thead><tbody><tr><td>10014861- C01</td><td>DRAWING LIST</td></tr><tr><td>- C02</td><td>GENERAL NOTES</td></tr></tbody></table><h4>SEWAGE PUMPING STATION</h4><table border="1"><tbody><tr><td>10014861- C03</td><td>SURVEY PLAN</td></tr><tr><td>- C04</td><td>SITE PLAN</td></tr><tr><td>- C05</td><td>SECTION AND ROAD DETAILS - SHEET 1 OF 2</td></tr><tr><td>- C06</td><td>ROAD DETAILS - SHEET 2 OF 2</td></tr><tr><td>- C07</td><td>GENERAL ARRANGEMENT</td></tr><tr><td>- C08</td><td>SECTIONS AND DETAILS</td></tr><tr><td>- C09</td><td>REINFORCEMENT DETAILS</td></tr><tr><td>- C10</td><td>MONORAIL DETAILS - SHEET 1 OF 2</td></tr><tr><td>- C11</td><td>MONORAIL DETAILS - SHEET 2 OF 2</td></tr><tr><td>- C12</td><td>DROP TUBE DETAILS</td></tr><tr><td>- C13</td><td>EMERGENCY STORAGE TANK</td></tr><tr><td>- C14</td><td>CONCEPT DRAWING FOR SCA SHELTER</td></tr><tr><td>- C15</td><td>NOT USED</td></tr><tr><td>- C16</td><td>NOT USED</td></tr></tbody></table><h4>RISING MAIN</h4><table border="1"><tbody><tr><td>10014861- C17</td><td>ROUTE PLAN AND LONGITUDINAL SECTION - CH 0+0 TO CH 639.3</td></tr><tr><td>- C18</td><td>ROUTE PLAN AND LONGITUDINAL SECTION - CH 639.3 TO CH 679.5</td></tr><tr><td>- C19</td><td>NOT USED</td></tr><tr><td>- C20</td><td>NOT USED</td></tr><tr><td>- C21</td><td>NOT USED</td></tr></tbody></table><h4>OTHER DRAWINGS</h4><table border="1"><tbody><tr><td>10014861- C22</td><td>PRECAST TYPE PUMP WELLS</td></tr><tr><td>- C23</td><td>MANHOLES (SEWER UP TO 600 mm DIA.)</td></tr><tr><td>- C24</td><td>WATER SERVICES DETAILS</td></tr><tr><td>- C25</td><td>FENCE DETAILS</td></tr><tr><td>- C26</td><td>MISCELLANEOUS DETAILS</td></tr></tbody></table></div>											DRAWING No.	TITLE	10014861- C01	DRAWING LIST	- C02	GENERAL NOTES	10014861- C03	SURVEY PLAN	- C04	SITE PLAN	- C05	SECTION AND ROAD DETAILS - SHEET 1 OF 2	- C06	ROAD DETAILS - SHEET 2 OF 2	- C07	GENERAL ARRANGEMENT	- C08	SECTIONS AND DETAILS	- C09	REINFORCEMENT DETAILS	- C10	MONORAIL DETAILS - SHEET 1 OF 2	- C11	MONORAIL DETAILS - SHEET 2 OF 2	- C12	DROP TUBE DETAILS	- C13	EMERGENCY STORAGE TANK	- C14	CONCEPT DRAWING FOR SCA SHELTER	- C15	NOT USED	- C16	NOT USED	10014861- C17	ROUTE PLAN AND LONGITUDINAL SECTION - CH 0+0 TO CH 639.3	- C18	ROUTE PLAN AND LONGITUDINAL SECTION - CH 639.3 TO CH 679.5	- C19	NOT USED	- C20	NOT USED	- C21	NOT USED	10014861- C22	PRECAST TYPE PUMP WELLS	- C23	MANHOLES (SEWER UP TO 600 mm DIA.)	- C24	WATER SERVICES DETAILS	- C25	FENCE DETAILS	- C26	MISCELLANEOUS DETAILS	A
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REV	AMENDMENT DETAILS	BY	DATE	REASON
0	ISSUED FOR REVIEW	NS	21/05/18	For review

FOR REVIEW

yass valley council

the country the people

NSW

PublicWorks Advisory

DESIGNED	M. SVACHANDRAN
CHECKED	B. DOUGLAS
DRAFTED	H. ZHOU
CHECKED	V. DAD
DIRECTOR	H. VAN RAUEN

YASS SEWERAGE SCHEME	
WELLINGTON ROAD SPS, RM AND GRAVITY MAIN	
DRAWING LIST	

PROJECT/CONTRACT No.	XXXXXX
SCALE	A1 @ 1:1
DRAWING No.	10014861- C01
REV	0

CONFIRM SCALE

100mm ON A1 ORIGINAL

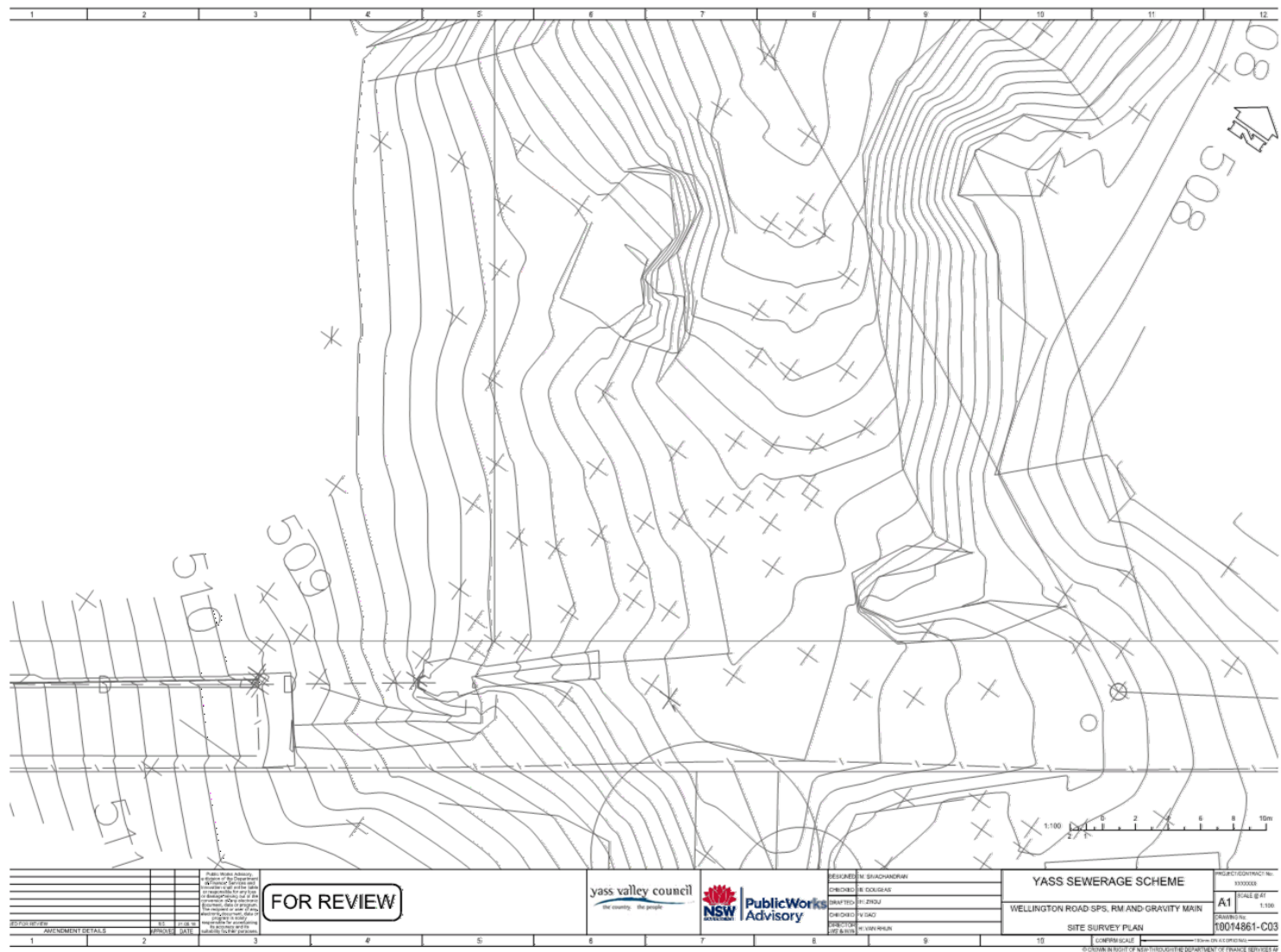
20% TOLERANCE IN SCALE FOR REVISIONS

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861

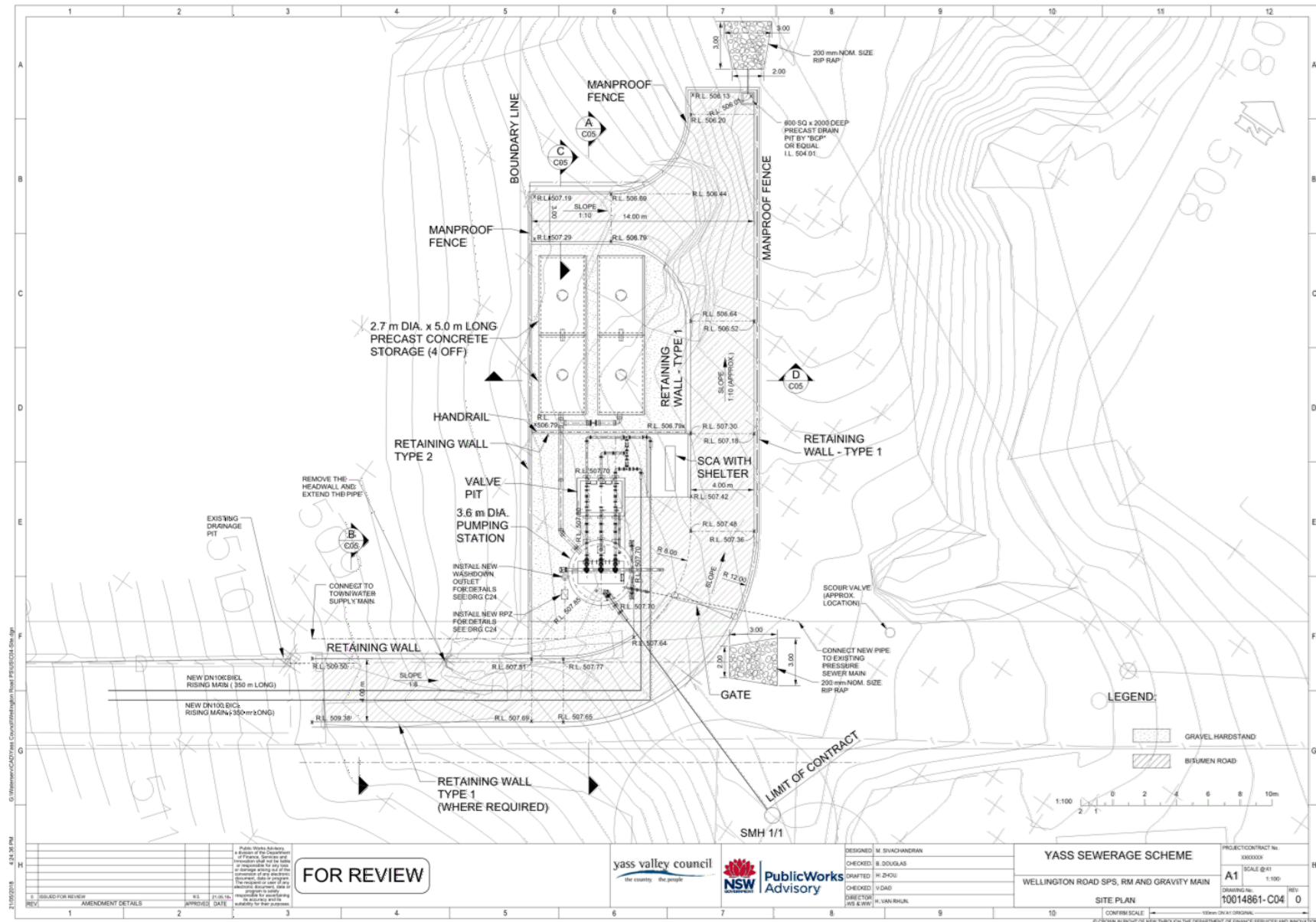
Attachment B Wellington Road SPS Review of Environmental Factors

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GENERAL NOTES:						METALWORKS: (REFER TO METALWORK SPECIFICATION)													
G1 SPECIFICATIONS AND CODES CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.						M1 DESIGN IS IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS: - STEEL STRUCTURES - FIXED PLATFORMS, WALKWAYS, STAIRWAYS AND LADDERS AS 4100 AS 1937													
G2 DIMENSIONS ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE COMMENCING ANY WORK. STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.						M2 SPECIFICATION AND CODES ALL STEEL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL CONFORM TO AS 4100.													
G3 PROVISION FOR EQUIPMENT MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE VERIFIED BY CONTRACTOR PRIOR TO PLACING CONCRETE.						M3 MATERIALS ALL STRUCTURAL SHAPES, BARS AND PLATES UNLESS NOTED OTHERWISE SHALL BE 10mm THICK OF GRADE 250 STEEL IN ACCORDANCE WITH AS 3678 & 3679.													
G4 CONSTRUCTION LOADS COMPLETE STRUCTURES. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED BY BRACING AND PROPPING WHEREVER CONSTRUCTION LOADS MAY OCCUR.						M4 SURFACE PREPARATION													
G5 CO-ORDINATION ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH CIVIL, MECHANICAL, ELECTRICAL, HYDRAULIC AND FABRICATION DRAWINGS TOGETHER WITH SPECIFICATIONS AND SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED BY THE PRINCIPAL FROM TIME TO TIME.						<table border="1"><thead><tr><th>ELEMENT</th><th>SURFACE PREPARATION</th><th>TREATMENT</th></tr></thead><tbody><tr><td>ALL MILD STEEL WORK INCLUDING STEELWORK</td><td>ABRASIVE BLAST CLEANING (AS 1627.4) OR CHEMICALLY DESCALE (AS 1627.5)</td><td>HOT DIP GALVANISED AFTER FABRICATION</td></tr></tbody></table>						ELEMENT	SURFACE PREPARATION	TREATMENT	ALL MILD STEEL WORK INCLUDING STEELWORK	ABRASIVE BLAST CLEANING (AS 1627.4) OR CHEMICALLY DESCALE (AS 1627.5)	HOT DIP GALVANISED AFTER FABRICATION		
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CONCRETE: (REFER TO CONCRETE SPECIFICATION)						M5 FABRICATION DRAWINGS CONTRACTOR SHALL PREPARE AND SUBMIT TWO COPIES OF ALL STRUCTURAL STEELWORK FABRICATION DRAWINGS TO THE PRINCIPAL PRIOR TO COMMENCING FABRICATION.													
C1 DESIGN CODES DESIGN IS IN ACCORDANCE WITH THE FOLLOWING SAA CODES:- AS 3600 SAA CONCRETE STRUCTURES CODE AS 1170 SAA LOADING CODES PART 1 & 2 AS 3735-2001 CONCRETE STRUCTURES FOR RETAINING LIQUIDS.						M6 WELDING ALL WELDING SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STEEL WELDING CODE AS 1554 AND AS 1665. ALL WELDS SHALL BE 6mm CONTINUOUS FILLET WELD CATEGORY SP UNLESS NOTED OTHERWISE.													
C2 MATERIALS CONSTRUCTION MATERIALS AND WORKMANSHIP FOR CONCRETE WORKS SHALL BE IN ACCORDANCE WITH THE SPECIFICATION AND THE SAA CODE AS 3600.						M7 ALUMINIUM ALUMINIUM PRODUCTS SHALL BE OF ALUMINIUM ALLOY AS FOLLOWS:													
C3 CONCRETE PROPERTIES FOR CONCRETE PROPERTIES REFER TO SPECIFICATION.						<table border="1"><thead><tr><th>PRODUCT</th><th>ALLOY</th></tr></thead><tbody><tr><td>PLATES, SHEETS</td><td>5251</td></tr><tr><td>EXTRUSIONS</td><td>6061</td></tr><tr><td>GRATINGS</td><td>6063</td></tr></tbody></table>						PRODUCT	ALLOY	PLATES, SHEETS	5251	EXTRUSIONS	6061	GRATINGS	6063
PRODUCT	ALLOY																		
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C4 CURING CURING SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.						AND SHALL BE IN ACCORDANCE WITH AS/NZS 1664, AS/NZS 1734, AS/NZS 1866, UNLESS NOTED OTHERWISE.													
C5 JOINTING IN CONCRETE STRUCTURES LOCATION OF ALL EXPANSION AND CONTRACTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS. LOCATION OF SUCH JOINTS SHALL NOT BE CHANGED WITHOUT APPROVAL OF THE PRINCIPAL. IF ADEQUATE CONSTRUCTION JOINTS ARE NOT SHOWN IN THE DRAWINGS THE CONTRACTOR SHALL SUBMIT PROPOSED LOCATION OF REQUIRED CONSTRUCTION JOINTS FOR APPROVAL BEFORE CONSTRUCTION.						M8 REFER TO SPECIFICATION FOR TREATMENT OF ALUMINIUM SURFACES IN CONTACT WITH OTHER MATERIALS.													
C6 CHAMFERS EXCEPT AS OTHERWISE REQUIRED, EXPOSED CONCRETE CORNERS AND EDGES SHALL HAVE 20mm CHAMFERS. ALL CHAMFERS TO PROVIDE SMOOTH AND CLEAN EDGES.						PIPEWORK: (REFER TO PIPEWORK SPECIFICATION)													
C7 NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE WITHOUT PRIOR APPROVAL OF THE PRINCIPAL.						P1 ALL DUCTILE IRON PIPES SHALL BE LIGHT CEMENT LINED WITH TYPE SR CEMENT. PIPE CLASS SHALL BE PN10 RUBBER RING JOINT OR FLANGED. ALL DUCTILE IRON FITTINGS TO AS 2280. ALL FLANGES SHALL BE TO AS 4087 CLASS PN16. ALL BURIED DIPPED TO BE WRAPPED AND ALL EXPOSED PIPES TO BE EPOXY COATED AS SPECIFIED IN THE SPECIFICATION.													
REINFORCEMENT: (REFER TO CONCRETE SPECIFICATION)						P2 ALL PRESSURE PVC PIPES SHALL BE PVC-D CLASS 12 SERIES 2 WITH RUBBER RING JOINTS TO AS 1477 UNLESS NOTED OTHERWISE.													
R1 REINFORCEMENT DESIGNATION SYMBOLS INDICATED ON DRAWINGS FOR GRADE AND TYPE OF REINFORCEMENT ARE AS FOLLOWS:-						P3 ALL PE PIPES SHALL BE PE100 TO AS 4130 WITH THERMO FUSION WELDING JOINTS.													
SL - COLD ROLLED, HIGH STRENGTH FABRIC OF GRADE R500N TO AS/NZS 4671.						P4 ALL NON-PRESSURE UPVC PIPES SHALL BE WITH RUBBER RING JOINTS TO AS 1260 AS FOLLOWS: 80 mm ND OR SMALLER PIPES - CLASS SH 100 mm ND PIPES - CLASS SN10 150 mm ND OR LARGER PIPES - CLASS SN8.													
N - HOT ROLLED, HIGH STRENGTH DEFORMED BARS OF GRADE D500N TO AS/NZS 4671.						P5 ALL GRP PIPES SHALL BE TO AS 3571 AND AS 3572.													
EARTHWORKS: (REFER TO EARTHWORKS SPECIFICATION)						P6 FOR MINIMUM COVER TO PIPES, REFER TO STANDARD SPECIFICATION SECTION TR13 AND TR14.													
E1 ASSESSMENTS OF IN-SITU MATERIAL ARE CONTAINED IN THE WELLINGTON ROAD SEWAGE PUMP STATION GEOTECHNICAL REPORT No ISR 18019, APRIL 2018 INVESTIGATION.						P7 PIPES WITH LESS COVER THAN INDICATED IN NOTE P5 SHALL BE MASS CONCRETE ENCASED 150 ALL AROUND UNLESS OTHERWISE STATED.													
E2 EXCAVATION, STOCKPILE, FILLING, COMPACTION, ETC. SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.						P8 PIPES SHALL BE PROTECTED EXTERNALLY AS SPECIFIED.													
DATUM:						P9 LAY PIPES BETWEEN PITS/STRUCTURES ON A CONTINUOUS RISING OR FALLING GRADE.													
D1 SURVEY LEVELS ARE IN METRES TO AHD (AUSTRALIAN HEIGHT DATUM).						P10 PROVIDE THRUST BLOCKS AT ALL LOCATIONS (EG BENDS AND VALVES) WHERE UNBALANCED THRUST CAN DEVELOP. DRAWINGS MAY NOT SHOW REQUIRED THRUST BLOCKS.													
FLOOD LEVELS: 1 IN 100 YEAR FLOOD LEVEL IS 263.52m AHD.																			
FOR REVIEW						YASS SEWERAGE SCHEME													
YASS VALLEY COUNCIL						WELLINGTON ROAD SPS, RM AND GRAVITY MAIN GENERAL NOTES													
NSW						PROJECT CONTRACT No. 1000000													
PublicWorks Advisory						SCALE @ A1 N.T.S.													
DESIGNED: M. SVACHANDRAN						DRAWING No. 10014861-C02													
CHECKED: B. DOUGLAS						REV 0													
DRAFTED: H. ZHOU																			
CHECKED: V. DAD																			
DIRECTOR: H. VAN RIJN																			
CONFIRM SCALE						100mm ON A1 ORIGINAL													

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

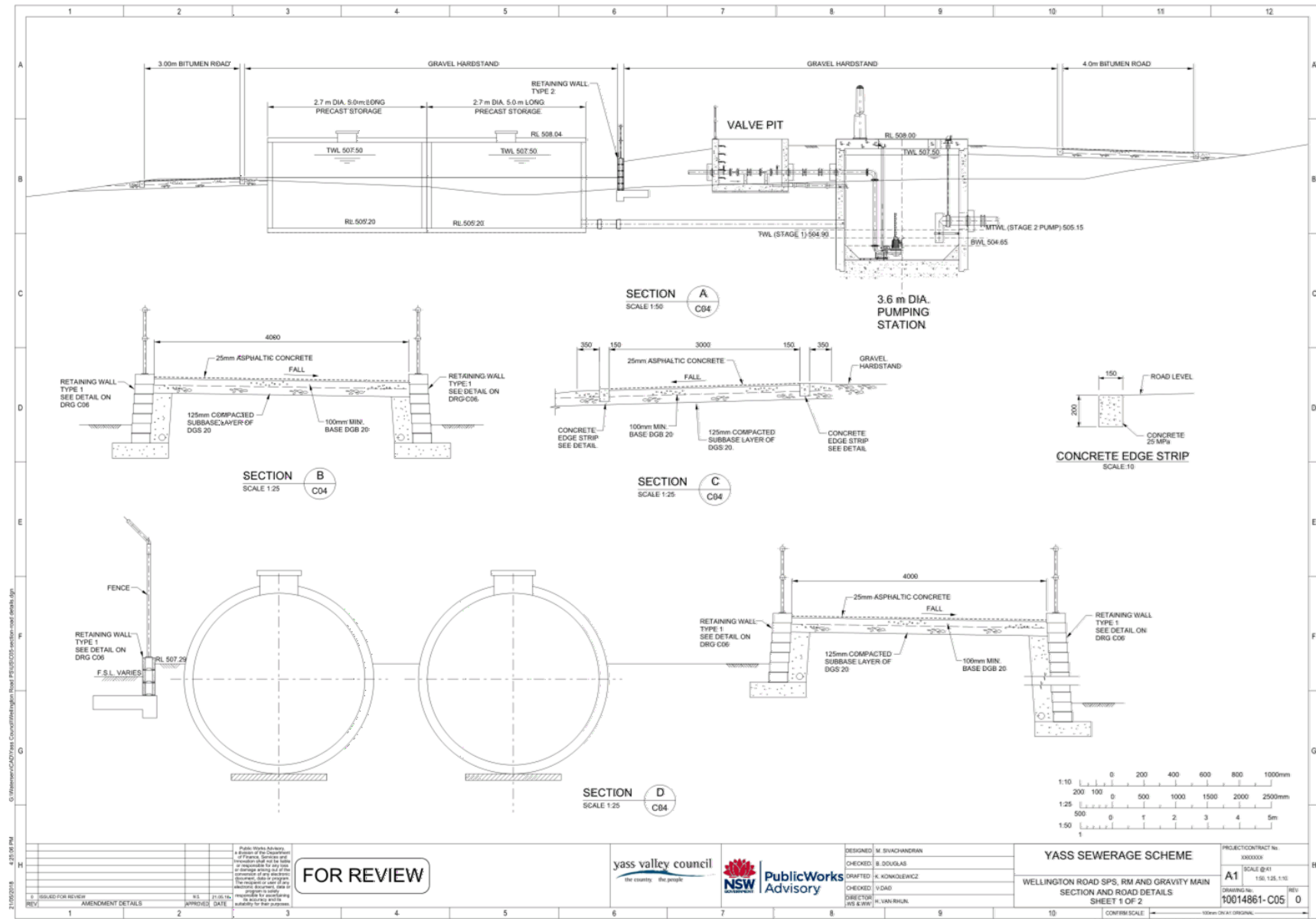


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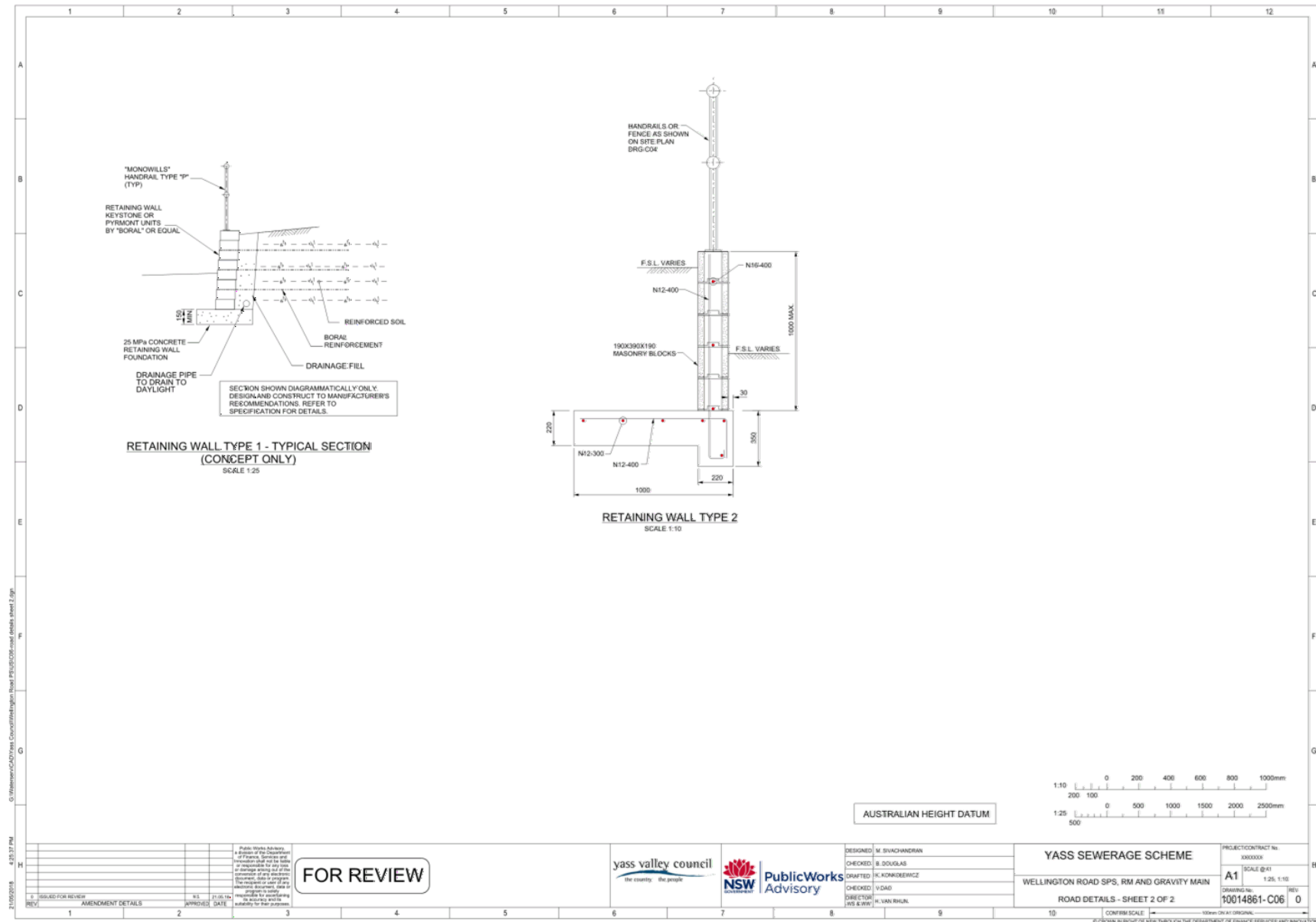
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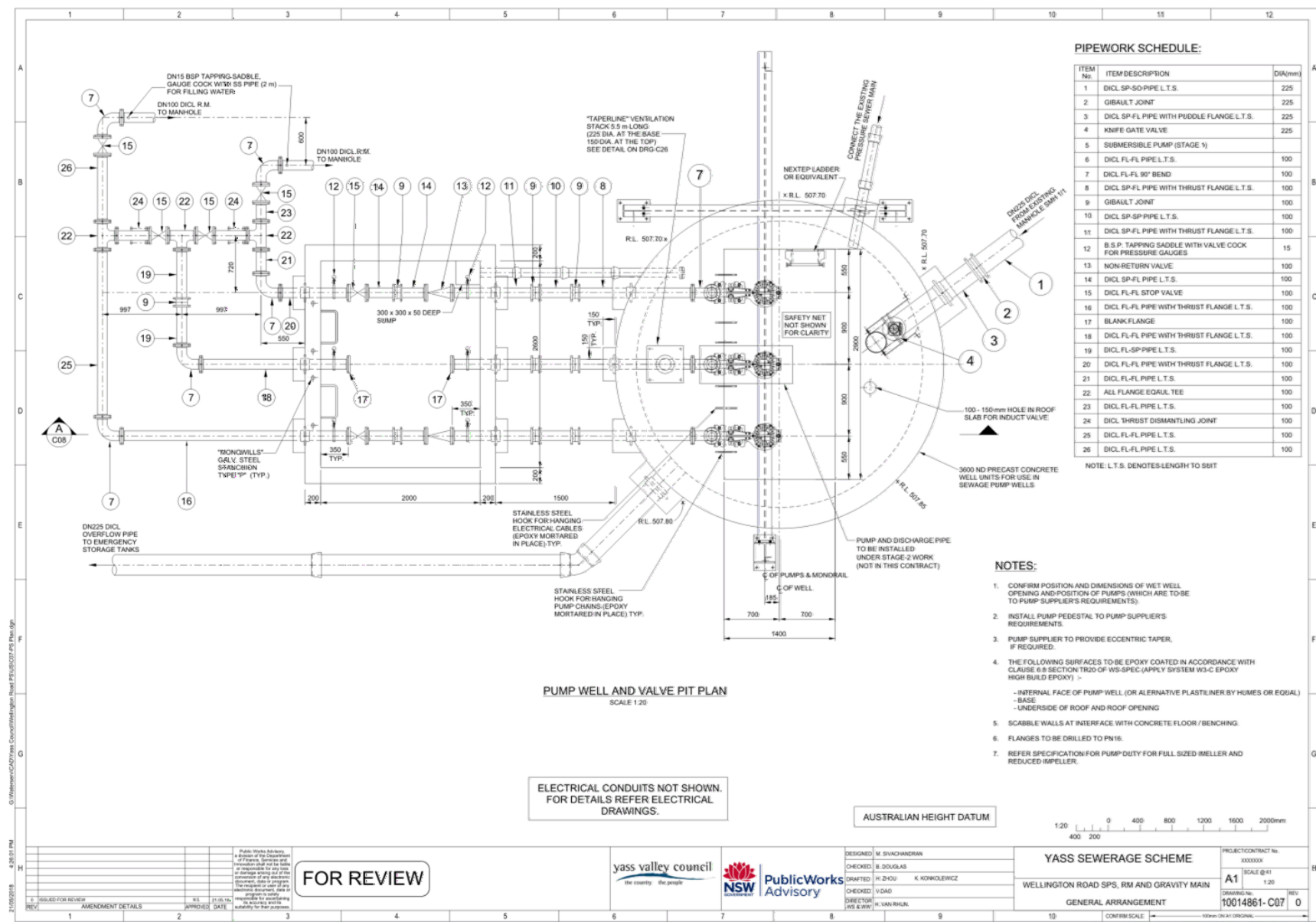
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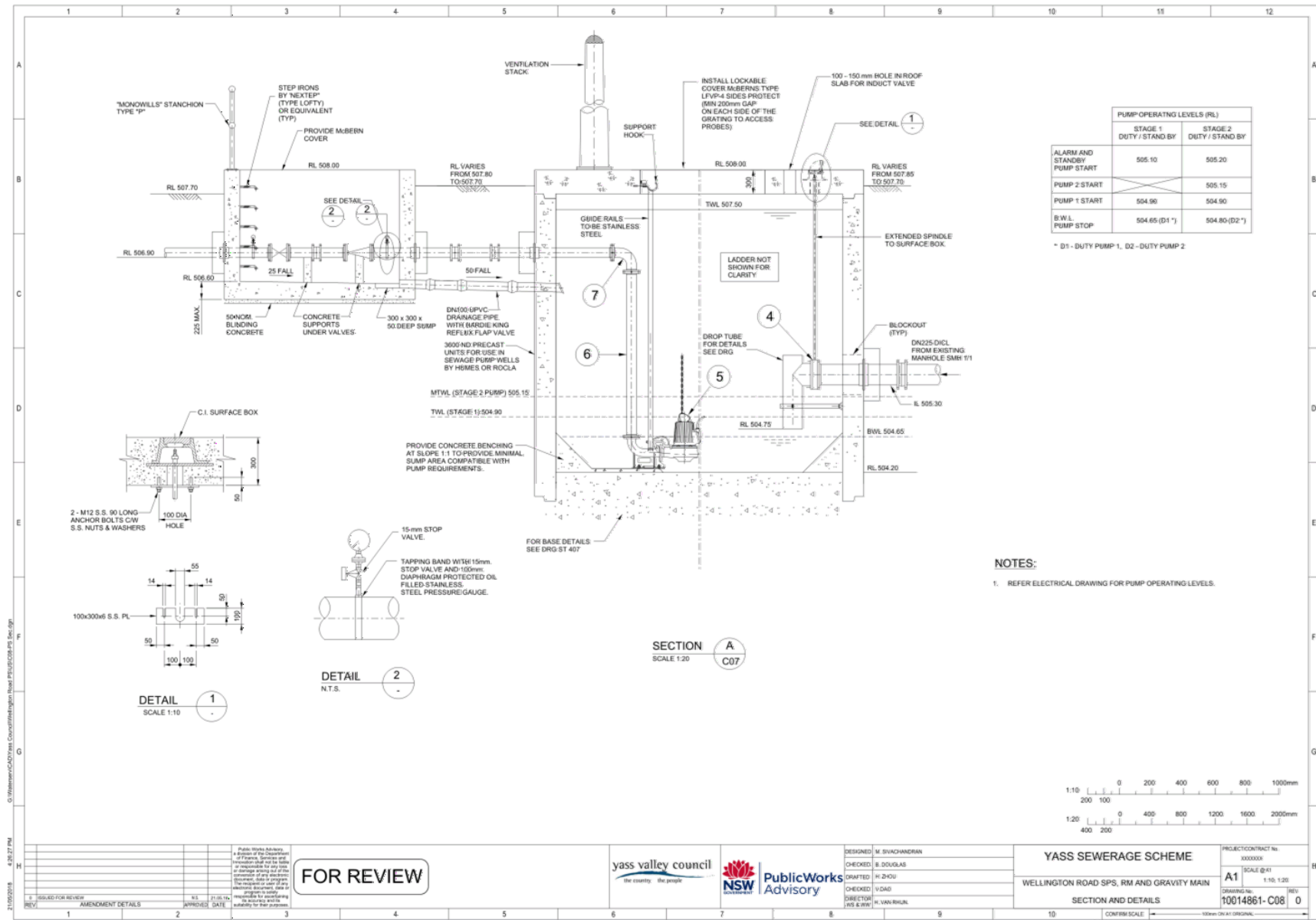
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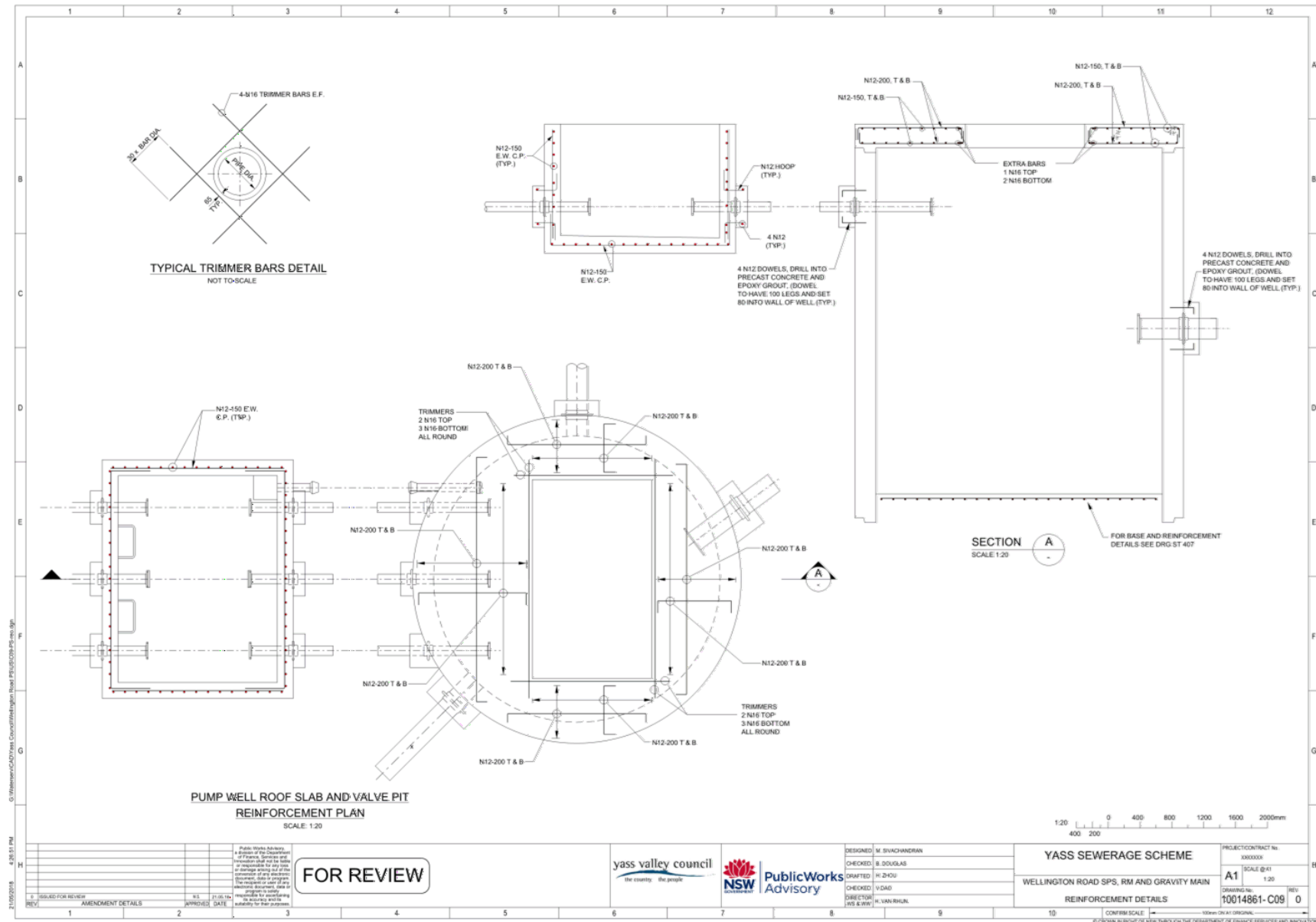
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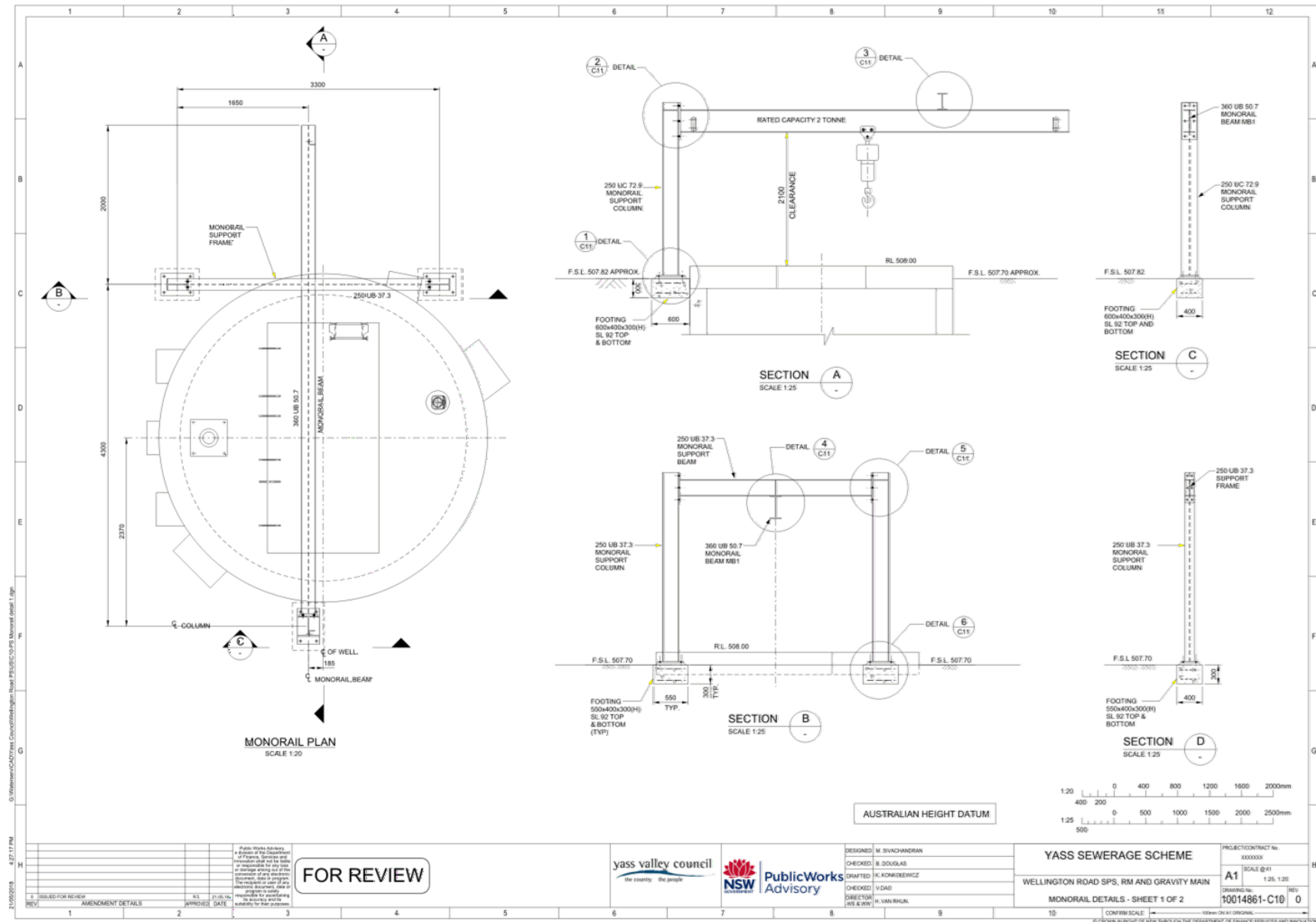


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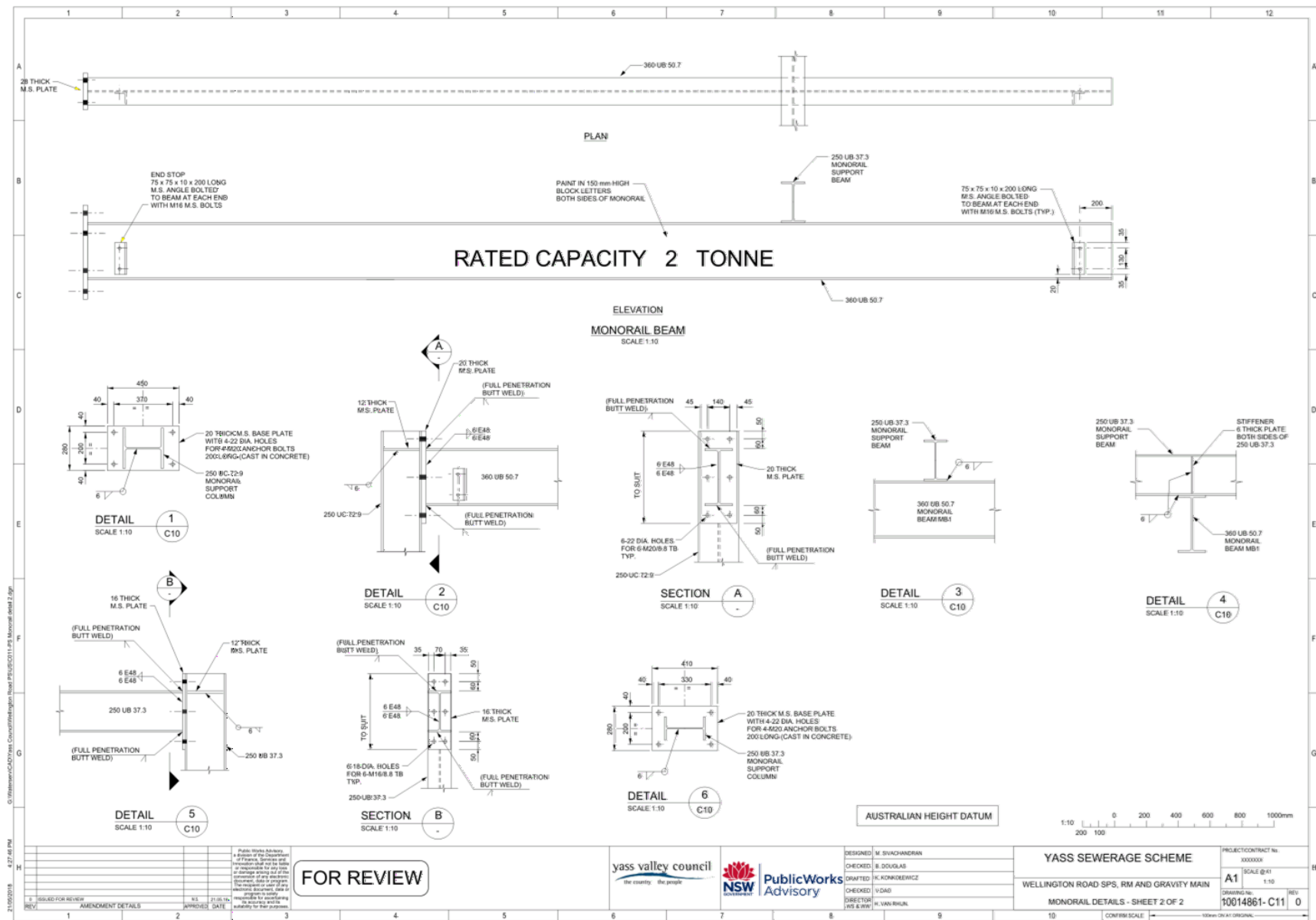
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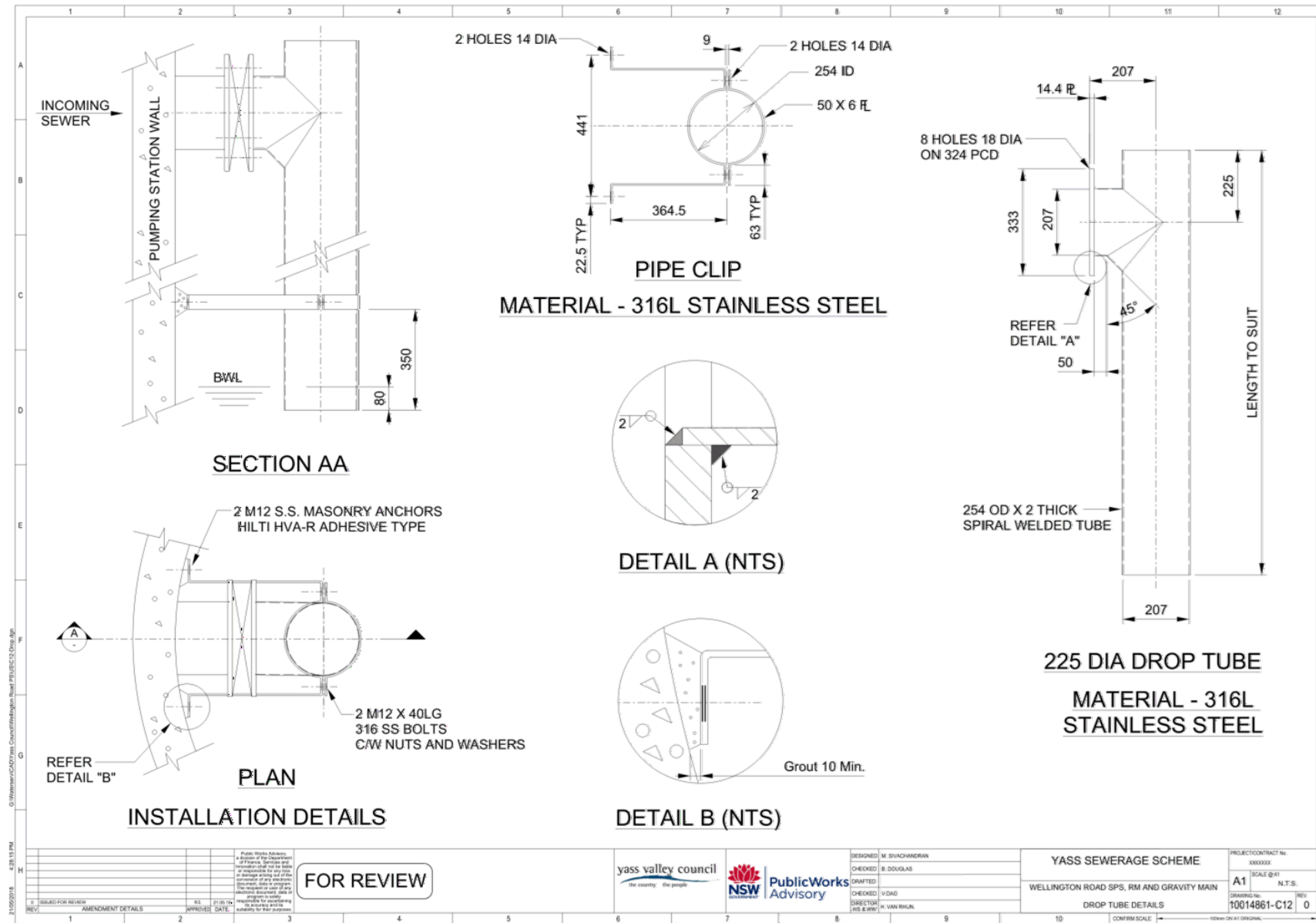


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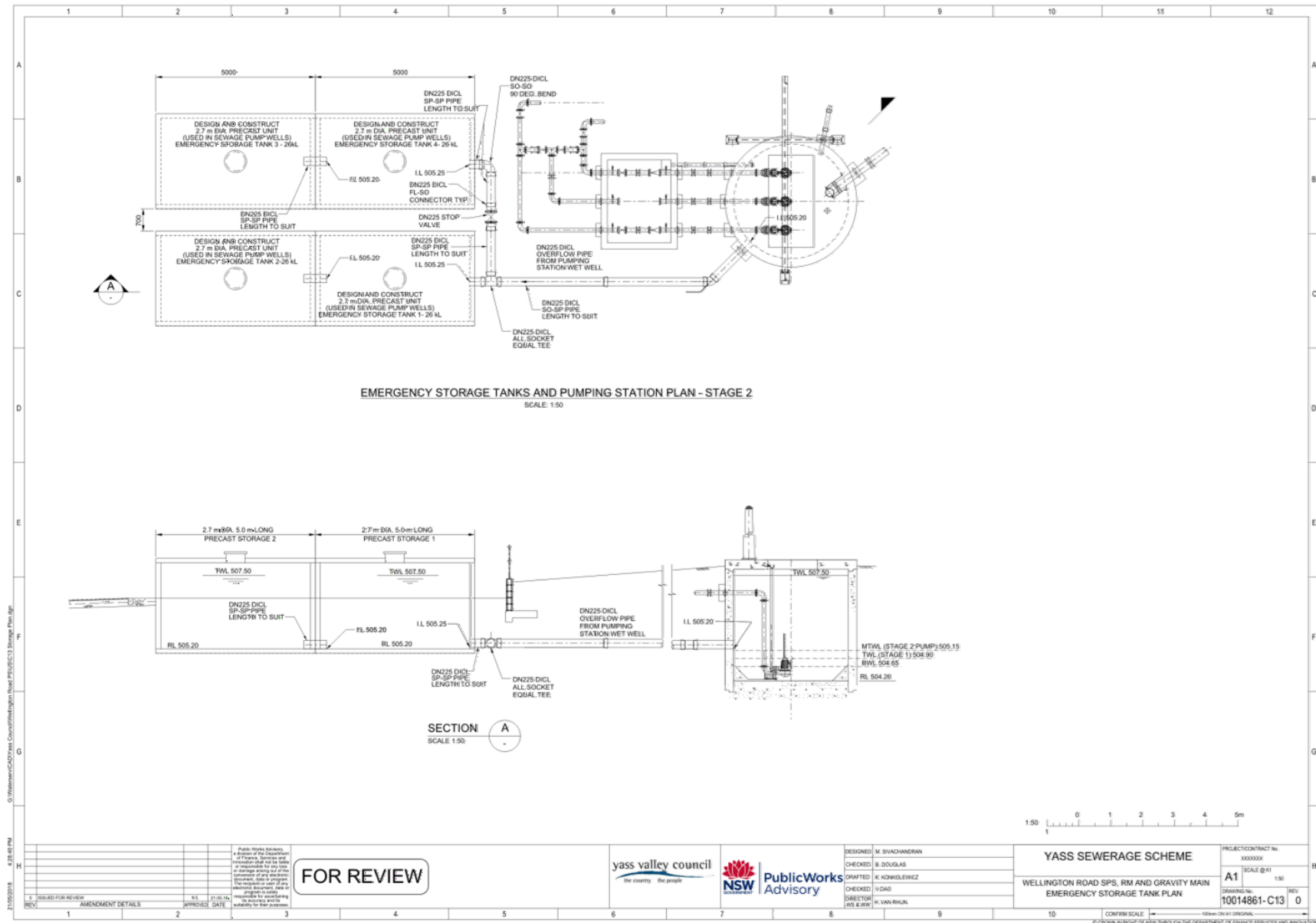
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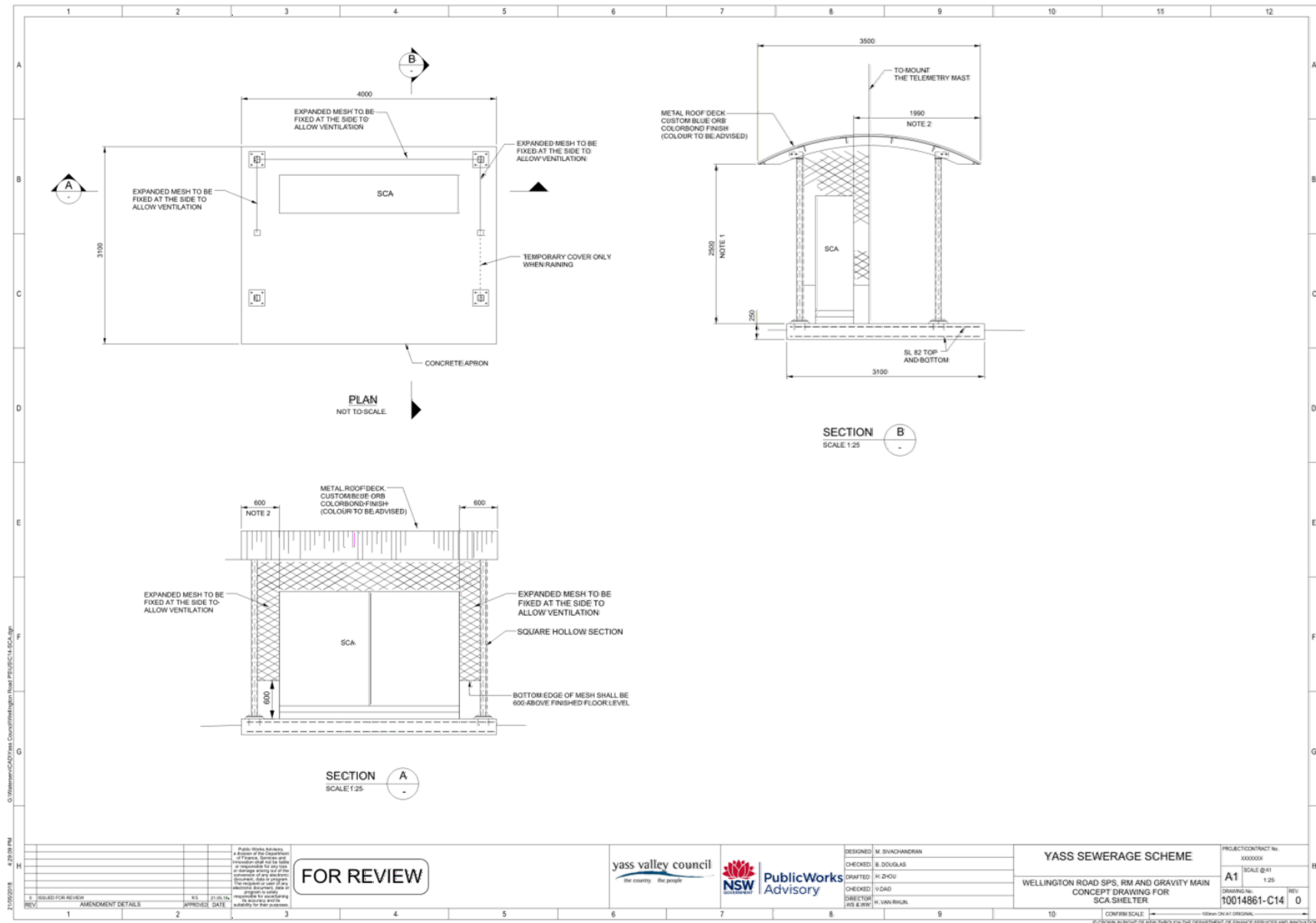
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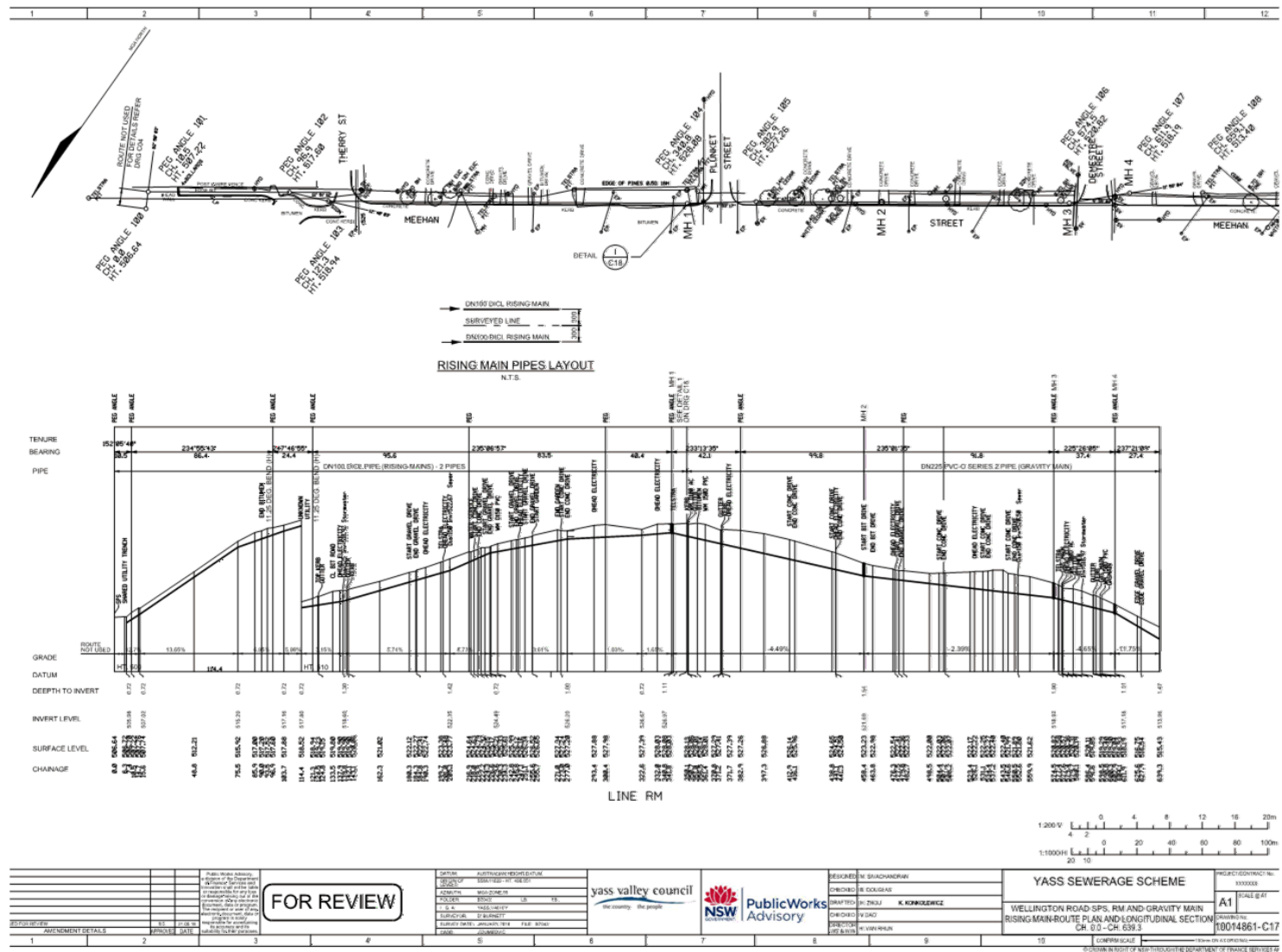


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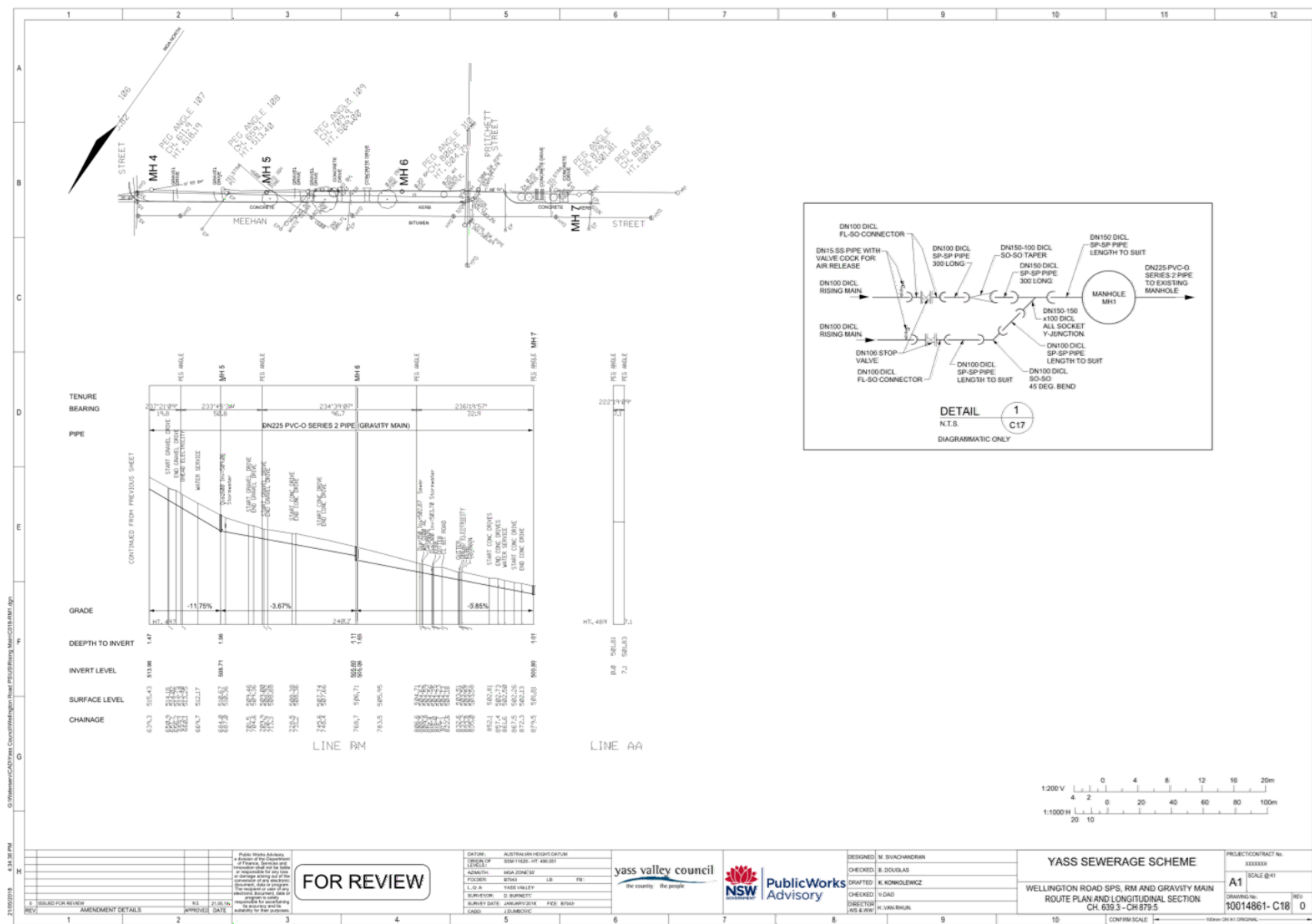
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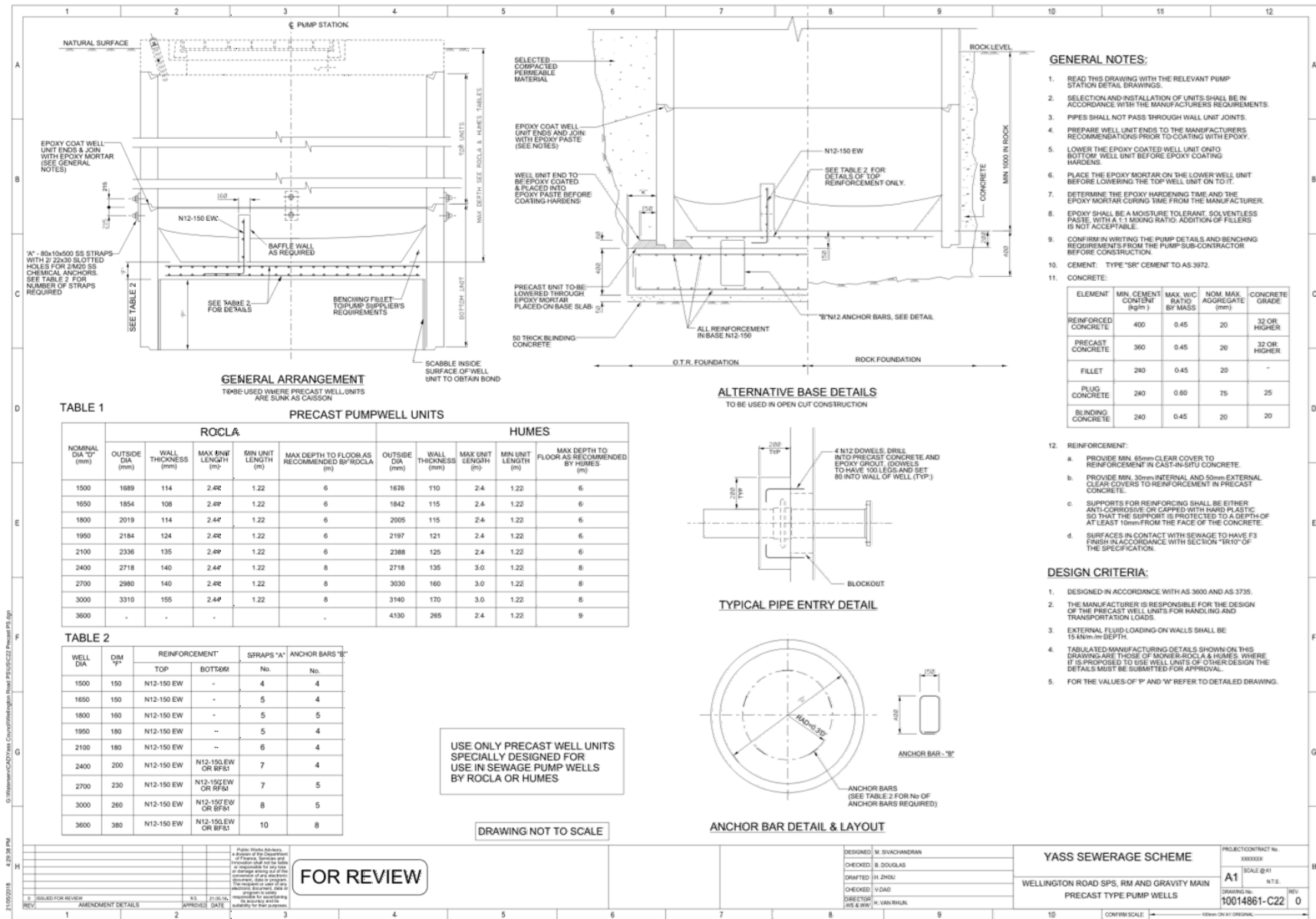


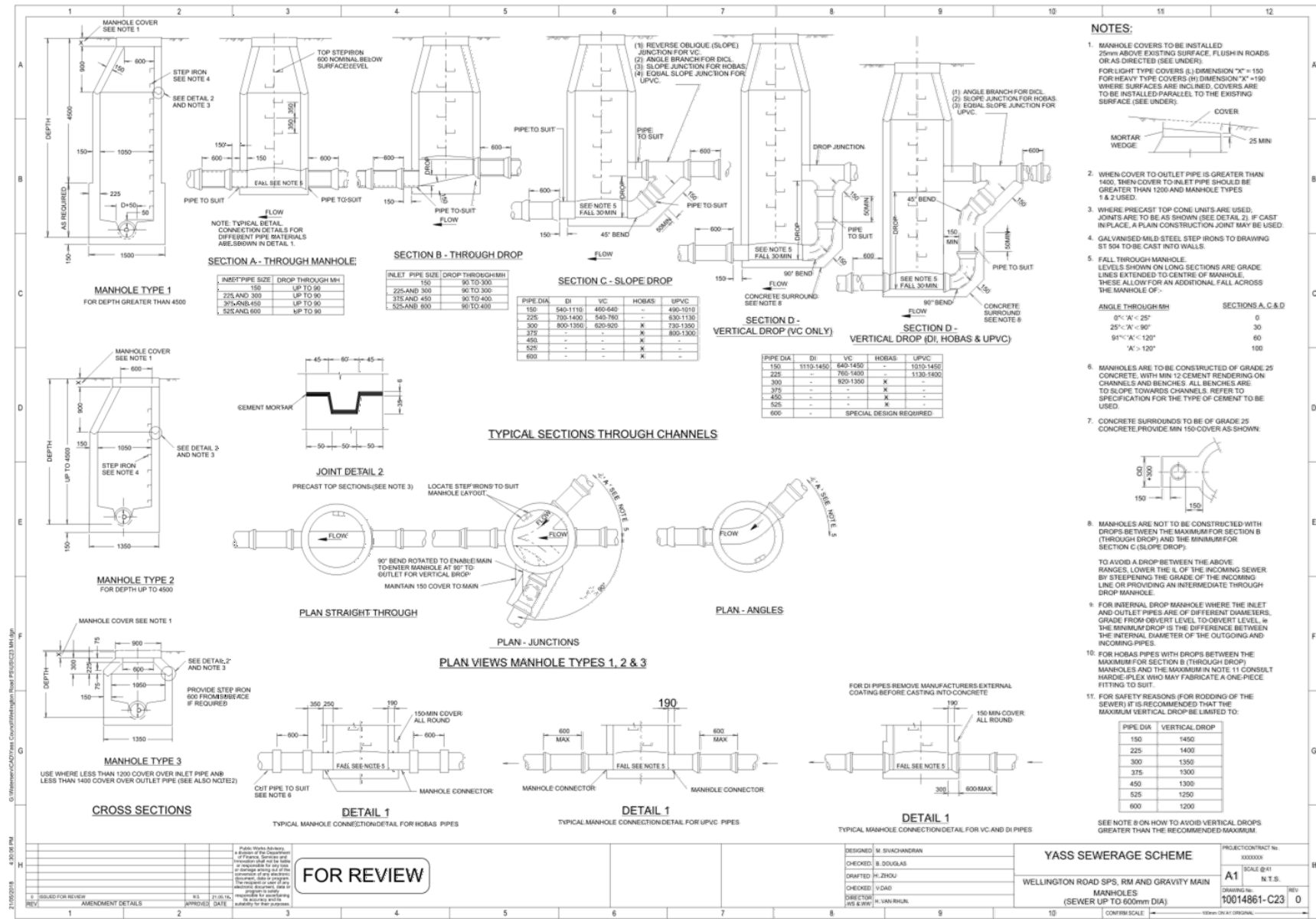
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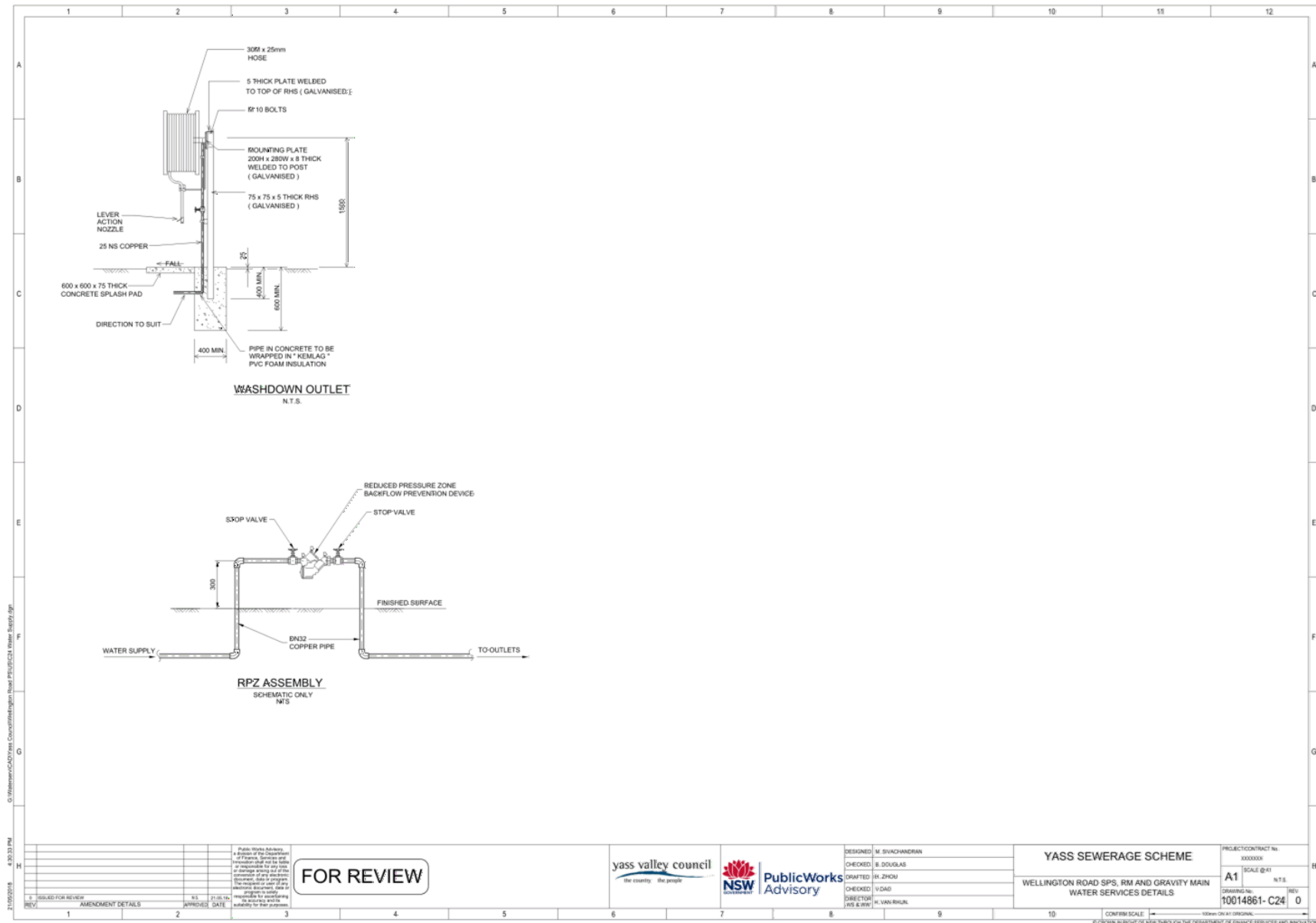




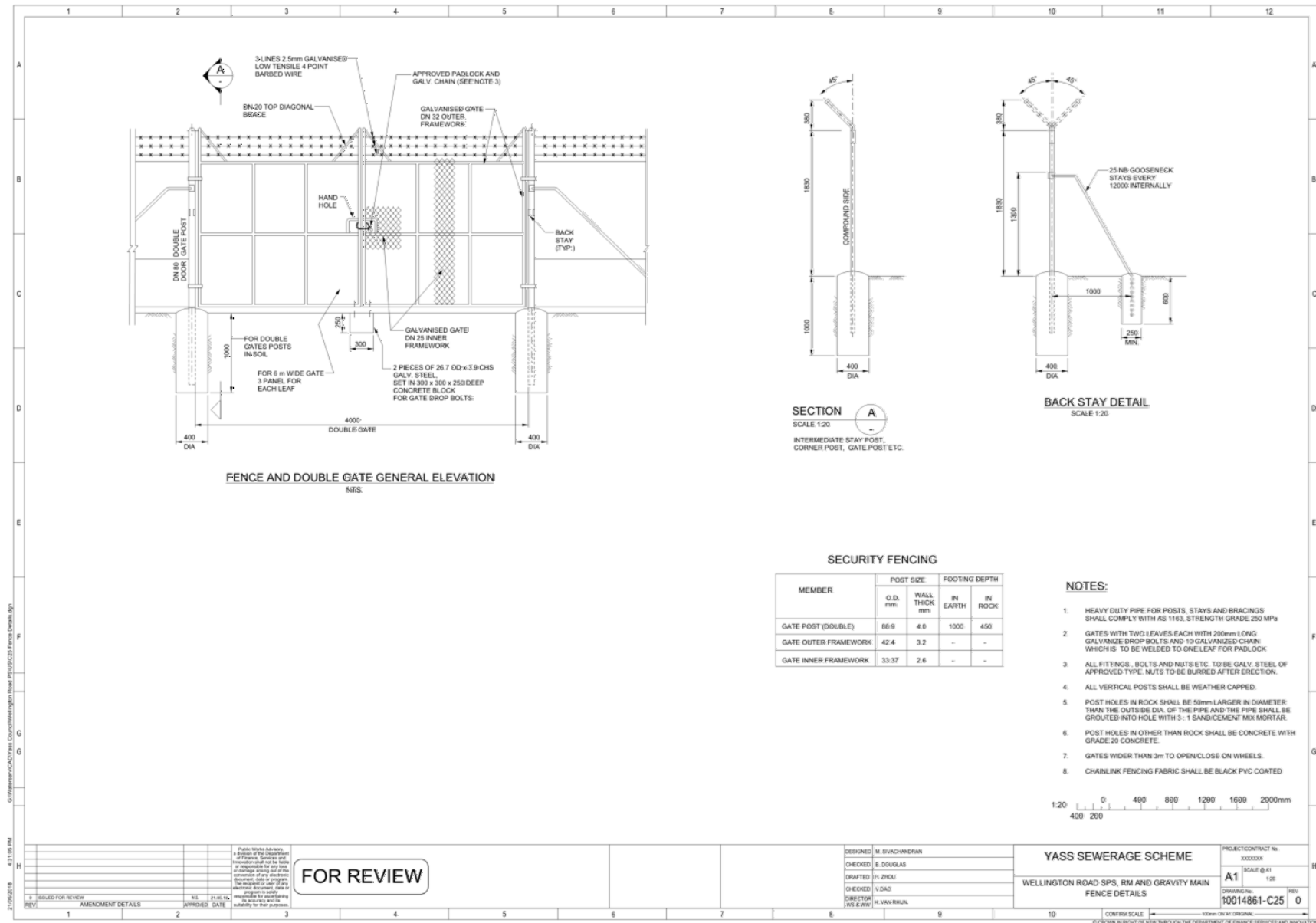


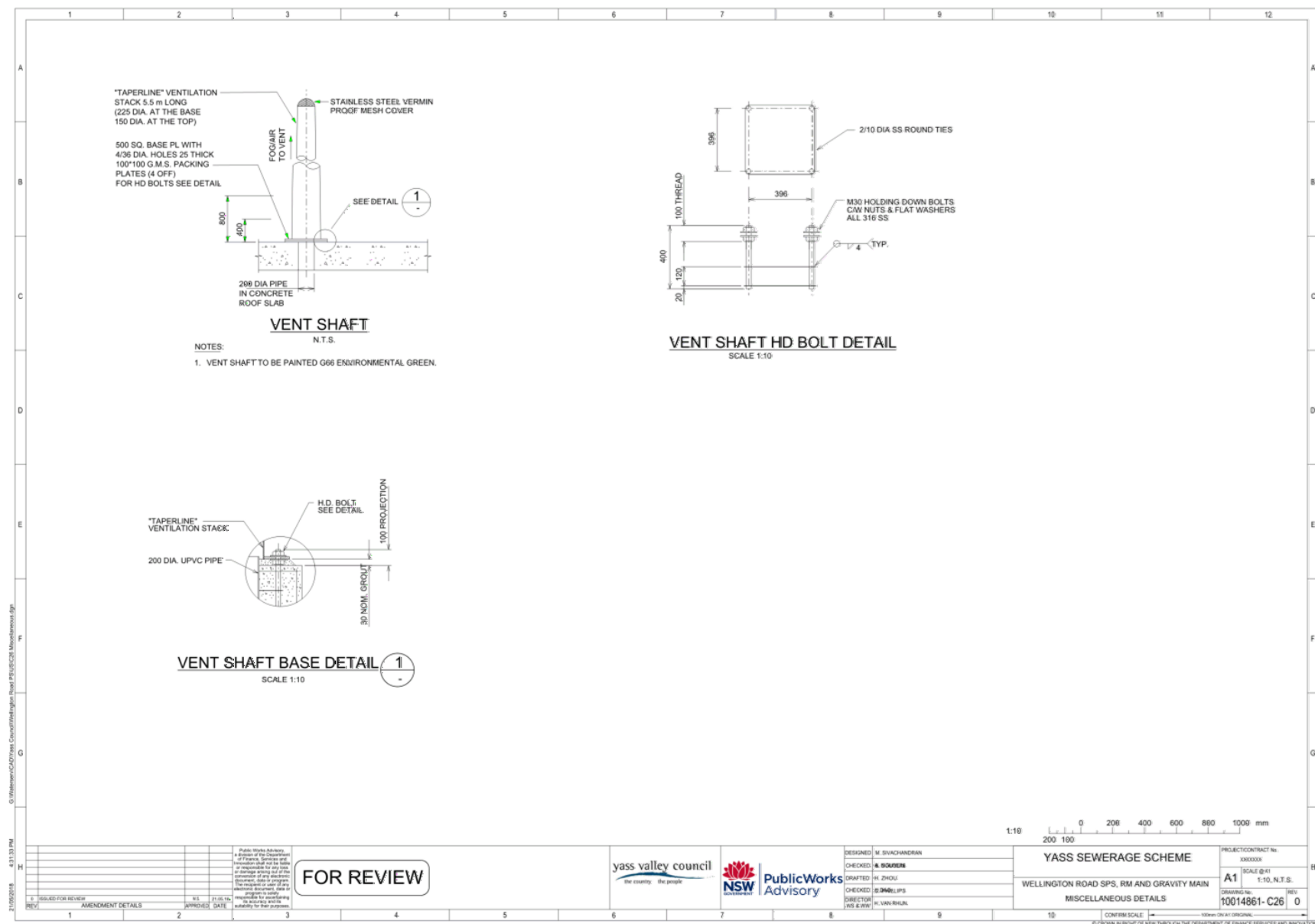
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*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Appendix B – Consideration of Clause 228

Clause 228 of the EP&A Regulation 2000 indicates, for purposes of Part 5 of the Act, the factors that must be taken into account when consideration is being given to the likely impact of an activity on the environment.

A determining authority is only required to consider the following matters where an EIS has been prepared for a Part 5 activity under the EP&A Act. However, the following information is provided to assist determining authorities in making determinations consistent with those made for an activity requiring preparation of an EIS.

The various factors and findings following environmental assessment are presented below.

(a) any environmental impact on a community,

There is the potential for some minor and temporary noise, dust and traffic and access impacts during construction.

(b) any transformation of a locality,

The proposed construction of the SPS and rising main would result in a minor transformation of grassed paddocks. This would not result in a significant transformation of the locality.

(c) any environmental impact on the ecosystems of the locality,

Some vegetation would need to be cleared. No significant impact to threatened species is anticipated.

(d) any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality,

None identified.

(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,

None identified.

(f) any impact on the habitat of protected animals (within the meaning of the Biodiversity Conservation Act 2016),

None identified.

(g) any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air,

None identified.

(h) any long-term effects on the environment,

None identified

(i) any degradation of the quality of the environment,

Temporary degradation may occur during the works due to excavation and associated impacts.

(j) any risk to the safety of the environment,

None identified.

(k) any reduction in the range of beneficial uses of the environment,

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

None identified.

(l) any pollution of the environment,

There is the potential for some minor and temporary noise and air pollution during the construction works. With the implementation of appropriate mitigation measures during construction there would be no long term or significant pollution of the environment.

(m) any environmental problems associated with the disposal of waste,

None identified.

(n) any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply,

None identified.

(o) any cumulative environmental effect with other existing or likely future activities,

None identified.

(p) any impact on coastal processes and coastal hazards, including those under projected climate change conditions.

Not relevant to this proposal.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Appendix C – Consultation Responses



Office of
Environment
& Heritage

DOC18/425592-2

Kristen Parmeter
Environmental Scientist
Public Works Advisory
66 Harrington Street
SYDNEY NSW 2000
Kristen.parmeter@finance.nsw.gov.au

Dear Ms Parmeter

Request for Environmental Assessment Requirements (EARs) – Proposed Sewage Pump Station and Rising Main – Meehan Street Yass

Thank you for referring this project to the Office of Environment and Heritage (OEH) for our comment. We have provided a list of Environmental Assessment Requirements (EARs) in Attachment 1 for this project that relate to flooding, water quality, impacts on river/estuary health, biodiversity and Aboriginal cultural heritage. We understand the project is to construct a sewage pumping station (SPS) and associated sewer rising main, to service new development in the Wellington Road area of Yass, NSW.

Flooding: The Yass Flood Study (2016) indicates that the proposed SPS is located within flood prone land, immediately adjacent to a minor tributary of the Yass River. The designs for any such infrastructure on flood prone land should involve council and Public Works considering and being satisfied that the floodplain risk management risks have been adequately addressed in the Review of Environmental Factors (REF).

Biodiversity: The REF should assess the ecological impacts associated with the proposed works in accordance with the recently commenced *Biodiversity Conservation Act 2016*. We also recommend that the project's impacts be addressed in accordance with the avoid, minimise and offset hierarchy established in OEH offsetting principles and relevant legislation.

We note that there are several records nearby of the Superb parrot (*Polytelis swainsonii*), a threatened species listed under the *Biodiversity Conservation Act 2017*. We also note that parts of the site are likely to be Natural Temperate Grassland, which is listed in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This means that the project may need to be referred to the Commonwealth Department of Energy and Environment for further consideration.

OEH recommends that the appropriate surveys are completed to identify any impacts this development may have on threatened species, including threatened birds and reptiles which may be present in the Natural Temperate Grassland.

Aboriginal cultural heritage: OEH supports the preparation of a Due Diligence assessment by a qualified archaeologist to support the Review of Environmental Factors. The absence of recorded sites on AHIMS within the location of works does not mean that archaeological sites are not present, only that none have been recorded. Although the proposed works are located within an established urban environment, they are also within an archaeologically sensitive landform


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because they are within 200m of the Yass River. The potential for Aboriginal objects to occur within the project footprint must therefore be considered.

If Aboriginal objects are likely to be harmed by the project an Aboriginal Heritage Impact Permit (AHIP) will be required from OEH under the *National Parks and Wildlife Act 1974*. Further details of the assessment requirements for Aboriginal cultural heritage are provided in Attachment 1 (Part 4).

If you have any questions, or would like more information or advice on these requirements, please contact Lyndal Walters on 02 6229 7157.

Yours sincerely


ALLISON TREWEEK 2/7/18
Senior Team Leader, Planning - South East
Regional Operations Division
OFFICE OF ENVIRONMENT AND HERITAGE

Enc: Attachment 1: OEH's Environmental Assessment Requirements for the Proposed Sewage Pump Station and Rising Main – Meehan Street Yass.
Attachment 2: Guidance material

Attachment 1

OEH's Environmental Assessment Requirements (EARs) for Yass SPS and Rising Main – Meehan Street Yass

1. Flood Risk Management

As the proposed Sewage Pump Station and Rising Main are located within flood prone land, OEH offers the following flood risk related advice for the project. The designs for any such infrastructure on flood prone land should involve council and Public Works considering, and being satisfied, that the following matters have been adequately addressed with relation to floodplain risk management and associated liabilities:

- the impact of flooding on the proposed development; and
- the impact of the proposed development on flood behaviour on and off site; and
- the impact of flooding on the safety of people/users of both the subject and surrounding development for the full range of possible floods; and
- the implications of climate change (including sea level rise and increased rainfall intensity) and cumulative development impacts on flooding and estimated flood planning levels; and
- the flood compatibility of the design of the infrastructure to ensure continued operation during a flood. For example, the location of wiring, metering equipment etc above flood level where possible.

There is the potential for flooding to cause equipment failure, particularly electrical components, which could be avoided through design by understanding flood behaviour on the site. OEH therefore recommends that council use the following flood related environmental assessment requirements to design and assess the schemes.

1. The REF must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:
 - a. Flood prone land
 - b. Flood planning area, the area below the flood planning level.
 - c. Hydraulic categorisation (floodways and flood storage areas).
2. The REF must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.
3. The REF must model the effect of the proposed project (including fill) on the flood behaviour under the following scenarios:
 - a. Current flood behaviour for a range of design events as identified in 2) above. The 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.
4. Modelling in the REF must consider and document:
 - a. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood.
 - b. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories.
 - c. Relevant provisions of the NSW Floodplain Development Manual 2005
5. The REF must assess the impacts of the proposal on flood behaviour, including:

- a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
- b. Consistency with Council floodplain risk management plans.
- c. Compatibility with the flood hazard of the land.
- d. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
- e. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
- f. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
- g. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council.
- h. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council.
- i. Emergency management, evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES.
- j. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

2. Biodiversity

Biodiversity Assessment Methodology for the Biodiversity Offsets Scheme (BOS)

The REF should assess the impact of the proposed development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" for the purposes of Section 7.2 of the *Biodiversity Conservation Act 2016* (BC Act), as follows:

- a. The REF must demonstrate and document how the proposed development exceeds, or does not exceed, the biodiversity offsets scheme threshold as set out in Section 7.4 of the BC Act 2016 and Clause 7.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation) by determining whether the proposed development involves:
 - i. **The clearing of native vegetation exceeds the thresholds** listed under Clause 7.23 of the BC Regulation, **or**
 - ii. The clearing of native vegetation, or other action, **on land included on the Biodiversity Values Map** published under Clause 7.23 of the BC Regulation (this map includes areas of outstanding biodiversity value, as declared under Section 3.1 of the BC Act).
- b. If the proposal does not trigger any of the criteria in (a) above, then the REF must determine whether the proposed development is likely to have a significant impact based on 'the test for determining whether proposed development likely to significant affect threatened species or ecological communities' in Section 7.3 of the BC Act.
- c. Where there is reasonable doubt regarding potential impacts, or where information is not available, then a significant impact upon biodiversity should be considered likely when applying the test in Section 7.3 of the BC Act. Where it is concluded that there is no significant impact, the REF must justify how the conclusion has been reached.
- d. If the development exceeds the thresholds in (a) or (b), then the REF must be accompanied by a biodiversity development assessment report (BDAR) prepared in

accordance with Part 6 of the BC Act. That is, the Biodiversity Assessment Methodology applies.

Required Information

Where development is considered "likely to significantly impact on threatened species" and a Biodiversity Development Assessment Report is required, the following requirements apply:

- Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and Biodiversity Assessment Method.
- The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
 - The total number and classes of biodiversity credits required to be retired for the proposal.
 - The number and classes of like-for-like biodiversity credits proposed to be retired.
 - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
 - Any proposal to fund a biodiversity conservation action.
 - Any proposal to make a payment to the Biodiversity Conservation Fund
- If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

The BDAR must be prepared by a person accredited to apply the Biodiversity Assessment Method under s6.10 of the *Biodiversity Conservation Act 2016*.

If the proponent chooses *not* to apply the Biodiversity Offsets Scheme/ Biodiversity Assessment Methodology

- 1) The REF should document *the test for determining whether proposed development likely to significantly affect threatened species or ecological communities* as outlined in Section 7.3 of the BC Act, by preparing an ecological assessment that includes:
 - a) A field survey of the site should be conducted and documented in accordance with relevant guidelines, including:
 - i) the *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna - Amphibians* (DECCW, 2009)
 - ii) Threatened species survey and assessment guideline information on www.environment.nsw.gov.au/threatenedspecies/surveyassessmentguidelines.htm
 - iii) If a proposed survey methodology is likely to vary significantly from the above methods, the proponent should discuss the proposed methodology with OEH prior to undertaking the REF, to determine whether OEH considers that it is appropriate.
 - iv) Recent (less than five years old) surveys and assessments may be used. However, previous surveys should not be used if they have:
 - (a) been undertaken in seasons, weather conditions or following extensive disturbance events when the subject species are unlikely to be detected or present, or

- (b) utilised methodologies, survey sampling intensities, timeframes or baits that are not the most appropriate for detecting the target subject species,
 - (c) unless these differences can be clearly demonstrated to have had an insignificant impact upon the outcomes of the surveys. If a previous survey is used, surveys for any additional entities listed under the BC Act since the previous survey took place, must be undertaken and documented.
- b) Where a BDAR is not required and a threatened species assessment is prepared to support a conclusion of "no significant impact", the REF must include a field survey of the site, conducted and documented in accordance with the relevant guidelines including the Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECCW, 2009), Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004) and Guidelines for Threatened Species Assessment (Dept Planning, July 2005). The approach should also reference the field survey methods and assessment information on the OEH website including the Bionet Atlas, Threatened Species Profile and Bionet Vegetation Classification (see Attachment two).
- c) The following information as a minimum:
- i) The requirements set out in the *Guidelines for Threatened Species Assessment* (Department of Planning, July 2005)
 - ii) A description and geo-referenced mapping of study area (and spatial data files), e.g. overlays on topographic maps, satellite images and /or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species and ecological communities present in the subject site and study area.
 - iii) A description of survey methodologies used, including timing, location and weather conditions.
 - iv) Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the REF.
 - v) Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status.
 - vi) A description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect and construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor.
 - vii) Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term management arrangements will be guaranteed.
 - viii) A description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected (see the requirements for this at point 4 below).
 - ix) The 'test for determining whether proposed development likely to significantly affect threatened species or ecological communities, or their habitats' as outlined in Section 7.3 of the BC Act.
 - x) If the EIS determines under Section 7.2 of the BC Act as set out in 1 above that the proposed development is likely to significantly affect threatened species, then in accordance with Section

7.7 of the BC Act the REF must be accompanied by a Biodiversity Development Assessment Report prepared in accordance with Part 6 of the BC Act.

3. Aboriginal cultural heritage

The REF should contain:

1. A description of the Aboriginal objects located within the area of the proposal, in accordance with OEH guidelines including the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales*.
2. A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposal, and the significance of these values for the Aboriginal people who have a cultural association with the land.
3. A description of how the requirements for consultation with Aboriginal people as specified in clause 80C of the National Parks and Wildlife Regulation 2009 have been met.
4. The views of those Aboriginal people regarding the likely impact of the proposal on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and your response.
5. A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposal, with reference to the cultural heritage values identified.
6. A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.
7. A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.

In addressing these requirements, the proponent must refer to the following documents:

- a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (OEH, 2010) - www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf. These guidelines identify the factors to be considered in Aboriginal cultural heritage assessments for development proposals under Part 4 of the *Environmental Planning and Assessment Act 1979*.
- b) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH, 2010) - www.environment.nsw.gov.au/licences/consultation.htm. This document further explains the consultation requirements that are set out in clause 80C of the National Parks and Wildlife Regulation 2009. The process set out in this document must be followed and documented in the EIS
- c) *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH, 2010) - www.environment.nsw.gov.au/licences/archinvestigations.htm. The process described in this Code should be followed and documented where the assessment of Aboriginal cultural heritage requires an archaeological investigation to be undertaken.

Notes:

- An Aboriginal Site Impact Recording Form (<http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm>) must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted through these environmental assessment requirements.
- Under section 89A of the *National Parks and Wildlife Act 1974*, it is an offence for a person not to notify OEH of the location of any Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). An AHIMS Site Recording Form should be completed and submitted to the AHIMS Registrar

(<http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm>), for each Aboriginal site found during investigations.

Requirement for an Aboriginal Heritage Impact Permit (AHIP)

If Aboriginal objects will be directly or indirectly harmed by the proposed development, the proponent must apply for an Aboriginal Heritage Impact Permit (AHIP) from OEH under the *National Parks and Wildlife Act 1974*.

Details on how to apply for an AHIP can be obtained from the OEH website at:
<http://www.environment.nsw.gov.au/resources/cultureheritage/20110280AHIPguideforapplicants.pdf>

Attachment 2 - Guidance Material

Title	Web address
<u>Relevant Legislation</u>	
<i>Biodiversity Conservation Act 2016</i>	https://www.legislation.nsw.gov.au/#/view/act/2016/63/full
<i>Coastal Management Act 2016</i>	https://www.legislation.nsw.gov.au/#/view/act/2016/20/full
<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
<i>Environmental Planning and Assessment Act 1979</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
<i>Fisheries Management Act 1994</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
<i>Marine Parks Act 1997</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+64+1997+cd+0+N
<i>National Parks and Wildlife Act 1974</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
<i>Protection of the Environment Operations Act 1997</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
<i>Water Management Act 2000</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
<i>Wilderness Act 1987</i>	http://www.legislation.nsw.gov.au/viewtop/inforce/act+196+1987+FIRST+0+N
<u>Aboriginal Cultural Heritage</u>	
Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/resources/cultureheritage/10783FinalArchCoP.pdf
Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)	http://www.environment.nsw.gov.au/resources/cultureheritage/20110263ACHguide.pdf
Aboriginal Site Recording Form	http://www.environment.nsw.gov.au/resources/parks/SiteCardMainV1_1.pdf
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/resources/cultureheritage/120558asirf.pdf
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm
Care Agreement Application form	http://www.environment.nsw.gov.au/resources/cultureheritage/20110914TransferObject.pdf

Title	Web address
<u>Biodiversity</u>	
Biodiversity Values Map	https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap
Biodiversity Assessment Method (OEH, 2017)	http://www.environment.nsw.gov.au/resources/bcact/biodiversity-assessment-method-170206.pdf
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	http://www.environment.nsw.gov.au/resources/bcact/guidance-decision-makers-determine-serious-irreversible-impact-170204.pdf
Ancillary rules: Biodiversity conservation actions	http://www.environment.nsw.gov.au/resources/bcact/ancillary-rules-biodiversity-actions-170496.pdf
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	http://www.environment.nsw.gov.au/resources/bcact/ancillary-rules-reasonable-steps-170498.pdf
Ancillary rules: Impacts on threatened species excluded from application of the variation rules	http://www.environment.nsw.gov.au/resources/bcact/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf
OEH Threatened Species Profiles	http://www.environment.nsw.gov.au/threatenedspeciesapp/
BioNet Atlas	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm
BioNet Vegetation Classification	http://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx
Threatened Species Profile	http://www.environment.nsw.gov.au/threatenedSpeciesApp/
NSW Guide to Surveying Threatened Plants (OEH, 2016)	http://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-guide-to-surveying-threatened-plants
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna - Amphibians (DECC, 2009)	www.environment.nsw.gov.au/resources/Threatenedspecies/09213amphibians.pdf
Threatened Species Assessment Guideline - The Assessment of Significance (DECC 2007)	www.environment.nsw.gov.au/resources/Threatenedspecies/tsaguide07393.pdf
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
Fisheries NSW policies and guidelines	http://www.dpi.nsw.gov.au/fisheries/habitat/publications/policies,-guidelines-and-manuals/fish-habitat-conservation
<u>OEH Estate</u>	
Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW, 2010)	http://www.environment.nsw.gov.au/protectedareas/developmentadjoiningdecc.htm

Title	Web address
List of national parks	http://www.environment.nsw.gov.au/NationalParks/parksearchatoz.aspx
Revocation, recategorisation and road adjustment policy (OEHL, 2012)	http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm
List of aquatic reserves	www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/mpa
List of marine parks	www.mpa.nsw.gov.au/contact.html
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	www.environment.gov.au/water/publications/quality/australian-and-new-zealand-guidelines-fresh-marine-water-quality-volume-1
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions	http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	http://deccnet/water/resources/AWQGuidance7.pdf
Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales (DEC 2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf
Flooding	
Floodplain Development Manual	http://www.environment.nsw.gov.au/floodplains/manual.htm
Floodplain Risk Management Guidelines	http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines
NSW Climate Impact Profile	http://climatechange.environment.nsw.gov.au/
Climate Change Impacts and Risk Management	Climate Change Impacts and Risk Management: A Guide for Business and Government, AGIC Guidelines for Climate Change Adaptation
Coastal Erosion	
Reforms to coastal erosion management	http://www.environment.nsw.gov.au/coasts/coastalerosionmgmt.htm
Guidelines for Preparing Coastal Zone Management Plans	http://www.environment.nsw.gov.au/resources/coasts/130224CZMPGuide.pdf
Historic Heritage	
The Burra Charter (The Australia ICOMOS charter for places of cultural significance)	http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf
Statements of Heritage Impact 2002 (HO & DUAP)	http://www.environment.nsw.gov.au/resources/heritagebranch/heritage/hmstatementsofhi.pdf

Title	Web address
NSW Heritage Manual (DUAP) (scroll through alphabetical list to 'N')	http://www.environment.nsw.gov.au/Heritage/publications/
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf



DOC18/380108-01

Ms Kristen Parmeter
Environmental Scientist
Public Works Advisory
PO Box N408
GROSVENOR PLACE NSW 1220

Dear Ms Parmeter

Re: Proposed Sewage Pump Station and Rising Main - Meehan Street, Yass

I refer to your letter dated 8 June 2018 inviting the NSW Environment Protection Authority (EPA) to comment on any matters that the EPA would like to see addressed in the Review of Environmental Factors ('REF') for the proposed Sewage Pump Station and rising main to service new development in the Wellington Road area of Yass, NSW. The EPA understands that Public Works Advisory has been engaged to prepare the REF on behalf of Yass Valley Council and appreciates the opportunity to comment on this matter.

The EPA considers that the following environmental issues will need to be addressed in the REF:

- Water pollution, including sediment and erosion controls
- Noise management
- Air quality impacts and dust management
- Waste management

To assist you with the preparation of the REF, detailed comments on these environmental issues are provided in Attachment 1.

Further, the proposed works will be captured under Environment Protection Licence No. 1730 for the Yass Sewage Treatment Plant and associated reticulation system. The EPA is the appropriate regulatory authority under the *Protection of the Environment Operations Act 1997* (POEO Act) for this activity. As such, it is important that all works undertaken in relation to the proposal are undertaken in accordance with the provisions of the POEO Act, EPL No. 1730 and best environmental management practices.

I trust this information is of assistance. If you have any questions or would like to discuss this matter further please contact me or Amanda Fletcher on (02) 6229 7002.

Yours sincerely

Stefan Press 29/06/18

STEFAN PRESS
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www.epa.nsw.gov.au

Attachment 1: EPA comments on environmental issues to be addressed in the Review of Environmental Factors – Sewage Pump Station and Rising Main, Meehan St, Yass

General Information – Construction Activities

All construction activities should be carried out with due diligence and use best environmental management practices. Council should be aware of the strict liability provisions of the *Protection of the Environment Operations Act 1997* ('POEO Act'), particularly section 120 of the Act which prohibits the pollution of waters. In addition, the Council should be aware that the works are operating in close proximity to residential areas and should consider any impacts to the community, especially noise and dust. Before any works commence, all personnel involved in the construction of the proposal should be aware of the details of the construction works plans, relevant legislation and associated pollution controls and the environmental sensitivity of the surrounding area.

Water Pollution, sediment and erosion controls

Under the POEO Act, it is an offence to pollute water. The REF should consider and detail all potential water pollution control measures, including sediment and erosion controls, as well as all operational procedures to that are required to prevent the pollution of waters. These measures should be in accordance with volumes 1 and 2A of the *'Managing Urban Stormwater – Soils and Construction'* (Landcom, 2004) document.

Noise Management

As the construction works are in close proximity to residential areas, all best practice measures to mitigate noise should be undertaken. The REF should consider all potential impacts of construction noise to the nearby sensitive receivers in accordance with the *'Interim Construction Noise Guideline'* (DECC, 2009), and detail the proposed mitigation measures.

Further, should the REF identify any potential noise impacts on nearby sensitive receivers from the ongoing operation of the sewage pump station, these impacts will need to be assessed in accordance with the EPA's *'Noise Policy for Industry'* (2017).

Air Quality Impacts and Dust Management

The REF should detail any dust mitigation and management procedures to reduce potential pollution to any sensitive receivers in accordance with the POEO Act and *'Managing Urban Stormwater – Soils and Construction'* (Landcom, 2004).

The REF should also detail any potential odour impacts to nearby sensitive receivers from the proposal and measures to mitigate the impacts. Such odour impacts will need to be assessed in accordance with the *'Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW'* (DEC 2006).

Waste Management

The REF should consider any potential waste that is produced by the construction works which should be classified under the *'Waste Classification Guidelines Part 1: Classifying waste'*, and managed and disposed of in accordance with the POEO Act, and the POEO Waste Regulation (2014). All wastes generated by the proposed works must be disposed of lawfully and at appropriate waste facilities where required.

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Appendix D – Due Diligence Heritage Assessment



Aboriginal Cultural Heritage Due Diligence Assessment Yass Sewerage Pump Station



Revised Report Prepared for NSW Public Works
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- ❖ Location or detailed information regarding places of Aboriginal cultural significance, as expressed or directed by Representative Aboriginal Organisations, Aboriginal elders, or members of the wider Aboriginal community.
- ❖ Other culturally appropriate restricted information as advised by Aboriginal representatives and traditional knowledge holders.

Information in the report covered by the above categories should be redacted before being made available to the general public. This information should only be made available to those persons with a just and reasonable need for access.

CONTENTS

EXECUTIVE SUMMARY i

1	INTRODUCTION	1
1.1	PROJECT OBJECTIVES.....	1
1.2	ABORIGINAL CONSULTATION	2
2	DESKTOP ASSESSMENT RESULTS.....	5
2.1	HERITAGE DATABASE SEARCHES	5
2.2	AHIMS SEARCH	5
2.3	ABORIGINAL GROUPS WITHIN THE PROJECT AREAS	7
2.4	PREVIOUS HERITAGE STUDIES.....	7
2.5	PREDICTIVE MODEL.....	11
2.6	LANDFORM AND DISTURBANCE LEVEL ASSESSMENT	12
3	FIELD SURVEY RESULTS	13
3.1	GROUND SURFACE VISIBILITY	13
3.2	DISTURBANCE.....	14
3.3	2020 SITE VISIT	14
3.4	ASSESSMENT RESULTS	15
3.4.1	Results - Aboriginal Heritage Sites	15
3.4.2	Results - Areas of Potential Archaeological Deposit (PAD)	15
3.4.3	Summary.....	16
4	IMPACT ASSESSMENT.....	17
4.1	RECOMMENDATIONS.....	19
5	REFERENCES.....	20

EXECUTIVE SUMMARY

Yass Valley Council is proposing to install a new sewage pumping station (SPS) in Yass to service a new residential sub-division. The SPS would be constructed within Lot 9 DP1160355, located off an access road (informally identified as Wellington Road), between Therry Street and Grand Junction Road. This location is situated between two house lots on the basal slopes of a drainage line.

The SPS would have a construction footprint of an approximate 15 x 38m area, located within an section of high previous impact. Construction of adjacent houses and water infrastructure for residential development, has impacted this area, removing within this limited area of the pump station footprint any potential for Aboriginal heritage to have been preserved. The location of works is shown in Figure 1 in a regional context and in detail in Figure 2.

The proposal consists of construction of the pump station, involving excavation of soils and levelling in adjacent areas. These works have the potential to impact on any unrecorded Aboriginal heritage sites which may be present. To determine the impacts of the development this Due Diligence assessment has been undertaken.

The Due Diligence heritage assessment has been undertaken in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a). This assessment consisted of a review of heritage registers, review of relevant reports and a site survey to confirm the findings of the desktop assessment.

A review of heritage registers revealed no recorded heritage sites within the project area and a review of landforms showed that the lower slopes of the creek line were considered to hold low - moderate potential. The heritage site of Riverside Camp is located to the north of the project area, at a distance to the proposed works and will not be impacted within the registered site boundaries.

Field survey was undertaken across the project area in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b). The field survey covered all impact areas. No heritage sites or areas of PAD were identified during the field survey and a high level of previous disturbance to the area was recorded. This level of disturbance is considered to have removed all potential for heritage sites to remain within this location.

Following submission of the original Due Diligence Report to Yass Valley Council concerns have been raised by the Aboriginal community that impacts may extend into the Riverside Park heritage site, whose boundary has been incorrectly recorded on site cards and in the AHIMS database. As a result of these concerns, consultation with the Aboriginal community has been undertaken for the Due Diligence Assessment. This consultation consisted of discussions with the Onerwal Local Aboriginal Land Council (OLALC) and members of the Buru Ngunawal Aboriginal Corporation (BNAC) and site visit with each to view the project boundary, current levels of impact and the relationship of the work to the recorded site and the extended potential boundary. These site visits resulted in the finding that, although the general area held high cultural values, the proposed works footprint had been highly impacted, removing the potential for heritage items in this location. Works held the low potential to impact on any heritage items and works could proceed in this area. For cultural reasons

these works (removal of topsoils) should be monitored to allay any concerns from other members of the community who have not been actively consulted in regards to the project.

As a result of the field survey and background research completed for the project, the following findings and recommendations have been developed:

- ❖ No areas of potential archaeological deposits or heritage sites have been identified within the development area and the potential for Aboriginal or Historical heritage objects to be present within the development area has been assessed as low.
- ❖ Due to the cultural sensitivity of the Yass River Area, cultural monitoring by the OLALC should be allowed during the removal of top soils, despite prior impacts affecting the potential for heritage sites within the project area.
- ❖ As monitoring involves working in proximity to excavation machinery, the monitors will observe the WHS directions of the excavation director. If the required safety distance precludes observance of soils, works will cease at regular intervals to allow monitors access to the works. Timing of intervals to be agreed by on site workers.
- ❖ All Aboriginal objects are protected under the *NSW National Parks and Wildlife Act 1974*. It is an offence to disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage. Should any Aboriginal objects be encountered during works then works must cease and the find should not be moved until assessed by a qualified archaeologist. Monitors are not authorised to remove material or to authorise work to continue.
- ❖ In the unlikely event that human remains are discovered during the construction, all work must cease. DPIE, the local police and the appropriate LALC should be notified. Further assessment would be required to determine if the remains are Aboriginal or non-Aboriginal.
- ❖ Further archaeological assessment would be required if the proposal activity extends beyond the area of the current investigation.

1 INTRODUCTION

This report provides Aboriginal heritage due diligence advice for the proposed construction of a sewer pump station on Lot 9 DP1160355 between Meehan Street and Grand Junction Road in Yass NSW. The sewer pump footprint covers an area of 15m x 38m on lower slopes of an unnamed tributary creek line to the Yass River, which runs to the north of the project area. The study area in a regional context is shown on Figure 1. The proposed construction area is shown on Figure 2.

Although confined to a small development footprint the required works are high impact and would have a negative impact on any Aboriginal heritage located within the project boundary. Aboriginal heritage sites may be located on the surface or subsurface in areas of high potential for the preservation of archaeological remains of past usage by Aboriginal groups.

To assess the potential impacts of the proposed works on Aboriginal heritage this Due Diligence Heritage Assessment has been undertaken.

This report, field survey and associated research has been conducted in accordance to the requirements of the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010).

1.1 PROJECT OBJECTIVES

The due diligence assessment is being undertaken to complete the following objectives:

1. Review of the NSW Department of Planning, Industry and Environment (DPIE), Aboriginal Heritage Information Management System (AHIMS), to identify any recorded heritage sites within the project area.
2. Review of Yass Valley Local Environment Plan (LEP) to determine the presence of any recorded heritage.
3. Review of previous heritage reports in area to develop predictive model of Aboriginal site location
4. Assess landforms present in project area against predictive model to determine potential for heritage sites and determine level of disturbance
5. Complete site visit to visually inspect impact areas or areas assessed as holding potential based on predictive model and record any identified heritage sites. The site visit will also document levels of disturbance within project area.
6. Complete due diligence report with management recommendations to avoid or minimise impacts within the project area.

1.2 ABORIGINAL CONSULTATION

Due to the small size of the project area and proposed subdivision no consultation with the local Aboriginal community has been undertaken. Consultation with the Aboriginal community is not a requirement of the Due Diligence Code of assessment, which is undertaken at the preliminary planning stage of the project.

On submission of the original report to the Yass Valley Council, the Aboriginal community raised concerns that the project area may extend into the boundaries of the Riverside Camp heritage site, whose boundaries are incorrectly mapped on the site card and AHIMS register.

To address these concerns, consultation with the Aboriginal community has been undertaken for the revised Due Diligence Assessment. This consultation consisted of discussions with the Onerwal Local Aboriginal Land Council (OLALC) and members of the Buru Ngunawal Aboriginal Corporation (BNAC) and site visit with each to view the project boundary, current levels of impact and the relationship of the work to the recorded site and the extended potential boundary.

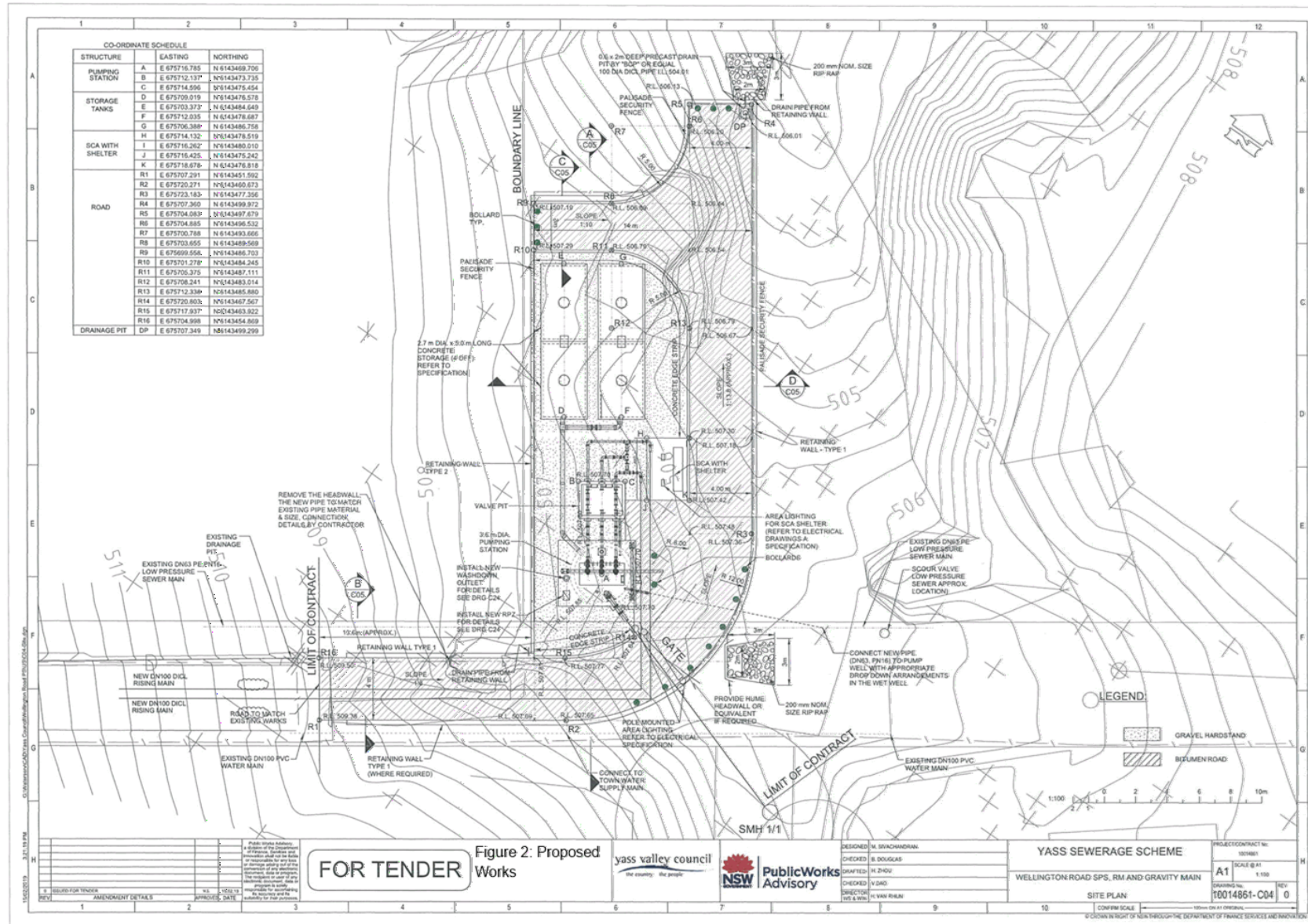
- ❖ Ms Karen Denny of the BNAC attended a site visit on the 22/4/2020 and
- ❖ Mr Bradley Bell of the OLALC attended a site visit on the 13/5/2020.

The results of onsite discussions were then outlined in a letter which was sent to each on the 23/5/2020 for their review to ensure that their views had been correctly captured in the document. A copy of this letter is provided in Appendix A.

The results of the site visit are provided in Section 3 of the report in conjunction with the results of the desktop and survey results.



9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors



2 DESKTOP ASSESSMENT RESULTS

2.1 HERITAGE DATABASE SEARCHES

Within NSW Local government is responsible for managing heritage items. This responsibility is mainly fulfilled by listing heritage items in the Local Environmental Plans (LEPs) under the *Environmental Planning & Assessment Act 1979*. Council approval is required to impact any listed item.

Searches of the State Heritage inventory and Yass Valley Local Environmental Plan (LEP) 2013 were conducted to determine if any places of Aboriginal significance are located within the vicinity of the current project area. The LEP search showed one item – A288 the Riverside Camp (listed in 2013) as a place of Aboriginal significance. This site is located to the north of the project area and consist of the remains of the historic 'Blacks Camp' an area which was occupied for huts and houses from the 1800s to the 1900s. The listing covers Lot 1 DP782734 and covers approximately 1.5ha and will not be affected by the proposed works.

2.2 AHIMS SEARCH

An updated search of the DPIE Aboriginal Heritage Information Management System (AHIMS) database was undertaken on the 26/5/2020 covering the 1km surrounding the project area. The extensive search revealed no previously recorded heritage sites within the project area with 9 sites within the wider search area, mostly located on the northern bank of the Yass River. Historically sites were known to exist at the Oak Hill Aboriginal reserve which was used as a camp for Aboriginal people on the northern bank of the Yass River and the Riverside Camp (also known as the Town Camp, Weir Camp or 'Blacks' Camp), located on the southern bank.

It should be noted that the AHIMS database can only provide data on recorded sites. In areas of low or no heritage survey the data will be missing from the records. This lack of data does not equate to an absence of sites, only to the absence of recorded sites.

The sites located in this area consist of small artefact scatters, one area of potential archaeological deposit (PAD) and isolated finds of stone artefacts. A burial site is recorded to the north of the project area which is part of site 51-4-0001 (Oak Hill) which has been gazetted as an Aboriginal Place (no 50 – Oak Hill). Oak Hill and the Riverside Camp are entered on the Yass LEP 2013 (See Section 2.1).

The sites located in the wider search area consist mainly of small artefact scatters and conform to the wider site predictive model for the Yass Region (Koettig and Silcox 1985, Koettig 1986, White and Cann 1986, NSW Archaeology 2009). This model predicts a site location model of small sites located on level ground or terrace features in proximity to water sources, with larger sites with subsurface deposits being present in proximity to water features such as creek confluence or major water sources. This predictive model is discussed in more detail in Section 2.3. The heritage site types located within the search area are shown on Figure 3 in relation to the project area. The results of the AHIMS search are attached at Appendix B for further information.



2.3 ABORIGINAL GROUPS WITHIN THE PROJECT AREAS

The major language group identified in the Yass region by Norman Tindale in his seminal work on Aboriginal tribal boundaries are the Ngunnawal people. The Ngunnawal (Ngunnawal) were also known as the Yass tribe, Lake George Blacks or Molonglo tribe. The boundaries of the Ngunnawal ran to the south east where they met the Ngarigo at the Molonglo and the Gundungurra to the north of Lake George (Tindale 1974). This distribution with minor amendments is still accepted and the review of tribal boundaries undertaken in the 1990s (Horton 1996) confirmed these earlier linguistic divisions.

One of the best sources for observations of the Indigenous inhabitants of the Yass region is Bennett who lived in the district from the 1830s and noted many features and traditions of Aboriginal life (1834). His observations must be viewed as from a European perspective but despite these limitations his work is a valuable reference for the region. His reflections on the Aboriginal life of the region provide a glimpse of a functioning hunter and gatherer lifestyle with a cycle of repeated visits to areas at times of seasonable resource availability and a ceremonial life that imposed duties and responsibilities on members of the group.

The flat, rolling topography of the Yass region and the lack of natural physical barriers (such as impassable gorges or rivers) would have facilitated contact and movement through the region. Broad ridgelines were often used for travelling distances through country, avoiding steep valleys and river gorges to reach resource areas. The Yass River is a major waterway which would have provided a permanent water resource, along with a range of resources. The oldest dates for Aboriginal people living in the broad region comes from around Lake George, where stone artefacts were excavated from a layer of sand that dated to between 17,000 and 23,000 years ago (BHM 2016:21).

Disease followed the settlement of the area and may have preceded it with the smallpox epidemic originating in Sydney in 1789 possibly spreading throughout the region (Flood 1980:32). This disease would have decimated the Aboriginal population and was followed by Influenza in 1846. The notable decline of the number of the Aboriginal people was noted in 1845 at Bungonia and in 1848 at Goulburn by the Bench of Magistrates (Tazewell 1991:244).

2.4 PREVIOUS HERITAGE STUDIES

A number of heritage studies have been undertaken in the immediate area of Yass, mainly focused on the north of the Yass River and in relation to the development of East Yass and the Water Treatment Plant. These assessments have been mainly small scale and development focused (AHS 2003; Thompson 2003, BHM 2016). Focused studies have been undertaken for the protection of the Oak Hill area (Koettig 1986, Anutech 1986, Boot and Kabaila 1995, Waters 2004) which have left detailed oral accounts of Aboriginal occupation of the area. Studies covering a larger area and generating models of occupation have been undertaken in the Yass Valley (Koettig and Silcox 1983, 1985, 1988, Kabaila 1995, NSW Archaeology 2009a and b).

A review of this large body of work has been undertaken to provide context and site location modelling for the project area. The most relevant reports for the current project are summarised

below. These reports refer to the southern bank of the Yass River or the opposite bank directly north of the Yass River.

In 1975 Aboriginal burials were reported to the NPWS on the northern side of the Yass River by K. Johnson due to concerns with the proposed Hume Highway alignment. In 1976 the site was inspected by NPWS staff and listed as AHIMS site 51-4-0001 (Oak Hill). In 1982 the regional archaeologist (Sullivan) inspected the site due to concerns over the proposed Council Garbage tip and extended the site to include the entire ridge line north of the recorded burials.

Koettig and Silcox (1983) completed a survey along the preferred route for the Hume Highway Yass By-Pass. The project area covered the 14km length of proposed highway. Low density artefact scatters were located along with 50 isolated finds. Sites were mainly located on low ridges and all were within 200m of water. The extended site 41-1-0001 (Oak Hill) would be impacted by the route and an alternative route was suggested to avoid impacts. This designation of the site boundary was based on Sullivan's 1982 assessment and was not verified by any archaeological evidence.

Koettig and Silcox (1985) undertook survey and assessment of the alternative proposed By Pass route. Nine artefact scatters and six isolated artefacts were recorded. The majority of sites were recorded on slopes associated with ridgelines or hill crests and all were within 200m of a drainage line. The artefact assemblage was dominated by unmodified flakes and flaked pieces of quartz.

Koettig (1986) completed the assessment for the proposed extension of the Yass Water Treatment Plant, adjacent to Oak Hill. This assessment carried out a field survey, review of Aboriginal reserves, previous work on Oak Hill and consultation with the Local Aboriginal Land Council. The report concluded that if the option to the north of the current water treatment plant was to proceed that due to the sensitivity of the area that a detailed investigation would be required.

White and Cane (1986) for ANUTECH completed a large scale assessment of the Aboriginal settlement and Burial patterns in the Yass region in response to Koettig's recommendation for the proposed extension of the Yass Water Treatment Plant. This report was commissioned by the NSW National Parks & Wildlife Service to investigate evidence for the potential presence of Aboriginal burials along the eastern side of Cooks Hill Road (AHIMS Site No. 51-4-0001).

Ecological (2016) undertook a detailed assessment for a proposed subdivision which covered the area of Lot 2 DP503391. Ecological undertook a field survey paying particular attention to site 51-4-0001 (the extended area defined by Sullivan 1992) along Cooks Hill Road. No sites were identified or areas of heritage potential and the project allowed to proceed.

On the southern bank of the Yass River, the Riverside Blacks camp has been recorded (51-1-0043) by Phil Boot in 1995, located on a flat, rocky knoll overlooking the Yass River, in the vicinity of the Yass Dam Wall (Boot 1995: site card). The site consists of a group of hut platforms and mounds which date to the 1800s when the Aboriginal community settled here following white settlement. The site was occupied till the early 1900s and huts were constructed of tin and timber. This site is located approximately 175m – 200m to the northeast of the current project area.

Kabaila in 1995 as a component of his thesis, undertook research on the Riverside Camp, mapping the locations of house mounds, gardens and tracks. He reports that an Aboriginal infant burial may

be present 90m to the south. This is a detailed recording in regards to the Riverside Camp and has not been contradicted by further studies or consultation. Extensive consultation was undertaken with community members who have since passed on and no indication of heritage sites or values as far south as the current project area were recorded. The possible burial to the south would have been located along the ridgeline, which now is under housing (see Plate 2).

Saunders undertook a survey in 2003 for the 60ha East Yass Proposed Residential Subdivision. This project area is located approximately 1.2km to the south of the SPS site. Saunders recorded one Aboriginal, one European site and one area of Potential. The Aboriginal site consisted of two quartz flake and the area of potential was in proximity to a spurline. The mapping location of this site places it in the vicinity of the Yass River based on AHIMS site card, however the mapping and description in the original report show this site to be on the northern side of Yass Valley Way and a distance from the current project area. This is a discrepancy in recording.

NSW Archaeology in 2009 completed a heritage assessment for the Yass Dam Raising project. This survey area was located to the east of the current study area and covered the inundation area on both sides of the Yass River. Dibden records the location of the Riverside Camp as being adjacent to the Dam wall and does not mention locating any evidence contradicting the earlier studies by Boot (1995) and Kabaila (1995). On additional small site SU17/1 was located consisting of two chert flakes on a raised terrace in proximity to the Yass River. This site is approximately 60m to the north east of the SPS area. Due to the proximity of the Blacks Camp to the Dam Wall, the construction compound was constructed on the western bank with minimisation of works on the eastern bank.

Bindon in 2011 undertook a review of Saunders 2003 work and discounted both the Aboriginal site and area of PAD as holding any Aboriginal heritage values and queried the validity in site identification. He recommended that the two AHIMS recordings be removed but this has not occurred to date.

CHMA in 2013 completed the Yass Valley Heritage Study, covering all areas of heritage significance in the boundaries of the Yass Valley Council. The study discusses at length the Riverside Camp but (following Kabaila 1995) locates this to the area adjacent to the Yass Dam Wall and covering an area of 3ha. A small artefact scatter was recorded at the end of Guginya Place on the edge of the recorded boundary of Riverside Camp on the ridgeline. Aboriginal representatives recalled finding artefacts along this ridgeline. The recorded location and the additional survey along the ridgeline undertaken by CHMA confirms the placement of the site distant to the proposed works. The study does not mention any heritage values or sites within the immediate project area or surrounds.

The location of the current pump station impact footprint, recent developments in the areas and the recorded location of the Riverside Camp is shown in Plates 1 and 2. It should be noted that these photos date to 2019 and do not show the extent of new housing which now extends to the edge of the project area on the west and the extent of current construction works in the project area.



Plate 1. Oblique aerial photo showing element locations (2019).



Plate 2. Aerial photo showing distance to Riverside Camp (2019).

2.5 PREDICTIVE MODEL

Based on the previous assessments completed through the region site locations and types can be summarised as follows for Aboriginal occupation of the region:

- ❖ the majority of open artefact scatters are located near major water resources, creek lines, particularly on reasonably level, elevated ground and low gradient basal slopes
- ❖ large artefact scatters occur most frequently within 100-150m of waterways most notably at creek confluences,
- ❖ artefact scatters occurring away from major creek lines tend to be small and sparse,
- ❖ scarred trees may occur wherever old growth trees of sufficient age have survived (locally at least 140-150 years).

The following predictive model has been developed for the project area (Table 1). This site prediction model is based on:

- ❖ Landscape features within the project area
- ❖ Probability of site type to be present within the project area
- ❖ Natural resources that may have been present and of use to Aboriginal people within the project area

Table 1 Site Prediction Model

Probability	Site Type	Definition	Landform
Moderate	Isolated finds and surface scatters of stone artefacts	Stone artefacts ranging from single artefact to high numbers	Creek line basal slopes and river frontages.
Low	Potential Archaeological Deposits (PADS)	Area considered on landform to hold higher potential for unidentified subsurface deposits	Elevated terraces along River frontage and creek lines – not present in project area
Low	Stone arrangements	Arrangements of stones by human intention, including circles lines or patterns.	Undisturbed areas - unlikely in project area
Nil	Culturally Modified Trees (CMTs)	Trees which have been modified by scarring, marking or branch twining	Based on aerial - no trees in areas
Nil	Burials	Burials of Aboriginal persons	Usually requiring deep sandy soils on eastern facing slopes – not present in project area

2.6 LANDFORM AND DISTURBANCE LEVEL ASSESSMENT

The study area consists of gentle lower slopes, rising from the unnamed creek south west to Meehan Road on the hill crest. Lower slopes in proximity to intermittent water resources are considered to hold moderate to low potential for Aboriginal sites based on the wider regional model for Yass. However, none of the recorded sites in the immediate vicinity are recorded on these landforms.

Aerial photography (2017) shows this area of the creek line to be within the floodplain and appears to have suffered disturbance in the past. To the north of the project area the creek widens and deepens as it approaches the junction with the Yass River. Terraces are also present through this section which would have been the focus for Aboriginal site location and utilisation of water resources. The location of the Riverside Camp is situated on this frontage area running to the north east of the creekline.

The resident's access road from Meehan Road runs along the housing boundary providing access to the proposed pump station site, which is located directly adjacent to the last house boundary fence. A power line and underground sewer are all adjacent to this area. The landform would have been impacted by the placement of this infrastructure in addition to natural effects such as erosion and flooding.

The landform is considered to hold low potential to retain any heritage items and a primary aim of the field visit will be to determine if this desktop assessment is valid.

3 FIELD SURVEY RESULTS

A site visit and field survey of the project area was originally undertaken on the 7th March 2018 to verify the findings of the desktop review of landforms and disturbance. The aim of the investigation was to identify heritage objects or places of potential archaeological deposit (PAD). Based upon the small size of the project area, background research, known Aboriginal site patterning and existing ground disturbances the entire impact footprint of the proposed pump station was inspected.

The field survey was undertaken in accordance with the *Code of Practice for the Investigation of Aboriginal Objects in NSW* (DECCW 2010) and consisted of pedestrian transects across the impact areas. All surveyed areas and items of interest were recorded on a topographic map of the study area (using a GPS and GDA 94 coordinates), along with levels of visibility, erosion, soil conditions, and evidence of land disturbance.

The site visit resulted in the following findings.

3.1 GROUND SURFACE VISIBILITY

Ground surface visibility (GSV) is the percentage of ground surface that is visible during the field inspection. GSV increases in areas of low grass or vegetation coverage, in areas of exposures such as stock impact trails, roads, gates and along areas of erosion such as creek banks and dam walls. As a result surveys undertaken in areas with high exposure rates and/or high GSV result in a more effective survey coverage.

GSV across the project area during the field survey was estimated to fair (40%) across the project area, due to grass coverage and frequent areas of exposure caused by water flows, foot tracks and erosion areas. The combination of ground surface visibility and the rate of exposures throughout the study area combined to make the field survey result in effective coverage. No surface artefacts were visible and the area is considered to hold low potential for surface or subsurface sites. The conditions across the project area at the time of field survey in 2018 are shown in plates 3 to 6.



Plate 3. View south across project area



Plate 4: View south along drainage line



Plate 5: View south west to Meehan Rd



Plate 6: View North across lower slopes

3.2 DISTURBANCE

The 2018 site visit found that the area of the proposed works has been subject to moderate levels of prior disturbance due to the placement of subsurface infrastructure, track placement, erosion and water flows along the drainage line. This disturbance is evident in the form of displaced soils and levelled areas. Granite outcrops are present to the south west and the north on the higher knolls and soils appear to be thin and easily erodible. These higher areas overlook the creek line and are present also the south in the neighbouring resident's property. These knoll features would have been more attractive camping or resting locations than the lower slopes which prior to clearance would have contained wetter soils and be flood prone.

Water flows across this area is visible in the grass patterning and erosion areas. These water flows would have acted to displace any surface artefacts and to have lessened any potential for sites to be present. As a result of these 2018 findings, the project area was considered to hold low potential for heritage items due to the form of these basal slopes, this soil profiles and past impacts.

3.3 2020 SITE VISIT

Concerns were raised by the Aboriginal community following submission of the original 2018 report that heritage sites, specifically burials associated with the Riverside Camp may be present within the project area. As a result, site visits were undertaken with the Onerwal Local Aboriginal Land Council and the Buru Ngunawal Aboriginal Corporation to gather the cultural significance of the project area and to determine the potential for sites and especially burials to be present.

The distance to the recorded site was explained to the representatives along with a discussion of the nature of the soils, flooding and previous impacts within the project area. It was agreed that it was unlikely that any burials had been within the vicinity, but that the area would have been utilised by Aboriginal people and that many people would have gathered here during the Riverside Camp period, crossing across the area frequently.

During the 2020 site visits, construction was ongoing for subsurface water piping for an adjacent residential development. These construction impacts are throughout the current proposed pumping

station area. It is considered highly unlikely that any heritage has been affected by these works, but as a consequence of these works, the potential for heritage items to be present (considered to be low) has been further reduced and would currently be considered negligible.

The conditions at the project area at the time of the 2020 site visits is shown in Plates 7 and 8.



Plate 7: Construction works project area



Plate 8: view east down access road

3.4 ASSESSMENT RESULTS

3.4.1 Results - Aboriginal Heritage Sites

No areas of Aboriginal heritage were identified during the field survey as present within the project area. No Aboriginal heritage item or areas were identified within the project area as a result of the site visit with Aboriginal representatives. The recorded heritage site of Riverside Camp is located to the northeast outside of the project area. Associated cultural values with the site extend over the wider region, but past impacts and current construction has affected the values remaining within the project area. As a result, there are no known heritage sites that will be affected by the proposed development.

3.4.2 Results - Areas of Potential Archaeological Deposit (PAD)

Areas of PAD are defined as landforms that hold higher potential than their surrounds to contain subsurface deposits of past Aboriginal occupation. Based on a review of previous studies completed for the region, areas of PAD would be located in association with area of level terrace or elevated landform near river frontage or 1st or 2nd order creeklines on level ground.

These landforms are not present within the project area which is located on sloping basal slopes and the landforms have been assessed as holding low potential for subsurface deposits. As a result no areas of PAD have been identified within the project area.

3.4.3 Summary

Based on the results of the field survey, the potential of the project area to contain heritage sites is considered to be low to negligible due to the shallow nature of soils, with evident levels of erosion through the project area. The thinness of soils in this location would appear to exclude burials and the potential flooding would not have made it conducive for camping or resting. The high levels of previous disturbance in this section, would have also resulted in the destruction of any heritage sites if once present.

Both of these factors (thin soils and high impacts), were observed during the site visit, with the finding that burials and any undisturbed deposits were unlikely to have survived. Due to the location of the project area on the lower floodplain course of the Creekline, periodic flooding was a risk that the Aboriginal population would have been aware of in the selection of burial sites. Previous discussions with Aboriginal representatives on the location of burials and the work of White and Cane (1986) on burial patterns and locations within the Yass region do not indicate that this location would be suitable for burials.

As a result of the site visit, field survey and background research, it is considered that the project has low potential to impact on unrecorded Aboriginal heritage sites due to these factors. No recorded Aboriginal heritage sites are present within the project boundary and the values associated with the area has been impacted by previous impacts within the project footprint. These findings were agreed to by the representatives with the understanding that despite the impacts, the area still hold high cultural significance to the community, and that the potential for sites to be present in areas outside of the impacts is retained.

No Known heritage impacts will result from the proposal.

4 IMPACT ASSESSMENT

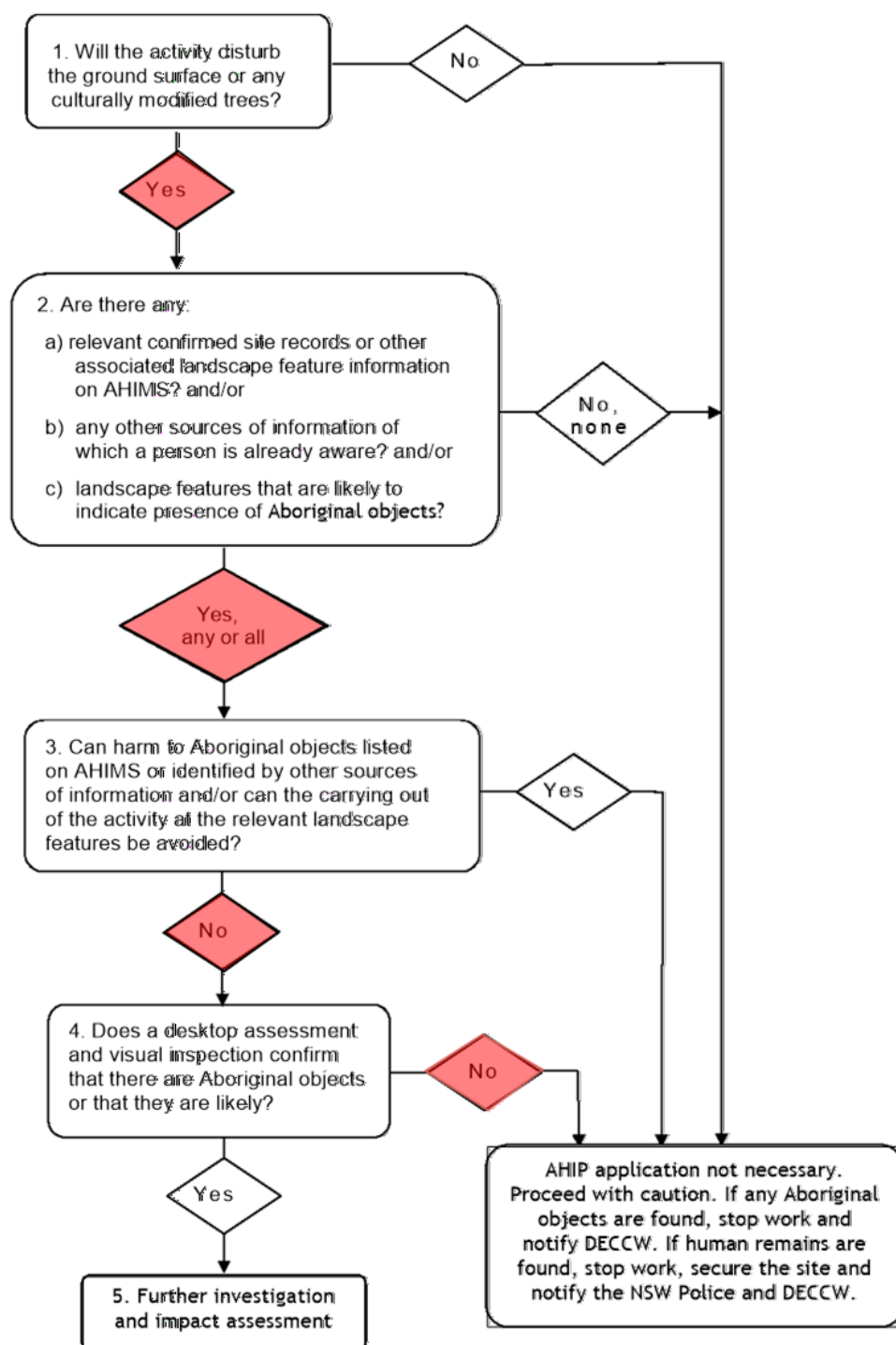
The impacts from the construction of the Sewer Pump Station would consist of removals of topsoils and subsoils. Any heritage sites within the area of the project would be destroyed by the proposed works. The area is known to hold high importance to the Aboriginal community based on views recorded for previous assessments and the recorded Riverside Camp (51-1-0043). No known heritage impacts would occur as a result of works to any recorded site, including the Riverside Camp.

Based on the background review and site assessment the impacts from the project are as follows:

- ❖ No known heritage sites are within the project area or immediate vicinity. The nearest site Riverside Camp is located to the northeast of the project area.
- ❖ The confined nature of the construction (15m x 38m) has low potential to impact on unrecorded heritage sites. All works are within areas of high previous impacts that would have removed any heritage potential in the area.
- ❖ The landform contains low potential to contain unrecorded Aboriginal sites.
- ❖ Landforms to the north and south of the proposed site which will not be impacted by the development are more conducive to Aboriginal site location and based on modelling, would have been the focus of activity. This is confirmed by the location of the Riverside Camp amongst these landforms.
- ❖ Heritage values associated with the recorded Riverside Camp located to the northeast of the project area and separated by the housing development on Grand Junction Rd, have been impacted by the previous construction work in the area and do not pose a constraint within the limited impact footprint.

The Code provides a flowchart of six questions to identify the presence of and potential harm to Aboriginal heritage. These questions and their applicability to the project are shown in Figure 4. The responses to these questions determine if further heritage investigations are required.

Figure 4. Due Diligence Flow Diagram (OEH 2010:10 – Due Diligence Code of Practice)



4.1 RECOMMENDATIONS

Based on this due diligence assessment the following actions are recommended for the project.

Recommendation 1: Finding of low potential to impact on heritage sites.

No areas of potential archaeological deposits or heritage sites have been identified within the development area and the potential for Aboriginal heritage objects to be present within the development area has been assessed as low.

Recommendation 2: Cultural Monitoring of Works

Due to the cultural sensitivity of the Yass River Area, cultural monitoring by the OLALC should be allowed, despite prior impacts affecting the potential for heritage sites within the project area.

As monitoring involves working in proximity to excavation machinery, the monitors will observe the WHS directions of the excavation director. As monitoring involves working in proximity to excavation machinery, the monitors will observe the WHS directions of the excavation director. If the required safety distance precludes observance of soils, works will cease at regular intervals to allow monitors access to the works. Timing of intervals to be agreed by on site workers.

Recommendation 3: Discovery of Unidentified Aboriginal cultural material during works.

Under the *NPW Act 1977* all Aboriginal places and objects are protected from harm, even if they have not been previously identified during the assessment process. If Aboriginal material is discovered during works then the steps as outlined below should be followed:

- ❖ All work must cease in the vicinity of the find and project manager notified immediately.
- ❖ A buffer zone of 10m should be fenced in all direction of the find and construction personnel made aware of the 'no go' zone.
- ❖ DPIE must be notified of the find and advice sought on the proper steps to be undertaken.
- ❖ After confirmation with DPIE a heritage consultation should be engaged to undertake assessment of the find and provide appropriate management recommendations to the proponent.

Recommendation 3: Discovery of Human Remains

In the highly unlikely event that human remains are discovered during any construction work, than all activity in the vicinity of the find must cease. As a first step the local police must be notified, followed by DPIE and advice sought on appropriate next actions. No work can continue on the site until cleared with police and DPIE.

Recommendation 4: Alteration of impact footprint

Further archaeological assessment would be required if the proposal activity extends beyond the area of the current investigation.

Implementation of the above management recommendations will result in low potential for the project to impact on Aboriginal heritage values or result in damage to heritage sites.

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APPENDIX A: RESULTS OF SITE VISIT LETTER TO OLALC



23/05/2020

Mr Bradley Bell
Onerwal Local Aboriginal Land Council
11 Adele Street
Yass NSW 2580

Dear Brad,

Re: Site meeting Yass Sewerage Pump Station - Meehan Street

Thank you for your assistance and for your time on the 13/5/20 to meet on site and discuss the Yass Sewerage Pump Station project and the relationship of the Riverside Camp Heritage site to the project area. Concerns have been raised that the project may encroach into the area of the Riverside Camp and that cultural heritage material may be damaged as a result of the works.

To address these concerns a site meeting has been arranged with the BNAC and yourself (on behalf of OLALC) to discuss the project, the cultural values of the area and the relationship of the project area to the Riverside Camp site.

On arriving on site, it was clear that impacts have already occurred to the locations proposed under the Yass Sewerage Pump Station Works. The works currently occurring within the project area relate to the installation of water infrastructure for a proposed residential development.

The outcome from the discussions that took place are summarised below for your review and additional comments if required. It would be appreciated if you could review these to ensure that your views have been correctly captured.

- The area from the recorded location of the Riverside Camp (as recorded by Kabaila and on the OEH site card) should extend to the verge of Meehan Street. The area between Moreton Street and the Yass River is also associated with this site as the area was regularly travelled across and camp sites extended around from the main Riverside Camp. These sites would be ephemeral and may not have resulted in any archaeological remains to show their location.
- The project area is located to the south of the recorded site boundary and is not within the mapped extent of the site.
- The project area consists of an area of 20 x 20 metres on the lower basal slopes next to the tributary creekline, adjacent to a newly constructed house lot. This area is highly impacted. Works associated with this house have probably also impacted this area.
- The project area is located within an area of high previous impact and is currently being highly impacted by the construction work associated with residential development. These high levels of impact have removed any potential for archaeological remains within the

1

GPO Box 1584 Canberra ACT 2601

project area and reduced the cultural values of the impacted area. These impacts are confined to the specific limited area of construction and the high cultural values of the area remain in all other areas from Meehan Street to the Yass River.

- It is understood that the Onerwal Local Aboriginal Land Council with your support is preparing an application to extend the site boundaries and also an application to register the Riverside Camp as an Aboriginal Place. Due to the high impacts within the creek line area and the housing developments this section may no longer meet the criteria for listing, but the extended boundaries would cover all of the non-developed area along the Yass River corridor and surrounding areas.
- That the extended area of significance had been discussed and mapped with Yass Valley Council and the Department of Planning, Industry and Environment (formerly Office of Environment and Heritage) personnel and that all Development Applications in the area should reflect this.
- No further development of housing, roads or infrastructure should occur within this area. If works are essential, then consultation with the Aboriginal Community would be required for any future works.

During discussions it was agreed that within the highly impacted area, measuring approximately 20 x 20 m, on the lower basal slopes above the tributary, and now on the east side of a newly constructed house lot the project may proceed with the following management recommendations:

- That agreement that the project could proceed does not affect any other area within the vicinity of the Yass River and Riverside Camp and does not constitute approval for any other works in the area.
- Installation of high vis barrier fencing prior to any works to confine impacts within the boundary area
- Monitoring of works by members of the Onerwal LALC and BNAC representing traditional owners will be undertaken.
- Immediate cessation of works in the event of the discovery of any cultural or archaeological material during the construction process.

I trust that this summary reflects the results of the discussions, but if any details have been left out or misinterpreted please contact me to amend and discuss. I have attached the latest aerial photo available for the area (2019) showing the works area, the mapped location of Riverside Camp and the development in the area. Please note that the recent housing and current construction impacts are not shown on this photo.

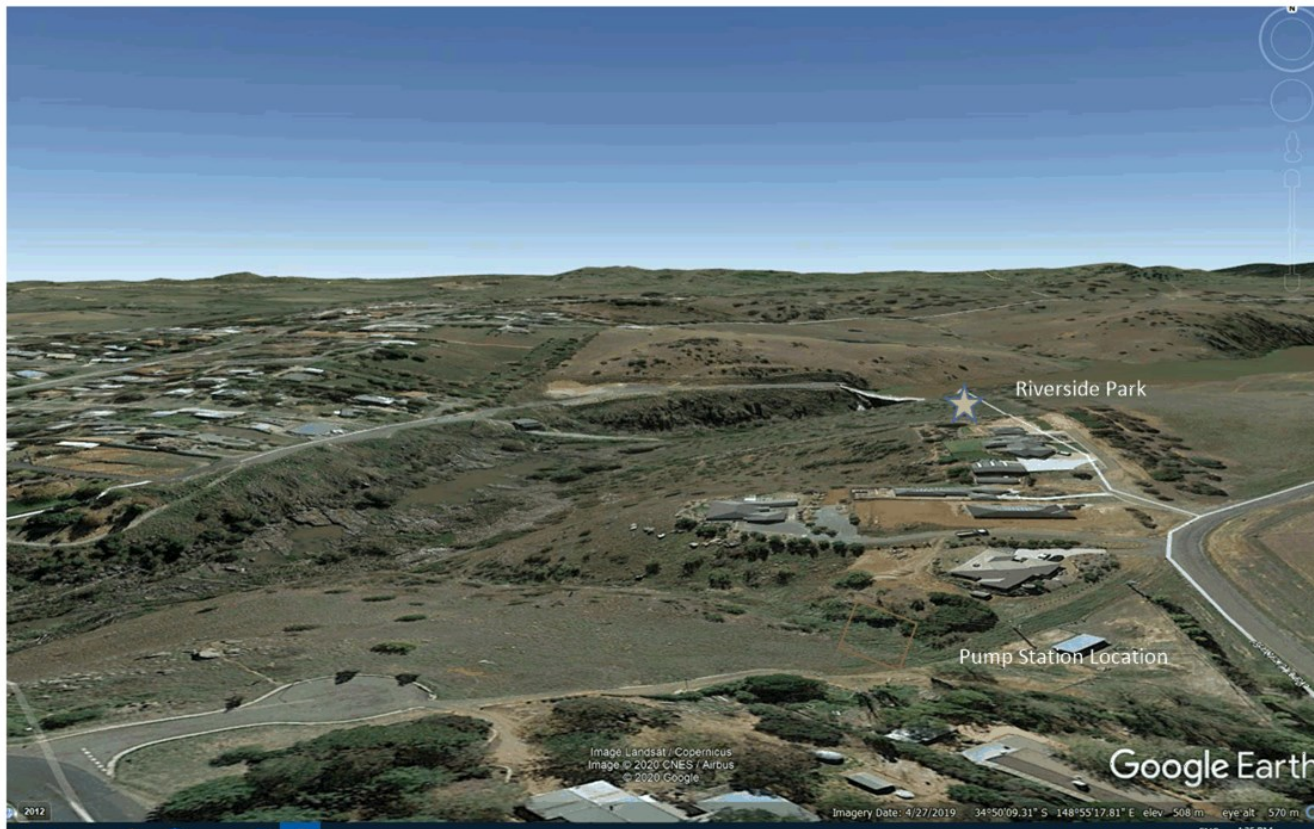
Once again I thank you for your time and patience and I look forward to hearing from you.

Kind Regards



Lyn O'Brien

Director



Oblique aerial showing landform and distance to recorded site



APPENDIX B: AHIMS SEARCH RESULTS

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors



Office of
Environment
& Heritage

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Yass PS 1

Client Service ID : 507952

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
51-4-0022	Yellow Creek Road, Y17	AGD	55	675474	6143614	Open site	Valid	Artefact : -	Open Camp Site	992
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig					<u>Permits</u>		
51-4-0019	Yellow Creek Road, Y14	AGD	55	675474	6143614	Open site	Valid	Artefact : -	Open Camp Site	992,98836
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig					<u>Permits</u>		
51-4-0020	Yellow Creek Road, Y15	AGD	55	675474	6143614	Open site	Valid	Artefact : -	Open Camp Site	992,98836
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig					<u>Permits</u>		
51-4-0021	Yellow Creek Road, Y16	AGD	55	675474	6143614	Open site	Valid	Artefact : -	Open Camp Site	992,98836
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig					<u>Permits</u>		
51-4-0023	Yellow Creek Road, Y18	AGD	55	675474	6143614	Open site	Valid	Artefact : -	Open Camp Site	992,98836
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig					<u>Permits</u>		
51-1-0043	Riverside Camp	AGD	55	675650	6143600	Open site	Valid	Habitation Structure : -, Hearth : -	Mound (Oven)	98836
	<u>Contact</u>	<u>Recorders</u>	Philip Boot					<u>Permits</u>		
51-1-0044	Oak Hill Camp	AGD	55	675700	6144200	Open site	Valid	Habitation Structure : -, Hearth : -	Mound (Oven)	98836
	<u>Contact</u>	<u>Recorders</u>	Philip Boot					<u>Permits</u>		
51-4-0001	Ashby	AGD	55	675671	6143972	Open site	Valid	Artefact : -, Burial : -	Burial/s.Open Camp Site	992,1038
	<u>Contact</u>	<u>Recorders</u>	NPWS - Blackheath Office, Miss. Marjorie Sullivan					<u>Permits</u>		
51-4-0102	PAD 1 East Yass	AGD	55	676040	6143600	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		102431
	<u>Contact</u>	<u>Recorders</u>	Ms. Trish Saunders					<u>Permits</u>	9,2967,3473	
51-4-0233	Yass SU17/L1	GDA	55	676580	6143805	Open site	Valid	Artefact : 2		101437
	<u>Contact</u>	<u>Recorders</u>	Doctor Julie Diben					<u>Permits</u>	3414	

Report generated by AHIMS Web Service on 26/05/2020 for Lyn O'Brien for the following area at Lot : 9, DP:DP1160355 with a Buffer of 1000 meters. Additional Info : due diligence. Number of Aboriginal sites and Aboriginal objects found is 10

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 1

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Appendix E – Geotechnical Investigation



Yass Sewerage Scheme Wellington Road Sewage Pumping Station and Rising Main Geotechnical Investigation

Report Number: ISR 18019
April 2018

Prepared for Yass Valley Council



Public Works Advisory

Yass Sewerage Scheme Wellington Road Sewage Pumping Station and Rising Main Geotechnical Investigation

Report number: ISR 18019

April 2018

Document Control

Issue / Revision	Author	Reviewer	Approved for Issue	
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Public Works Advisory

Wellington Road SPS and Rising Main- Geotechnical Investigation

Table of Contents

1	INTRODUCTION	1
1.1	General	1
1.2	Location	1
1.3	Aims of Investigation	1
1.4	Terminology	1
1.5	Limitations	2
2	REGIONAL GEOLOGY	2
3	FIELDWORK	2
4	LABORATORY TESTING	3
4.1	Rock Core Testing	3
4.2	Corrosion and Scaling Assessment	3
5	SEWAGE PUMPING STATION	3
5.1	Site Description	3
5.2	Subsurface Conditions	4
5.3	Discussion	4
5	RISING MAIN	6
5.3	Site Description	6
5.4	Subsurface Conditions	6
5.5	Discussion	7
6	GENERAL REMARKS	8

Plates

1 - 7

Figures

- Figure 1 – Locality Plan
- Figure 2 – SPS Site – Borehole Location Plan
- Figure 3 – Rising Main – Borehole Location Plan
- Figure 4 – Rising Main – Borehole Location Plan

Appendices

- A Geotechnical Terminology and Technical Aids
- B SPS Site - Borehole Logs PS1 to PS3
- C Rising Main – Borehole Logs RM1 and RM4
- D Rock Core Test Results
- E Corrosion and Scaling Assessment Test Results

1 Introduction

1.1 General

To stimulate development in the local government area, Yass Valley Council has committed to provide sewerage infrastructure to approved developments and re-zonings. Wellington Road Sewage Pumping Station (SPS) will be required to cater for residential development including future development to the east of the proposed SPS and the connection of 8 lots in Meehan Street and Guginya Place, which are currently operating as a low-pressure system.

It is understood that the main components of the proposed works comprise the following:

- SPS - a 3.6m diameter wet well, a valve pit and an emergency storage (three pre-cast concrete segments);
- Access road to the SPS site and within the complex; and,
- Approximately 900m of transfer main, comprising a rising main to a high point at approximate Ch350m and then a gravity main between Ch350m and approximate Ch900m.

In early December 2017, the Yass Valley Council commissioned Public Works Advisory (PWA) to undertake concept designs for the proposed development. As part of that commission, the Geotechnical Engineering Section (PWA) was engaged to undertake site investigation to provide information on subsurface conditions at the SPS site and along the sewer main alignment.

The scope of work was outlined in discussions held with PWA project designers and confirmed in our proposal dated 19th October 2017. At the time of fieldwork, the scope of work was amended to include diamond rock coring at the SPS site.

This report presents the data obtained from field investigations and laboratory testing and discusses geotechnical aspects relevant to design and construction of the proposed development.

1.2 Location

Yass is located in the Southern Tablelands region of New South Wales, approximately 280km south-west of Sydney, and in the Yass Valley Council Local Government Area (LGA). The proposed Wellington Road SPS site is located off Meehan Street, on the eastern periphery of the town's built-up area. The proposed rising main is generally located in the southern nature strip of Meehan Street, up to its intersection with Pritchett Street (see **Figure 1**).

1.3 Aims of Investigation

The main aims of the investigation were to report on:

- subsurface conditions, including groundwater levels, within target depths range;
- the quality of the bedrock at the SPS site, with respect to lithology, degree of weathering and rock substance strength;
- foundation conditions;
- chemical aggressiveness properties of in-situ sediments, and
- excavation characteristics of in-situ strata.

1.4 Terminology

The methods used in this report to describe the soil profiles, including visual classification of material types encountered, are in accordance with Australian Standard AS1726 Geotechnical Site

Wellington Road SPS and Rising Main- Geotechnical Investigation

Investigations. For bedrock description, the methods are in-house and are based on a few sources including AS1726 and ISRM. The explanation of terminology used is given in **Appendix A**.

1.5 Limitations

The Geotechnical Engineering Section has conducted a site investigation and prepared this report in response to specific instructions from the client, to whom this report is addressed. This report is intended for the sole use of the client, and only for the purpose which it was prepared. Any third party who relies on the report or any representation contained in it does so at their own risk.

2 Regional Geology

Published geological map (Yass, 1: 100,000 Geological Series Sheet 8628, 2nd Edition), compiled by the NSW Geological Survey, indicates that the SPS site and rising main alignment are located within the Hawkins Volcanics (Douro Group). The formation is Siluro-Devonian in age and comprises medium to coarse grained, often welded, rhyolitic to dacitic ignimbrite with occasional quartz and diorite xenoliths. Flow-banded, vesicular rhyodacitic to dacitic lava, volcanic sandstone, minor rhyodacitic agglomerate and rhyolitic lapilli tuff are also present.

3 Fieldwork

Fieldwork was carried out in two stages, on 15th January and 5th February 2018, and comprised a program of auger drilling and diamond rock coring. At the proposed SPS site, two (2) boreholes (PS1 and PS2) were augered to depths of 0.8m, and one (1) borehole (PS3) was rock cored to a depth of 4.9m. In addition, four (4) boreholes (RM1 to RM4) were augered to depths of 2.5m, along the alignment of the proposed sewer rising main.

The drilling was carried out by Fico Group Pty. Ltd., using an FG102 drill rig, mounted on the back of a 4WD utility; and, a truck-mounted FG101 rig (borehole PS3 only). Generally, the boreholes were advanced using continuous, solid, spiral flight augers fitted with a hardened steel vee bit. Following vee bit refusal in weathered bedrock, further advancement into the bedrock was achieved using a tungsten carbide (TC) bit. TC bit refusal was not recorded in any of the RM series boreholes and all boreholes were terminated at their nominal target depth of 2.5m. At the pumping station site, TC bit refusals were recorded at depths of 0.8m. In borehole PS3, the bedrock was rock cored between 0.7m and 4.9m depths, using an NMLC-size, triple split-tube core barrel.

Due to shallow soil profile, in-situ testing and sampling was limited. Standard Penetration Tests (SPT's) were carried out at shallow depths in all boreholes. This was supplemented by taking disturbed samples off the auger flights.

The fieldwork was supervised full-time by a geotechnical engineer from our Section who positioned and logged the boreholes, and directed in-situ testing and sampling. The recovered rock core was logged and photographed in Sydney by a senior engineering geologist.

Detailed borehole logs are presented in **Appendices B** (SPS site) and **C** (Rising main). Engineering geology log and rock core photograph are also presented in **Appendix B**. The boreholes were located by tape measure from existing near-by features and their locations are shown on **Figures 2 to 4**.

Wellington Road SPS and Rising Main- Geotechnical Investigation

4 Laboratory Testing

4.1 Rock Core Testing

Two specimens of rock core (2.48m to 2.61m and 4.78m to 4.86m), were subjected to uniaxial compressive strength (UCS) test in accordance with Australian Standard AS4133.

The testing was carried out by our Section's Geotechnical Centre laboratory in Manly Vale. The individual NATA test certificates for the two samples are presented in **Appendix D**.

4.2 Corrosion and Scaling Assessment

One (1) sample of residual materials, from each of the boreholes PS1 (0.65m to 0.8m), PS2 (0.5m to 0.75m) and RM3 (0.5m to 0.95m), were forwarded to the Sydney Environmental and Soil Laboratory Pty Ltd (SESL).

The samples were analysed for the following:

- pH 1:5 extract ratio;
- Electrical Conductivity (EC) 1:5 extract ratio;
- Soluble Sulphate (SO_4); and,
- Soluble Chloride (Cl).

The testing was carried out by SESL for the purposes of assessment of soil aggressivity towards concrete and steel, in accordance with Australian Standard AS2159-2009 (Piling Design and Installation).

Detailed test results, together with the laboratory's assessment, are presented in **Appendix E**. The testing indicated that materials are either neutral or slightly alkaline with very low salinity and low sulphate and chloride levels. Overall, the laboratory's assessment is that the likelihood of aggressive corrosion is low.

5 Sewage Pumping Station

5.1 Site Description

The SPS site is located on the eastern periphery of the town within a sloping grassed paddock. To the north-east/east, the site is bounded by a drainage course/gully which collects stormwater run-off from surrounding slopes and drains to Yass River. The site slopes at low to moderate gradients (6° to 10°) to the north-east.

The site has a lush grass cover (see **Plate 1**) with a stand of trees lining the drainage gully.

Bedrock crops out intermittently on the lower slope approaching the gully floor, especially in the northern/north-western parts of the site (see **Plates 2 and 3**). The outcrop on the lower slope/banks of this drainage course becomes more evident and massive to the north-west of the site, on the approaches to the Yass River.

Wellington Road SPS and Rising Main- Geotechnical Investigation

5.2 Subsurface Conditions

The subsurface conditions at the SPS site are presented in the logs of auger boreholes PS1 and PS2, and engineering geology log PS3 (refer to **Appendix B**). Generally, the site is located within intrusive, igneous bedrock of the Hawkins Volcanics, which occurs at very shallow depths. Bedrock crops out in the central north-eastern extremity of the site.

The soil profile is very shallowly developed and comprises a 0.1m/0.15m cover of clayey sand topsoil followed by silty sandy clay (CH) to depths of 0.6m (PS1) and 0.7m (PS2). In borehole PS1, the residual sandy clay is of hard consistency and grades to extremely weathered bedrock. Vee bit refusal was recorded in this stratum at 0.2m depth. In borehole PS2, the sandy clay is of firm to stiff consistency.

Dacitic ignimbrite bedrock underlies the sandy clays. The weathering profile of the bedrock is also very shallow, with TC bit achieving very little penetration (100mm-200mm) into the bedrock prior to reaching TC bit refusal at 0.8m depth in both boreholes.

In borehole PS3, located near borehole PS1, the bedrock was diamond-cored between 0.7m and 4.9m depths. Within the interval from 0.7m to 2.5m depth, the ignimbrite is assessed as being moderately weathered with a strong rock substance strength. For a specimen from this interval (2.48m to 2.61m depth), the testing yielded a UCS of 57.9 MPa. However, the specimen failed through multiple incipient defects within the sample and therefore, the result may under-estimate the actual rock substance strength. The defects are typically closely spaced (60mm-200mm) with minor zones of very closely spaced (20mm-60mm) defects.

Between 2.5m and borehole termination depth of 4.9m, the ignimbrite becomes slightly weathered with a very strong rock substance strength. For a specimen from this interval (4.73m to 4.86m depth), the testing yielded a UCS of 182.5 MPa. Furthermore, within this interval, the defects are typically widely spaced (600mm to 2000mm) with a zone of closely spaced defects.

Groundwater was not encountered in any of the boreholes within the depths of drilling. However, it should be noted that during rock coring, water was used as a drilling medium which has the tendency to disguise the presence of groundwater (if any). None-the-less, the presence of Fe staining along joint surfaces suggests groundwater movement within the fractured bedrock. Any infiltrated stormwater and stormwater run-off from the elevated slopes to the south-west would be expected to drain through the site and into the adjoining gully.

5.3 Discussion

5.3.1 General

It is understood that the proposed pumping station will comprise a 3.6m diameter wet well with the floor level at RL503.35m while the emergency storages will have a finished floor level at RL504.25m. The existing surface levels are typically in the order of RL506.5m/RL506.8m, reducing to approximate RL505.5m in the north-eastern storage tank area.

5.3.2 Foundation Conditions

For the pumping station well, the proposed structure will be founded some 3.5m to 3.8m below existing surface level and within slightly weathered dacitic ignimbrite bedrock. In case of the emergency storages, the founding levels will be some 1.5m to 2.8m below existing levels and within moderately weathered to slightly weathered bedrock. Consequently, bearing capacity is many orders higher than the proposed loading while settlement is not an issue.

Wellington Road SPS and Rising Main- Geotechnical Investigation

It is understood that the subgrade level will be raised along the proposed access road and that the fill will be retained by retaining walls. The height of the walls will vary with topography but are expected to range up to 3.5m in height in the northern corner of the complex.

The foundation conditions along the alignments of the retaining walls were not investigated as part of this commission; however, bedrock crops out in the northern/north-eastern part of the site and typically, it is likely to occur at shallow depths throughout the site. Furthermore, the quality of the bedrock is expected to be similar to that encountered in borehole PS3. It is recommended that the retaining wall footings be founded in moderately weathered bedrock. In design, for this quality bedrock, an allowable bearing pressure of 1MPa may be adopted.

5.3.3 Engineered Fill

The topsoil is not considered to be suitable for re-use as engineered fill and should be put to spoil or stockpiled for landscaping purposes. Excavations in bedrock for various structures is expected to yield a material comprising gravel to fine boulder-sized rock fragments, as defined by defect spacing. The rock-fill, due to lack of fines and likely large particle sizes, is also not considered suitable for raising the existing subgrade levels. The residual sandy clays and clayey sands can be considered for this purpose; however, their volumes are expected to be minimal.

Fill will need to be imported from a suitable borrow area. Imported fill materials should be suitable materials (preferably granular for controlled fill) as described in Section 4 of AS 3798-2007 *"Guideline on Earthworks for Commercial and Residential Development"*. Also, imported fill materials should be validated in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM). The fill material should not contain asbestos, and not be acid sulfate soil or saline soil. The imported fill material should be 'virgin excavated natural material' (VENM) and 'excavated natural material' (ENM), as defined in the DECC's waste guidelines because of their low risk of contamination.

Depending on construction schedules, any spoil (residual deposits and extremely weathered to highly weathered ignimbrite) from the excavations for the rising main could be considered for re-use as engineered fill at the SPS site.

5.3.4 Presumptive Pavement Design Parameters

As previously indicated, the natural subgrade at the site will be raised by filling and the fill materials will need to be imported. Consequently, compaction criteria and CBR design values need to be evaluated as appropriate for the type of imported material.

5.3.5 Excavation Characteristics

Excavations in ignimbrite bedrock will be required for the construction of the wet well, storages and inter-connecting pipeline. Excavation characteristic of bedrock are highly dependent on lithology, degree of weathering, rock substance strength and defect spacing. As indicated in Section 5.2, the bedrock is moderately weathered to slightly weathered with depth. The rock substance strength is strong to very strong (58MPa to 182.5MPa). The defect spacing vary with depth.

At the proposed wet well, excavations in bedrock will require a large hydraulic excavator (minimum 20 tonne) with assistance from a rock breaker. The depths that will be achieved using this technique are expected to be in the order of 2m to 2.5m; that is, within the zone where defect spacing is favourable. Below these depths, blasting or use of non-explosive demolition agents (such as Expando, Dexpan or equivalents) will be required in slightly weathered, very strong bedrock, with unfavourable defect spacing.

In case of the emergency storages, the quality of the bedrock within proposed excavation depths is not known; however, it is expected to be similar to that at the wet well site. Therefore, comments given above are also applicable for the storages site.

Wellington Road SPS and Rising Main- Geotechnical Investigation

Near vertical excavations in moderately weathered to slightly weathered bedrock are expected to be stable; however, minor localised instability may occur where joint-defined blocks are dislodged from the cut batter face.

5 Rising Main

5.3 Site Description

The proposed alignment of the rising/gravity sewer main, from the SPS site (Ch0m) to the new sewer manhole in vicinity of Meehan Street and Pritchett Street intersection (Ch886.7m), is shown on **Figures 3 and 4**. Generally, the alignment is located within the southern road reserve of Meehan Street, apart from some 60m section (approximate Ch30m to Ch90m) which is in the road (see **Plate 4**).

The alignment crosses Therry Street, Plunkett Street, Demestre Street and Pritchett Street, as well as numerous concrete and gravel driveways. Generally, the road reserve is grassed with occasional mature trees in vicinity of the alignment (see **Plates 5 to 7**).

The topography along the alignment rises at gentle gradients (3° to 4°), from approximate RL507m at the SPS site to RL528m at topographic high point (approximate Ch350m). It then descends at similar gradients, with a relatively flat (RL522m) portion between approximate Ch480m and Ch550m, to approximate RL502m at the terminating point (Ch886.7m).

5.4 Subsurface Conditions

The subsurface conditions along the rising main alignment may be extrapolated from data presented in the logs of boreholes RM1 to RM4 (refer to **Appendix C**). Generally, as for the pumping station site, the alignment is located within a suite of intrusive igneous rocks of the Hawkins Volcanics. It should be noted that on the borehole logs the lithology of the bedrock has been given a general description as dacitic ignimbrite. However, due to inherent difficulty in identifying the bedrock type based on ground-down auger cuttings, some variations in the lithology of the bedrock are possible. Although not conclusive, other volcanic types that may be encountered include rhyolitic ignimbrite and dacite.

At discrete borehole locations, the surficial horizons comprise either variable fill or a veneer of clayey topsoil. The thicknesses of these horizons vary from 0.1m to 0.2m, locally (RM2), thickening to 0.5m. The fill materials include clayey sand with gravel and clayey sandy gravel. However, as indicated in the preceding sub-section, the alignment crosses a number of streets and numerous driveways; consequently, fill associated with their construction and any levelling of the road reserve will be encountered. Therefore, fill thicknesses and fill material types along the alignment may vary from those presented on the borehole logs.

The surficial deposits are typically underlain by variably weathered bedrock to borehole termination depths of 2.5m. The exception to the above was encountered in borehole RM3, where the topsoil is underlain by residual sandy clay to a depth of 0.5m and then weathered bedrock to 2.5m depth.

The bedrock's lithology, degree of weathering and rock substance strength have all been based on the auger cuttings appearing at the surface and the rate of penetration of either a hardened steel vee bit or a tungsten carbide (TC) bit. The bedrock appears to be variably weathered between discrete borehole locations. Generally, the vee bit failed to penetrate the bedrock for any appreciable depths. Vee bit refusals were recorded at depths of between 0.25m (RM1) and 0.9m (RM2 and RM3), with depths of penetration into the bedrock of 100mm to 600mm.

Following vee bit refusal, a TC bit was deployed. The TC bit reached the nominal target depths of 2.5m in all boreholes.

Wellington Road SPS and Rising Main- Geotechnical Investigation

When first encountered, the bedrock is assessed to be extremely weathered with extremely weak rock substance strength. This quality bedrock generally behaves as very dense silty clayey sand or very stiff to hard silty sandy clay, with evident rock fabric and structure, and typically extends to vee bit refusal levels.

The drilling conditions for a TC bit varied between borehole locations and with depth (refer to individual borehole logs). Typically, firm to hard drilling conditions, with depth, were noted in all boreholes, apart from borehole RM3 where easy drilling conditions were recorded. On these basis, the rock mass within the depths penetrated by a TC bit has been assessed as being generally extremely weathered to highly weathered, ranging to highly weathered with extremely weathered zones. The rock substance strength varies with degree of weathering from extremely weak to very weak and weak.

Groundwater was not intersected in any of the boreholes within the depths of drilling.

5.5 Discussion

6.3.1 Foundation Conditions

Concept designs of the proposed sewer main were not available at the time of reporting; however, it is expected that the main will be founded at shallow depths in the order of 1.0m to 1.3m, locally increasing up to 2m depth.

The proposed main will be founded within variably weathered volcanic bedrock. Consequently, the bearing capacity is more than adequate while settlement is of no concern.

6.3.2 Trench Support and Dewatering

Generally, trench walls should be self-supporting during the short-term construction period. However, if any excavations in excess of 1.5m depth are proposed, then the trench would need to be either benched or adequately supported, as required for safety purposes.

Construction difficulties associated with permanent groundwater are not envisaged. However, it should be noted that presence of seepage is subject to prevailing weather conditions at the time of construction and may vary from that recorded on the borehole logs.

6.3.3 Excavation Characteristics

Excavations to design invert levels will encounter a combination of fill, residual deposits comprising silty sandy clay and clayey silty sands and variably weathered bedrock.

The occurrences of volcanic bedrock are given on individual borehole logs. Excavations in bedrock will be required throughout the alignment. As previously indicated, the quality of the bedrock with respect to the degree of weathering and rock substance strength were based on the drilling conditions. Generally, Vee bit can penetrate extremely weak bedrock while the TC bit can penetrate very weak to weak bedrock. Penetration can also be achieved in better quality bedrock if defect spacing is very closely to closely spaced and the joints are open.

Excavations in extremely weathered to highly weathered volcanic bedrock should be possible using a large hydraulic excavator (minimum 20 tonne). Some assistance from ripper/rock breaker may be required in highly weathered bedrock. Furthermore, the possibility of encountering some less weathered interbeds within the likely excavation depths should not be totally discounted. If encountered, excavation within these zones is also likely to require assistance from a ripper/rock breaker.

Very difficult excavations in moderately weathered or better-quality bedrock may be expected on the approaches to the sewage pumping station, where this quality bedrock was encountered at 0.7m depth. Depths in the order of 2m are likely to be achieved with assistance from a rock breaker.

Wellington Road SPS and Rising Main- Geotechnical Investigation

However, as for the pumping station site, blasting or use of non-explosive demolition agents will be required in areas where defect spacing is unfavourable.

6 General Remarks

It should be noted that this report is based on extrapolation of data from discrete boreholes and may not represent actual conditions between them. Should different conditions be encountered at the time of construction advice should be sought from a geotechnical consultant.

C. Karwaj
Senior Geotechnical Engineer

Wellington Road SPS and Rising Main- Geotechnical Investigation

PLATES

Public Works Advisory



PLATE 1: General view of SPS site, looking north-east. Drilling rig is set up on borehole PS3 location.



PLATE 2: View of rock outcrop on the southern lower slope leading to the drainage course/gully to, the north of PS3.



PLATE 3: Another view of rock outcrop near the drainage course/gully floor, looking north-west.



PLATE 4: Rising Main – General view of the alignment located within Meehan Street, looking north-east.



PLATE 5: Rising Main – General view of the alignment, looking south-west from approximate Ch 100m. Therry Street crossing in centre-middle ground.



PLATE 6: Rising Main – General view of the alignment, looking south-west from RM2 location. Plunkett Street crossing in foreground.

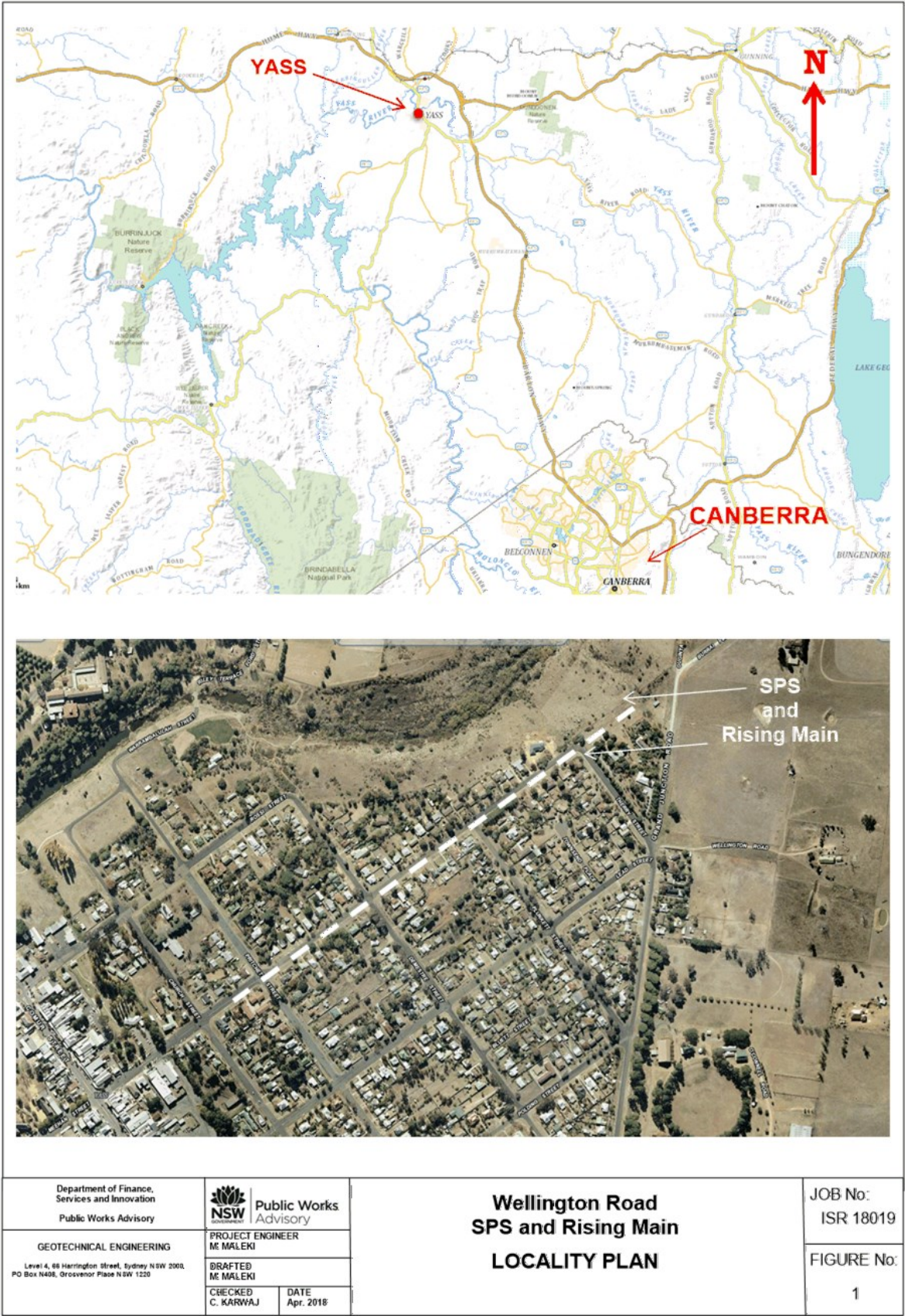


PLATE 7: Rising Main – General view of the alignment, looking north-east from RM2 location.

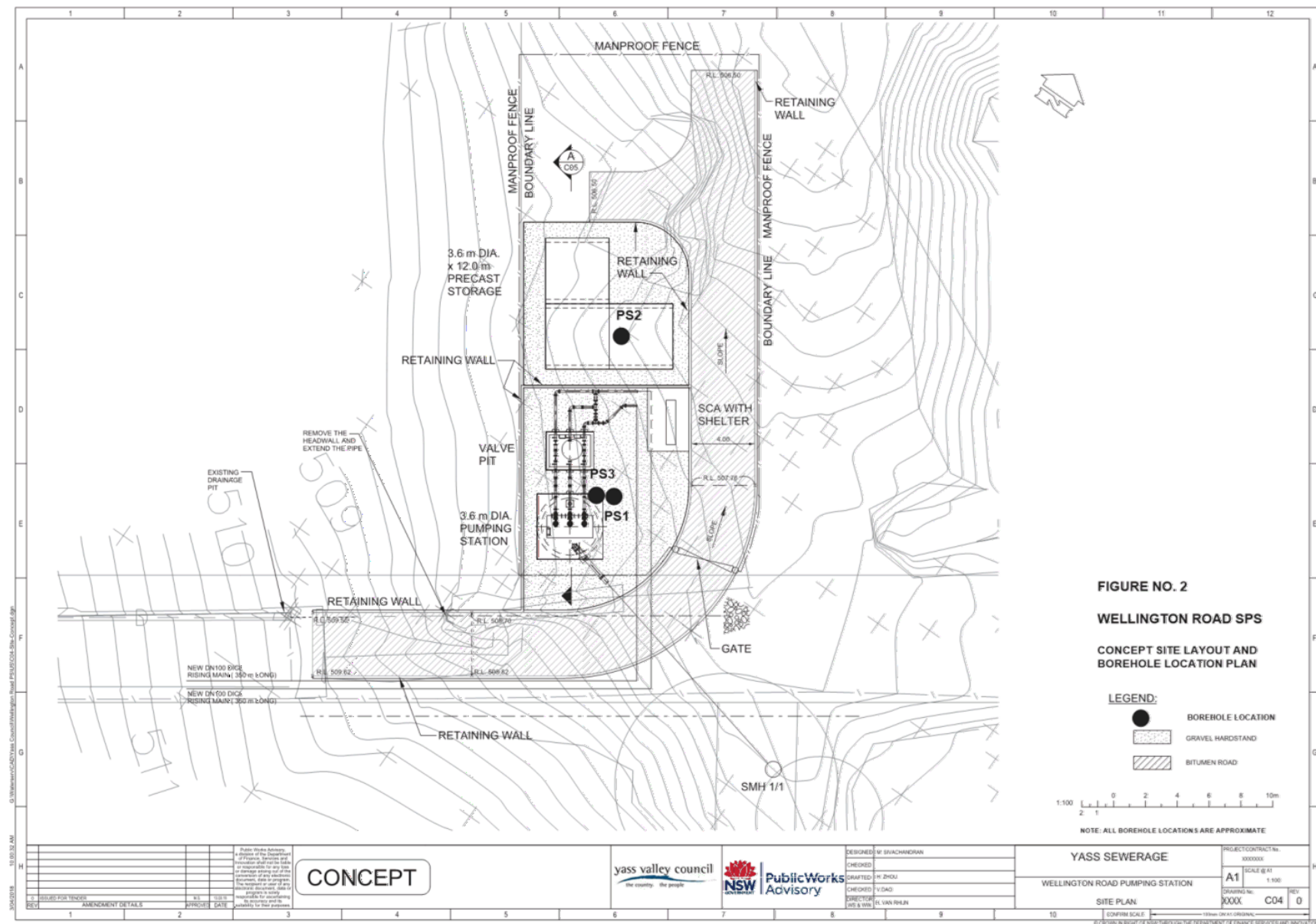
Wellington Road SPS and Rising Main- Geotechnical Investigation

FIGURES

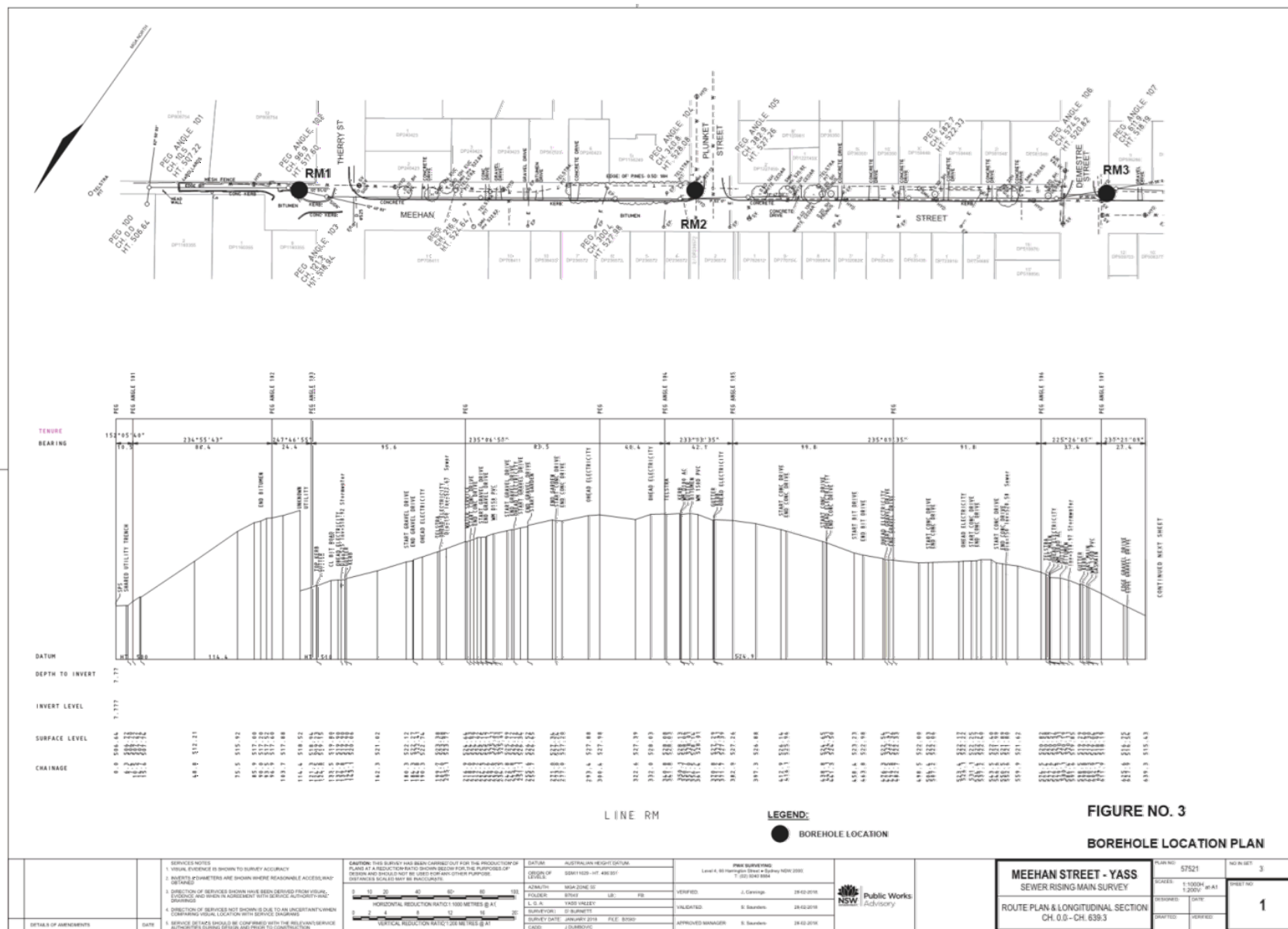
Public Works Advisory

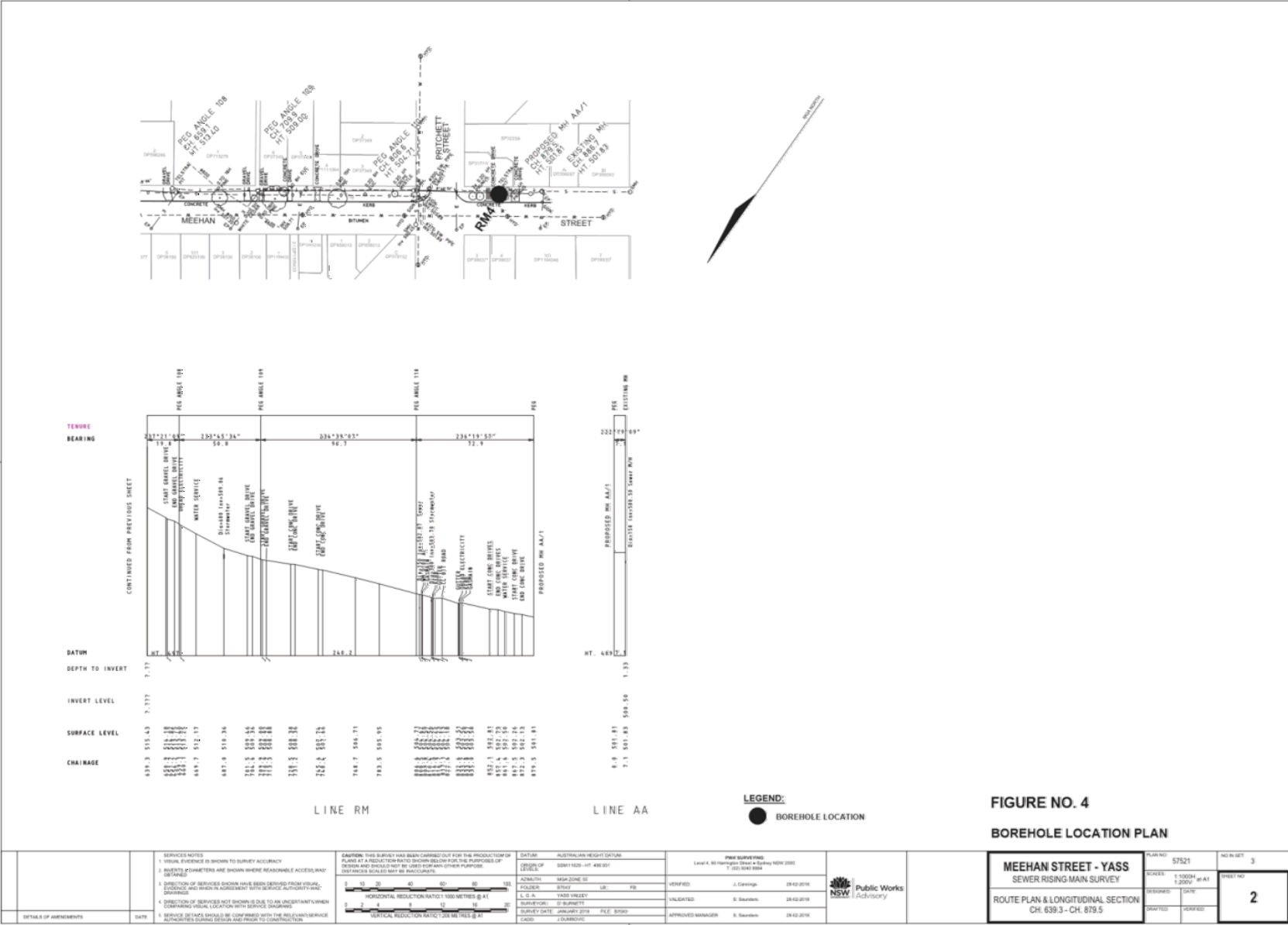


9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors



9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
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Wellington Road SPS and Rising Main- Geotechnical Investigation

APPENDIX A

Geotechnical Terminology and Technical Aids

Public Works Advisory

GEOTECHNICAL & ENVIRONMENTAL

CHARACTERISATION OF GEOTECHNICAL DATA

Geotechnical data generally fall into the categories of fact, interpretation and opinion, as defined by the Institution of Engineers, Australia, 1987 - Guidelines for the Provision of Geotechnical Information in Construction Contracts.

Facts are defined as the materials, statistics and properties which may be seen, measured or identified by means of accepted and preferably standardised criteria, classifications and tests. Examples of facts include: exploration locations, outcrop locations, samples and drill core, lithological names/descriptions of soils and rocks, measured water levels, laboratory test results and seismic time/distance plots.

Interpretative data is defined as information derived from competently made interpretation of facts using accepted and proven techniques, or reasonable judgement exercised in the knowledge of geological conditions or processes evident at the site. Examples of interpretative data are: borehole and test pit logs, inferred stratigraphy and correlations between boreholes or test pits, material and rock mass properties used in analysis (e.g. permeability), and seismic interpretation (yielding velocity and layer depths).

Opinion is derived from consideration of relevant available facts, interpretations and analysis and/or the exercise of judgement. Examples of opinions based on geotechnical/geological interpretations include bearing capacity and foundation suitability, need for foundation treatment, settlements, potential for grouting, excavation stability, ease of excavation, and suitability of construction materials.

GEOTECHNICAL & ENVIRONMENTAL

SOIL DESCRIPTION

The methods of description and classification of soils are based on Australian Standard 1726, the SAA Site Investigation Code. The description of a soil is based on particle size distribution and plasticity as shown in the "GUIDE TO THE DESCRIPTION, IDENTIFICATION AND CLASSIFICATION OF SOILS".

SOIL CLASSIFICATION

The basic soil types and their subdivisions are defined by their particle sizes:

MAJOR SOIL CATEGORIES

Soil Classification	Particle Size
Boulders	Greater than 200mm
Cobbles	63 - 200mm
Gravel	2.36 - 63mm
Sand	0.075 - 2.36mm
Silt	0.002 - 0.075mm
Clay	Less than 0.002mm

MINOR SOIL CONSTITUENTS

As most natural soils are combinations of various constituents, the primary soil is further described and modified by its minor components:

Coarse grained soils		Fine grained soils	
% Fines	Modifier	% Coarse	Modifier
≤ 5	Omit, or use 'trace'	≤ 15	Omit, or use 'trace'
> 5 ≤ 12	Describe as 'with clay/silt', as applicable	> 15 ≤ 30	Describe as 'with sand/gravel', as applicable
> 12	Prefix soil as 'silty/clayey', as applicable	> 30	Prefix soil as 'sand/gravelly', as applicable

COHESIVE SOILS

Clay and silt may be described according to their plasticity:

Descriptive Term	Range of liquid limit (percent)
Of low plasticity	≤ 35
Of medium plasticity	> 35 ≤ 50
Of high plasticity	> 50

GEOTECHNICAL & ENVIRONMENTAL

MOISTURE CONDITION

Term	Description
Dry (D)	Cohesive soils; hard and friable or powdery, well dry of plastic limit. Granular soils; cohesionless and free-running.
Moist (M)	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet (W)	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water forms on hands when handling. Granular soils tend to cohere.

CONSISTENCY - NON-COHESIVE SOILS

Term	Density index %	SPT "N" value
Very loose	≤ 15	< 5
Loose	$> 15 \leq 35$	5 - 10
Medium dense	$> 35 \leq 65$	10 - 30
Dense	$> 65 \leq 85$	30 - 50
Very dense	> 85	> 50

CONSISTENCY - COHESIVE SOILS

Term	Undrained shear strength (kPa)	Field guide to consistency	SPT "N" value
Very soft	≤ 12	Exudes between the fingers when squeezed in hand.	< 2
Soft	$> 12 \leq 25$	Can be moulded by light finger pressure.	2 - 4
Firm	$> 25 \leq 50$	Can be moulded by strong finger pressure.	4 - 8
Stiff	$> 50 \leq 100$	Cannot be moulded by fingers; can be indented by thumb	8 - 16
Very stiff	$> 100 \leq 200$	Can be indented by thumb nail.	16 - 32
Hard	> 200	Can be indented with difficulty by thumb nail.	> 32

GEOTECHNICAL & ENVIRONMENTAL

GRAPHICAL SYMBOLS USED FOR
GEOTECHNICAL BOREHOLE AND TEST PIT LOGS

SOIL - COARSE GRAINED

	GW		GP		GM		GC
	SW		SP		SM		SC

SOIL - FINE GRAINED

	CH		CI		CL
	MH		ML		
	OH		OL		Pt

ROCK

	Sedimentary rock		Igneous rock		Metamorphic rock
--	------------------	--	--------------	--	------------------

FILL MATERIAL

	Fill
--	------

GROUNDWATER

	Level		Inflow
--	-------	--	--------

NGE No Groundwater Encountered

SOIL HORIZON BOUNDARIES

	Boundary measured or determined from drilling conditions
	Diffuse or uncertain boundary

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

GUIDE TO THE DESCRIPTION IDENTIFICATION AND CLASSIFICATION OF SOILS

GEOTECHNICAL & ENVIRONMENTAL

Major Divisions		Particle-Size (mm)	Group Symbol	Typical Names	Field Identification Sand and Gravels	Laboratory Classification						
						% < 0.06mm (see note 2)	Plasticity of Fine Fraction	$C_u = \frac{D_{50}}{D_{10}}$	$C_c = \frac{(D_{30})^2}{D_{10}D_{60}}$	Notes		
COARSE GRAINED SOILS (more than half of material less than 63 mm is larger than 0.075 mm)	BOULDERS	200				—	—	—	—			
	COBBLES	63				—	—	—	—			
	GRAVELS (more than half of coarse fraction is larger than 2.36mm)	coarse		GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	0-5	—	> 4	between 1 and 3	1. Identify lines by the method given for fine grained soils.	
			28		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	0-5	—	Fails to comply with above	—	2. Borderline classifications occur when the percentage of fines (fraction smaller than 0.06mm size) is greater than 5% and less than 12%. Borderline classifications require the use of dual symbols e.g. SP-SM, GW-GC
		medium		GM	Silty gravels, gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	12-50	Below 'A' line or $I_p < 4$	—	—		
				6		GC	Clayey gravels, gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	12-50	Above 'A' line or $I_p > 7$	—	
		SANDS (more than half of coarse fraction is smaller than 2.36mm)		2.36		SW	Well graded sands, gravelly sands, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	0-5	—	> 6	
	coarse				SP	Poorly graded sands and gravelly sands, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	0-5	—	Fails to comply with above	Fails to comply with above	
				0.6		SM	Silty sands, sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	12-50	Below 'A' line or $I_p < 4$	—	—
	medium					SC	Clayey sands, sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	12-50	Above 'A' line or $I_p > 7$	—	—
				0.2								
		fine										
		0.075										

Use the gradation curve of material passing 63mm for classification of fractions according to the criteria given in "Major Divisions"

GUIDE TO THE DESCRIPTION, IDENTIFICATION AND CLASSIFICATION OF SOILS (CONT.)

GEOTECHNICAL & ENVIRONMENTAL

Major Divisions		Particle Size (mm)	Group Symbol	Typical Names	Field Identification			Laboratory Classification		
					Dry* Strength	Dilatancy†	Toughness ‡	Plasticity of Fine Fraction	Notes	
FINE GRAINED SOILS (more than half of material less than 63 mm is smaller than 0.075 mm)	SILTS & CLAYS (liquid limit < 50%)	<0.075	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	None to low	Quick to slow	None	More than 50% passing 0.06 mm	Below 'A' line	<div>PLASTICITY CHART FOR CLASSIFICATION OF FINE GRAINED SOILS</div>
			CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Medium to high	None to very slow	Medium		Above 'A' line	
			OL ‡	Organic silts and organic silty clays of low plasticity	Low to medium	Slow	Low		Below 'A' line	
	SILTS & CLAYS (liquid limit > 50%)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, clastic silts	Low to medium	Slow to none	Low to medium		Below 'A' line	
			CH	Inorganic clays of high plasticity, fat clays	High to very high	None	High		Above 'A' line	
			OH ‡	Organic clays of medium to high plasticity, organic silts	Medium to high	None to very slow	Low to medium		Below 'A' line	
	HIGHLY ORGANIC SOILS		Pt ‡	Peat and other highly organic soils	Identified by colour, odour, spongy feel and generally by fibrous texture				—	
	Use the gradation curve of material passing 63mm for classification of fractions according to the criteria given in "Major Divisions"									

FIELD IDENTIFICATION PROCEDURE FOR FINE GRAINED SOILS OR FRACTIONS

THESE PROCEDURES ARE TO BE PERFORMED ON THE MINUS 0.2MM SIZE PARTICLES. FOR FIELD CLASSIFICATION PURPOSES, SCREENING IS NOT INTENDED. SIMPLY REMOVE BY HAND THE COARSE PARTICLES THAT INTERFERE WITH THE TESTS.

* Dry strength (Crushing characteristics)

After removing particles larger than 0.2mm size, mould a pat of soil, to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity. High dry strength is characteristic for clays of the CH group.

A typical inorganic silt possesses only very slight dry strength.

Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

† Dilatancy (Reaction to shaking)

After removing particles larger than 0.2mm size, prepare a pat of moist soil with a volume of 10 cm³. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens, and finally it cracks or crumbles.

The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, shows a moderately quick reaction.

‡ Toughness (Consistency near plastic limit)

After removing particles larger than 0.2mm size, a specimen of soil about 10cm³ in size is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. The specimen is then rolled out by hand on a smooth surface or between the palms into a thread about 3mm in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together with a slight kneading action continued until the lump crumbles. The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil.

Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line. Highly organic clays have a very weak and spongy feel at the plastic limit.

GEOTECHNICAL & ENVIRONMENTAL

EXPLANATION OF LOGGING TERMS FOR ENGINEERING GEOLOGY BOREHOLE LOGGING

ROCK SUBSTANCE WEATHERING CLASSIFICATION		ESTIMATED STRENGTH CLASSIFICATION	
RS	Residual soil	EW	Extremely weak
EW	Extremely weathered	VW	Very weak
HW	Highly weathered	W	Weak
MW	Moderately weathered	MS	Medium strong
SW	Slightly weathered	S	Strong
F(s)	Fresh (stained defects)	VS	Very strong
F	Fresh	ES	Extremely strong

DEFECTS

Defects include all joints, bedding planes, fracture zones, seams, veins and cleavage partings.

RQD

Rock quality designation:

$$\text{RQD} = \frac{\text{length of core in pieces} \geq 100\text{mm or longer}}{\text{length of run}} \times 100\%$$

WATER

DATE ▼	Water table, with date
▶	Water inflow
△	Partial drilling water loss
◀	Complete drilling water loss

Angles of joint inclination (and other geological features and drill holes) are angles between the feature and a horizontal plane. In core, angles of joints (and other geological structures) are angles between the structure and the plane normal to the axis of the core. In vertical holes these angles are then the true inclination (dip) of the structure.

GEOTECHNICAL & ENVIRONMENTAL

DEFINITIONS OF ENGINEERING GEOLOGICAL TERMS

This classification system provides a standard terminology for the engineering description of rock.

DEGREE OF WEATHERING ¹

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Rock is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.
Extremely Weathered	EW	Rock substance affected by weathering to the extent that the rock exhibits soil properties - i.e. it can be remoulded and can be classified according to the Unified Classification System, but the texture of the original rock is still evident.
Highly Weathered	HW	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance, and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock, usually as a result of iron bleaching or deposition. The colour and strength of the original substance is no longer recognisable.
Moderately Weathered	MW	Rock substance affected by weathering to the extent that staining extends throughout the whole of the rock substance, and the original colour of the fresh rock is no longer recognisable.
Slightly Weathered	SW	Rock substance affected by weathering to the extent that partial staining or discolouration of the rock substance, usually by limonite has taken place. The colour and texture of the fresh rock is recognisable.
Fresh (stained)	F _s	Rock substance unaffected by weathering. Weathering is limited to the surface of major discontinuities, for example an iron-stained joint.
Fresh	F	Rock substance unaffected by weathering.

GEOTECHNICAL & ENVIRONMENTAL

ROCK STRENGTH ²

Rock strength is defined by the Point Load Strength Index (Is (50)), and refers to the strength of the rock substance in the direction normal to the bedding.

TERM	Is (50)	FIELD GUIDE	APPROX. qu MPa *
Extremely Weak (EW)	0.03	Easily remoulded by hand to a material with soil properties.	0.7
Very weak (VW)	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.	2.4
Weak (W)	0.3	A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.	7
Medium Strong (MS)	1	A piece of core 150mm long x 50mm dia. may be broken by hand with considerable difficulty. Readily scored with a knife.	24
Strong (S)	3	A piece of core 150mm long x 50mm dia. cannot be broken by unaided hands, may be slightly scratched or scored with knife.	70
Very Strong (VS)	10	A piece of core 150mm long x 50mm dia. may be broken readily with hand held hammer. Cannot be scratched with pen knife.	240
Extremely Strong (ES)		A piece of core 150mm long x 50mm dia. is difficult to break with hand held hammer. Rings when struck with hammer.	

* The approximate unconfined compressive strength (qu) shown in the table is based on an assumed ratio to the point load index of 24:1. This ratio may vary widely and should be calibrated on site.

GEOTECHNICAL & ENVIRONMENTAL

STRATIFICATION SPACING ²

TERM	SEPARATION OF STRATIFICATION PLANES
Thinly laminated	< 6mm
Laminated	6mm - 20mm
Very thinly bedded	20mm - 60mm
Thinly bedded	60mm - 200mm
Medium bedded	200mm - 600mm
Thickly bedded	600mm - 2m
Very thickly bedded	> 2m

DISCONTINUITY SPACING ³

TERM	SPACING
Very widely spaced	> 2m
Widely spaced	600mm - 2m
Moderately widely spaced	200mm - 600mm
Closely spaced	60mm - 200mm
Very closely spaced	20mm - 60mm
Extremely closely spaced	< 20mm

APERTURE OF DISCONTINUITY SURFACES ⁴

The degree to which a discontinuity is open, or to which the faces of the discontinuity have been separated and the space subsequently infilled (such as in a vein, fault or joint).

TERM	APERTURE THICKNESS (Discontinuities, veins, faults, joints)
Wide	> 200mm
Moderately wide	60mm - 200mm
Moderately narrow	20mm - 60mm
Narrow	6mm - 20mm
Very narrow	2mm - 6mm
Extremely narrow	> 0 - 2 mm
Tight	Zero

GEOTECHNICAL & ENVIRONMENTAL

BLOCK SHAPE AND SIZE ⁴

The following descriptive terms define shape:

Blocky	- approximately equidimensional.
Tabular	- one dimension considerably shorter than the other two.
Columnar	- one dimension considerably larger than the other two.

Block sizes are defined by the following descriptive terms:

TERM	BLOCK SIZE	EQUIVALENT DISCONTINUITY SPACINGS IN BLOCKY ROCK
Very large	$> 8\text{m}^3$	Extremely wide
Large	$> 0.2\text{m}^3 - 8\text{m}^3$	Very wide
Medium	$> 0.008\text{m}^3 - 0.2\text{m}^3$	Wide
Small	$> 0.0002\text{m}^3 - 0.008\text{m}^3$	Moderately wide
Very small	$\leq 0.0002\text{m}^3$	Less than moderately wide

REFERENCES

- Modifications of:
 - McMahon, B.K., Douglas, D.J., & Burgess, P.J., 1975. Engineering classification of sedimentary rocks in the Sydney area. Australian Geomechanics Journal, G5 (1), 51-53.
 - Geological Society Engineering Group Working Party, 1977. The description of rock masses for engineering purposes. Quarterly Jour. Engg. Geology, 10 (4), 355-388.
- McMahon, B.K., Douglas, D.J., & Burgess, P. J., 1975. Engineering classification of sedimentary rocks in the Sydney area. Australian Geomechanics Journal, G5 (1), 51 -53.
- ISRM Commission on Standardisation of Laboratory and Field Tests, 1978. Suggested methods for the quantitative description of discontinuities in rock masses. Jl. Rock Mechanics Min. Sci. and Geomech. Abstra., 15, 319-368.
- Geological Society Engineering Group Working Party, 1977. The description of rock masses for engineering purposes. Quarterly Jour. Engg Geology, 10 (4), 355-388.







Wellington Road SPS and Rising Main- Geotechnical Investigation

APPENDIX B

SPS Site – Borehole Logs PS1 to PS3


Public Works Advisory




9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors



 Public Works GEOTECHNICAL & ENVIRONMENTAL NSW Water Solutions		BOREHOLE No. PS1					
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN LOCATION: PUMPING STATION CONTRACTOR: FICO GROUP SITE SUPERVISOR: M. MALEKI		DATE: 15/01/2018 SURFACE RL: AHD EASTING: NORTHING:					
DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
0.5			SC (v)	TOPSOIL - Clayey Silty Sand, with a trace of gravel; with root fibres; dark brown, loose, dry.			VEE
			CI (v)	SILTY SANDY CLAY, with a trace of ironstone gravel; red-orange-brown, with black spotting; very stiff, just moist.			TC
			ROCK (v)	DACITIC IGNIMBRITE; highly weathered to moderately weathered; weak to medium strong; grey, black, white, red-brown, yellow-brown.	SPT 20,-- N=R		
1.0				NOTE: Vee bit refusal at 0.2m. TC bit refusal at 0.8m. Easy TC drilling from 0.2m to .6m, and then very hard. Hole Terminated at 0.80 m			
1.5							
2.0							
2.5							
PROJECT No.: ISR18019		v : visual l : laboratory		SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT	GROUNDWATER  Water Table  Water Inflow		
SHEET: 1 OF 1							

NSW PW LIB 1.03 GLB Log NSW PW BOREHOLE ISR 18019 WELLINGTON ROAD SPS AND RM GPJ <<DrawingFile>> 05/04/2018 14:48 10.0.000 Daged Lab and in Situ Tool

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

 Public Works GEOTECHNICAL & ENVIRONMENTAL NSW Water Solutions		BOREHOLE No. PS2	
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN		DATE: 15/01/2018	
LOCATION: PUMPING STATION		SURFACE RL: AHD	
CONTRACTOR: FICO GROUP		EQUIPMENT: FG102	
SITE SUPERVISOR: M. MALEKI		EASTING: NORTHING:	
PROJECT COORDINATOR: C. KARWAJ			

DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
0.5			SC (v)	TOPSOIL - Clayey Silty Sand, with a trace of gravel; with root fibres; dark brown, loose, dry.			
			CH/SC (v)	SILTY SANDY CLAY, with a trace of ironstone gravel; red-orange-brown, with black spotting; very stiff, just moist.			
			ROCK (v)	DACITIC IGNIMBRITE; extremely weathered to highly weathered; weak; grey, black, white, red-brown, yellow-brown.	SPT 3,25/110,- N=R		
				NOTE: Vee bit and TC bit refusals at 0.8m. Hole Terminated at 0.80 m			
1.0							
1.5							
2.0							
2.5							

v : visual l : laboratory	SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT	GROUNDWATER  Water Table  Water Inflow	SHEET: 1 OF 1
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PROJECT No.: ISR18019

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

NSW GOVERNMENT		Public Works GEOTECHNICAL & ENVIRONMENTAL		BOREHOLE No. PS3			
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN				DATE: 05/02/2018			
LOCATION: PUMPING STATION				SURFACE RL: AHD			
CONTRACTOR: FICO GROUP				EQUIPMENT: FG101			
SITE SUPERVISOR: M. MALEKI				EASTING:			
				NORTHING:			
DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
0.5			SC/CI (v)	TOPSOIL - Clayey Silty Sand; with root fibres and some gravels; dark brown, loose/firm, dry.	D	Not Encountered	VEE
	CMSC (v)		SANDY SILTY CLAY/CLAYEY SILTY SAND; red-orange-brown; with black spotting; very stiff/medium dense; just moist.	D	TC		
	ROCK (v)		DACITIC IGNIMBRITE; highly weathered; very weak.				
1.0			ROCK (v)	DACITIC IGNIMBRITE; REFER TO ENGINEERING GEOLOGY LOG.			
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0				NOTE: Vee bit refusal at 0.2m; TC bit refusal at 0.7m. Hole Terminated at 4.90 m			
		v : visual l : laboratory		SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT		GROUNDWATER Water Table Water Inflow	
PROJECT No.: ISR18019		SHEET: 1 OF 1					



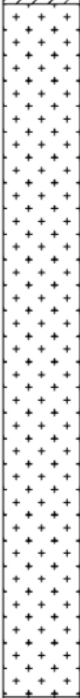
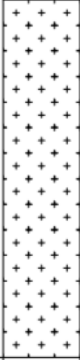


Wellington Road SPS and Rising Main- Geotechnical Investigation

APPENDIX C



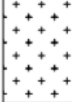
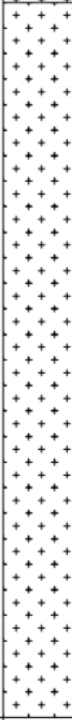


Rising Main – Borehole Logs RM1 to RM4

Public Works Advisory

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors










 Public Works GEOTECHNICAL & ENVIRONMENTAL NSW Water Solutions		BOREHOLE No. RM1					
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN LOCATION: RISING MAIN CONTRACTOR: FICO GROUP SITE SUPERVISOR: M. MALEKI		DATE: 15/01/2018 SURFACE RL: AHD EASTING: NORTHING:					
DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
			CI (v)	TOPSOIL - Silty Sandy Clay; with root fibres; dark brown, firm, moist.			VEE
0.5			ROCK (v)	DACITIC IGNIMBRITE; extremely weathered, extremely weak; (behaves as very dense silty clayey sand with a trace of gravel with definite rock fabric/structure); red-brown, orange-brown, grey, light brown, with white and black.	SPT	13,20,12/80 N>32	Not Encountered
1.0							TC
1.5							
2.0			ROCK (v)	becomes extremely weathered to highly weathered; extremely weak to very weak; multicoloured, orange-brown, light brown, white, red-brown, black and grey	SPT	15/60,-,- N=R	
2.5					D		
				NOTE: Firm drilling for a TC bit to 1.7m depth and then harder. Vee bit refusal at 0.25m. Hole Terminated at 2.50 m			
PROJECT No.: ISR18019		v : visual l : laboratory		SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT		GROUNDWATER  Water Table  Water Inflow	
SHEET: 1 OF 1							

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

 Public Works NSW Water Solutions		GEOTECHNICAL & ENVIRONMENTAL		BOREHOLE No. RM2			
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN LOCATION: RISING MAIN CONTRACTOR: FICO GROUP SITE SUPERVISOR: M. MALEKI				DATE: 15/01/2018 SURFACE RL: AHD EASTING: NORTHING:			
DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
0.5			FILL (v)	TOPSOIL- Clayey Silty Sand with some gravel (SC); with root fibres; dark grey, loose; just moist.	SPT 8, 16, 16/80 N=R	Not Encountered	VEE
			FILL (v)	CLAYEY SILTY SAND with some gravel (SC); grey with some red-brown; loose, dry.			HA
			ROCK (v)	DACITIC IGNIMBRITE; extremely weathered; behaves as very stiff sandy silty clay with evident rock fabric; red-orange-brown, with some light brown/yellow-brown mottled.			VEE
			ROCK (v)	DACITIC IGNIMBRITE; extremely weathered; extremely weak; multicoloured, orange-brown, light brown, white, red-brown, yellow-brown.			
			ROCK (v)	becomes highly weathered; very weak; multi-coloured.			
2.5			ROCK (v)			TC	
NOTE: Hand auger between 0.3m to 0.6m due to suspected underground services. Vee bit refusal at 0.9m. Firm to hard drilling conditions for a TC bit to 1.7m and then very hard. Hole Terminated at 2.50 m							
PROJECT No.: ISR18019		v : visual I : laboratory		SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT		GROUNDWATER  Water Table  Water Inflow	
				SHEET: 1 OF 1			









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9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

 Public Works NSW Water Solutions		GEOTECHNICAL & ENVIRONMENTAL		BOREHOLE No. RM3			
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN LOCATION: RISING MAIN CONTRACTOR: FICO GROUP SITE SUPERVISOR: M. MALEKI				DATE: 15/01/2018 SURFACE RL: AHD EASTING: NORTHING:			
DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
			CI (v)	TOPSOIL- Sandy Clay with root fibres; grey-brown; firm; just moist.			
			CI/CH (v)	SANDY SILTY CLAY; light brown with yellow-brown and white spotting; firm to stiff, moist.			
0.5			ROCK (v)	DACITIC IGNIMBRITE; extremely weathered; behaves as very stiff to hard sandy silty clay/clayey silty sand with evident rock structure; light grey, white, orange-brown, light brown, red-brown.	SPT	8, 15, 19 N=34	VEE
1.0			ROCK (v)	becomes extremely weathered to highly weathered; extremely weak to very weak; multicoloured, brown, white, yellow-brown, orange-brown, black.			Not Encountered
1.5			ROCK (v)				TC
2.0					SPT	26, 6/20mm N=R	
2.5				NOTE: Vee bit refusal at 0.9m. Easy TC bit drilling. Hole Terminated at 2.50 m			
		v : visual l : laboratory		SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT		GROUNDWATER  Water Table  Water Inflow	
PROJECT No.: ISR18019				SHEET: 1 OF 1			

NSWPVLIB 1.03 GLB Log NSW PW BOREHOLE ISR 18019 WELLINGTON ROAD SPS AND RM GPJ <<DrawingFile>> 05/04/2018 14:48 10.0.000 Daged Lab and In Situ Tool

9.3 Tender Evaluation Report - Wellington Road Sewage Pump Station Tender RFQ 10014861
Attachment B Wellington Road SPS Review of Environmental Factors

 Public Works GEOTECHNICAL & ENVIRONMENTAL NSW Water Solutions		BOREHOLE No. RM4					
PROJECT: WELLINGTON ROAD SEWAGE PUMPING STATION AND RISING MAIN LOCATION: RISING MAIN CONTRACTOR: FICO GROUP SITE SUPERVISOR: M. MALEKI		DATE: 16/01/2018 SURFACE RL: AHD EASTING: NORTHING:					
DEPTH (m)	RL (m)	GRAPHIC LOG	SOIL GROUP	MATERIAL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks	SAMPLE or TEST	WATER	METHOD
			FILL (v)	TOPSOIL- Clayey Sandy Gravel (GC); wit root fibres; dark grey; loose; moist.			
0.5			ROCK (v)	DACITIC IGNIMBRITE; extremely weathered; extremely weak; behaves as very stiff to hard sandy silty clay; multicoloured, brown, orange-brown, light brown, white, grey.	SPT	8,21/140.- N=R	VEE
1.0			ROCK (v)	DACITIC IGNIMBRITE; highly weathered; very weak; multi-coloured.			Not Encountered
1.5			ROCK (v)	becomes extremely weathered to highly weathered; extremely weak to very weak; with clay seams; multicoloured, light grey, white, light brown, yellow-brown.			TC
2.0			ROCK (v)		SPT	10,23.- N=32	
2.5				NOTE: Vee bit refusal at 0.85m Hard TC bit drilling to 1.3m and then easy drilling. Hole Terminated at 2.50 m			
PROJECT No.: ISR18019		v : visual l : laboratory		SAMPLE OR TEST Undisturbed: U Disturbed: D Bulk: B Standard Penetration Test: SPT	GROUNDWATER  Water Table  Water Inflow		
				SHEET: 1 OF 1			

NSWPVLIB 1.03 GLB Log NSW PW BOREHOLE ISR 18019 WELLINGTON ROAD SPS AND RM GPJ <<DrawingFile>> 05/04/2018 14:48 10.0.000 Daged Lab and In Situ Tool

Wellington Road SPS and Rising Main- Geotechnical Investigation

APPENDIX D

Rock Core Test Results

Public Works Advisory

GEOTECHNICAL CENTRE

110B King Street Manly Vale 2093

Telephone 02 - 9949 0253

NATA Accreditation Number: 13380



PublicWorks
Advisory

CLIENT:	PWA - INFRASTRUCTURE SERVICES	BATCH No	18003
UNIAXIAL COMPRESSIVE STRENGTH			
PROJECT:	YASS SEWERAGE	BORE HOLE No:	PS3
LOCATION:	Wellington Road SPS	DEPTH:	2.48 - 2.61 m

STORAGE HISTORY & ENVIRONMENT: Metal core box

SPECIMEN PREPARATION: As Received

SPECIMEN LITHOLOGY: Dacitic Ignimbrite

TESTED BY: MA/ZG

DATE TESTED: 16/02/2018

TESTING MACHINE: Shimadzu Universal Testing Machine, UDH-50

DIAMETER	mm	51.54
HEIGHT	mm	129.43
HEIGHT/DIAMETER RATIO		2.5
WET DENSITY	t/m ³	2.64
DRY DENSITY	t/m ³	2.63
WATER CONTENT	%	0.5
STRESS RATE	MPa/min	16.5
UNIAXIAL COMPRESSIVE STRENGTH (UCS)	MPa	57.9
AVERAGE UCS (if applicable)	MPa	N/A

Note: Individual specimens may not conform exactly to the requirements of the test method due to factors including drilling technique and defects in rock structure. Relevant observations appear below.

NOTES ON TEST:

Failed through multiple incipient defects

Test Methods: AS 4133.1.1.1 & AS 4133.4.2.1



FAILURE MODE



Accredited for
compliance with ISO/IEC
17025 - testing

APPROVED SIGNATORY:

Zoran Gusevski

DATE:

5/03/2018

GEOTECHNICAL CENTRE

110B King Street Manly Vale 2093
Telephone 02 - 9949 0253
NATA Accreditation Number: 13380



PublicWorks
Advisory

CLIENT:	PWA - INFRASTRUCTURE SERVICES	BATCH No	18003
UNIAXIAL COMPRESSIVE STRENGTH			
PROJECT:	YASS SEWERAGE	BORE HOLE No:	PS3
LOCATION:	Wellington Road SPS	DEPTH:	4.73 - 4.86 m

STORAGE HISTORY & ENVIRONMENT: Metal core box

SPECIMEN PREPARATION: As Received

SPECIMEN LITHOLOGY: Dacitic Ignimbrite

TESTED BY: MA/ZG

DATE TESTED: 16/02/2018

TESTING MACHINE: Shimadzu Universal Testing Machine, UDH-50

DIAMETER	mm	51.59
HEIGHT	mm	130.02
HEIGHT/DIAMETER RATIO		2.5
WET DENSITY	t/m ³	2.68
DRY DENSITY	t/m ³	2.68
WATER CONTENT	%	0.3
STRESS RATE	MPa/min	11.6
UNIAXIAL COMPRESSIVE STRENGTH (UCS)	Mpa *	182.5
AVERAGE UCS (if applicable)	MPa	N/A

Note: Individual specimens may not conform exactly to the requirements of the test method due to factors including drilling technique and defects in rock structure. Relevant observations appear below.

NOTES ON TEST:

Failed through rock substance

Test Methods: AS 4133.1.1.1 & AS 4133.4.2.1



Accredited for
compliance with ISO/IEC
17025 - testing

APPROVED SIGNATORY:

Zoran Gusevski

DATE:

5/03/2018

Wellington Road SPS and Rising Main- Geotechnical Investigation

APPENDIX E

Soil Corrosion and Scaling Assessment Test Results

Public Works Advisory



Corrosion & Scaling Assessment: Soil Reporting Profile

Sample Drop Off: 16 Chilvers Road Tel: 1300 30 40 80
Thornleigh NSW 2120 Fax: 1300 64 46 89
Mailing Address: PO Box 357 Email: info@sesl.com.au
Pennant Hills NSW 1715 Web: www.sesl.com.au

Batch N°: 47001 Sample N°: 1 Date Received: 5/3/18 Report Status: ☐ Draft ☒ Final

Client Name: **Office of Finance & Services** Project Name: **Wellington St Sewerage Pumping Station and Rising Main**
Client Contact: **Conrad Karwaj** SESL Quote N°:
Client Order N°: **ISR18019** Sample Name: **8183/PS1/0.65-0.80m**
Address: **Level 13, McKell Building** Description: **Soil**
2-24 Rawson Place Test Type: **CSCSSNR**
SYDNEY NSW 2000

TEST	RESULT	COMMENTS
pH in water (1:5)	7.5	Slight alkalinity
EC mS/cm (1:5)	0.04	Very low
Texture Class	Light Sandy Clay Loam	
Soil Condition Class (Permeability)	High	
SOLUBLE ANION ANALYSIS		
Sulphate (1:5) mgSO ₄ / kg	<5.0	Low (mildly aggressive)
Chloride (1:5) mgCl / kg	80	Low (non-aggressive)
* Resistivity Ω. m	-	Did not test
* Resistivity tested on a saturated sample/paste		(Note:- 10,000 mg/kg = 1%)

Recommendations

Analysed by SESL Australia, NATA #15633

For the purpose of corrosion and scaling assessment of soils towards concrete structures with steel reinforcement, concrete and steel piles, this soil shows slight alkalinity, very low salinity, low sulfate and low chloride levels.

The client has advised that the sample has been collected from above the groundwater table and therefore soil conditions B (despite the high permeability class) has been considered in accordance with AS2159:2009.

According to AS2159:2009 the pH is considered non aggressive towards concrete and steel. The low sulfate and low chloride levels are considered non aggressive towards concrete and steel.

Factors affecting concrete scaling are: (a) elevated sulfate, becoming mildly aggressive at >5000mg/kg SO₄; and (b) low pH, becoming mildly aggressive at pH of <5.5.

Factors affecting steel corrosivity are: (a) elevated chloride, becoming mildly aggressive at >5,000mg/kg Cl; and (b) low pH, becoming mildly aggressive at pH of <5 and (c) low resistivity, becoming mildly aggressive with resistivity values less than 50Ω.m.

Overall, based on the limited results and according to AS2159:2009 the likelihood of aggressive corrosion is low.

Please note not all analysis was conducted and may not necessarily depict the actual corrosion risk.

pH, EC, Soluble SO₄: Bradley et al., (1983); Cl, (4500-Cl- E; APHA, 1998);
Resistivity, AS1289.4.4.1:1997, Texture - PM0003 (Texture- "Northcote" (1992))

Date Report Generated
16/03/2018

Consultant:
Stuart Jamieson

Authorised Signatory:
Kelly Lee

Tests are performed under a quality system certified as complying with ISO 9001: 2008. Results and conclusions assume that sampling is representative. This document shall not be reproduced except in full.



Corrosion & Scaling Assessment: Soil Reporting Profile

Sample Drop Off: 16 Chilvers Road Tel: 1300 30 40 80
Thornleigh NSW 2120 Fax: 1300 64 46 89
Mailing Address: PO Box 357 Email: info@sesl.com.au
Pennant Hills NSW 1715 Web: www.sesl.com.au

Batch N°: 47001 Sample N°: 2 Date Received: 5/3/18 Report Status: ☐ Draft ☒ Final

Client Name: **Office of Finance & Services** Project Name: **Wellington St Sewerage Pumping Station and Rising Main**
Client Contact: **Conrad Karwaj** SESL Quote N°:
Client Order N°: **ISR18019** Sample Name: **8184/PS2/0.5-0.75m**
Address: **Level 13, McKell Building** Description: **Soil**
2-24 Rawson Place Test Type: **CSCSSNR**
SYDNEY NSW 2000

TEST	RESULT	COMMENTS
pH in water (1:5)	7	Neutral
EC mS/cm (1:5)	0.02	Very low
Texture Class	Sandy Clay Loam	
Soil Condition Class (Permeability)	Low	
SOLUBLE ANION ANALYSIS		
Sulphate (1:5) mgSO ₄ /kg	10	Low (non-aggressive)
Chloride (1:5) mgCl/kg	80	Low (non-aggressive)
* Resistivity Ω.m	-	Did not test
* Resistivity tested on a saturated sample/paste		(Note:- 10,000 mg/kg = 1%)

Recommendations

Analysed by SESL Australia, NATA #15633

For the purpose of corrosion and scaling assessment of soils towards concrete structures with steel reinforcement, concrete and steel piles, this soil shows a neutral pH, very low salinity, low sulfate and low chloride levels.

According to AS2159:2009 the pH is considered non-aggressive towards concrete and non-aggressive towards steel. The low sulfate and low chloride levels are considered non-aggressive towards concrete and non-aggressive towards steel.

Factors affecting concrete scaling are: (a) elevated sulfate, becoming mildly aggressive at >5000mg/kg SO₄; and (b) low pH, becoming mildly aggressive at pH of <5.5.

Factors affecting steel corrosivity are: (a) elevated chloride, becoming mildly aggressive at >5,000mg/kg Cl; and (b) low pH, becoming mildly aggressive at pH of <5 and (c) low resistivity, becoming mildly aggressive with resistivity values less than 50Ω.m.

Overall, based on the limited results and according to AS2159:2009 the likelihood of aggressive corrosion is low.

Please note not all analysis was conducted and may not necessarily depict the actual corrosion risk.

pH, EC, Soluble SO₄: Bradley et al., (1983); Cl, (4500-Cl-E; APHA, 1998);
Resistivity, AS1289.4.4.1:1997, Texture - PM0003 (Texture- "Northcote" (1992))

Date Report Generated
16/03/2018

Consultant:
Stuart Jamieson

Authorised Signatory:
Kelly Lee

Tests are performed under a quality system certified as complying with ISO 9001: 2008. Results and conclusions assume that sampling is representative. This document shall not be reproduced except in full.



Corrosion & Scaling Assessment: Soil Reporting Profile

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Mailing Address: PO Box 357
Pennant Hills NSW 1715
Email: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 47001 **Sample N°:** 3 **Date Received:** 5/3/18 **Report Status:** ☐ Draft ☒ Final

Client Name: Office of Finance & Services **Project Name:** Wellington St Sewerage Pumping Station and Rising Main
Client Contact: Conrad Karwaj **SES Quote N°:**
Client Order N°: ISR18019 **Sample Name:** 8191/RM3/0.5-0.95m
Address: Level 13, McKell Building **Description:** Soil
2-24 Rawson Place **Test Type:** CSCSSNR
SYDNEY NSW 2000

TEST	RESULT	COMMENTS
pH in water (1:5)	7.6	Slight alkalinity
EC mS/cm (1:5)	0.03	Very low
Texture Class	Sandy Clay Loam	
Soil Condition Class (Permeability)	Low	
SOLUBLE ANION ANALYSIS		
Sulphate (1:5) mgSO ₄ /kg	<5.0	Low (non-aggressive)
Chloride (1:5) mgCl/kg	80	Low (non-aggressive)
* Resistivity Ω.m	-	Did not test
* Resistivity tested on a saturated sample/paste		(Note:- 10,000 mg/kg = 1%)

Recommendations

Analysed by SESL Australia, NATA #15633

For the purpose of corrosion and scaling assessment of soils towards concrete structures with steel reinforcement, concrete and steel piles, this soil shows slight alkalinity, very low salinity, low sulfate and low chloride levels.

According to AS2159:2009 the pH is considered non-aggressive towards concrete and non-aggressive towards steel. The low sulfate and low chloride levels are considered non-aggressive towards concrete and non-aggressive towards steel.

Factors affecting concrete scaling are: (a) elevated sulfate, becoming mildly aggressive at >5000mg/kg SO₄; and (b) low pH, becoming mildly aggressive at pH of <5.5.

Factors affecting steel corrosivity are: (a) elevated chloride, becoming mildly aggressive at >5,000mg/kg Cl; and (b) low pH, becoming mildly aggressive at pH of <5 and (c) low resistivity, becoming mildly aggressive with resistivity values less than 50Ω.m.

Overall, based on the limited results and according to AS2159:2009 the likelihood of aggressive corrosion is low.

Please note not all analysis was conducted and may not necessarily depict the actual corrosion risk.

pH, EC, Soluble SO₄: Bradley et al., (1983); Cl, (4500-Cl-E; APHA, 1998);
Resistivity, AS1289.4.4.1:1997, Texture - PM0003 (Texture- "Northcote" (1992))

Date Report Generated
16/03/2018

Consultant:
Stuart Jamieson

Authorised Signatory:
Kelly Lee

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*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*

Appendix F – Database Searches



AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : Yass Wellington Rd RM

Client Service ID : 389449

Public Works Advisory

Date: 18 December 2018

66 Harrington St
Sydney New South Wales 2000

Attention: Michelle Moodley

Email: michelle.moodley@finance.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.8411, 148.9132 - Lat, Long To : -34.8355, 148.9222 with a Buffer of 200 meters, conducted by Michelle Moodley on 18 December 2018.

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:

0	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) (<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 to 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.



Australian Government
Department of the Environment and Energy

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.

Report created: 07/08/18 12:26:37

[Summary](#)

[Details](#)

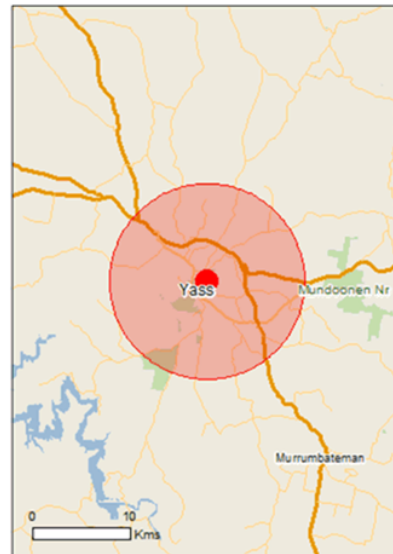
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

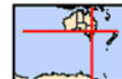
[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 10.0Km



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:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	29
Listed Migratory Species:	13

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:	2
Commonwealth Heritage Places:	1
Listed Marine Species:	20
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:	1
Regional Forest Agreements:	1
Invasive Species:	32
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	700 - 800km upstream
Hattah-kulkyne lakes	500 - 600km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream

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
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to 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 may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Breeding known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area

Fish

Name	Status	Type of Presence
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat may occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may 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 known to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may 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
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Ammobium craspedioides Yass Daisy [20758]	Vulnerable	Species or species habitat likely to occur within area
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat may occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Rutidosia leptorrhynchoidea Button Wrinklewort [7384]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area
Delma impar Striped Legless Lizard [1649]	Vulnerable	Species or species habitat known to 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		
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may 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 likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may 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 may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Species or species habitat may 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 - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Yass Post Office	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 may 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 likely 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 may 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

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		habitat likely to occur within area Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely 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 likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may 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 may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Hattons Corner	NSW
Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included.	
Name	State
Southern RFA	New South Wales

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 Resources 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
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		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
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
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

Name	Status	Type of Presence
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		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to 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
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
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
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
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

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

-34.8359 148.92164

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.

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+61 2 6274 1111

Data from the BioNet 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 0.1Å°; ^^ rounded to 0.01Å°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Act 1995) ,Commonwealth listed ,CAMBA listed ,JAMBA listed or ROKAMBA listed Entities in selected area [North: -34.79 West: 148.87 East: 148.97 South: -34.89] returned a total of 28 records of 6 species.
Report generated on 7/08/2018 12:39 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Common status	Records	Info
Animalia	Reptilia	Pygopodidae	2159	<i>Delma impar</i>		Striped Legless Lizard	V,P	V	1	
Animalia	Aves	Accipitridae	0226	<i>Haliaeetus leucogaster</i>		White-bellied Sea-Eagle	V,P	C	11	
Animalia	Aves	Accipitridae	0225	<i>Hieraaetus morphnoides</i>		Little Eagle	V,P		4	
Animalia	Aves	Falconidae	0238	<i>Falco subniger</i>		Black Falcon	V,P		1	
Animalia	Aves	Psittacidae	0277	^^ <i>Polytelis swainsonii</i>		Superb Parrot	V,P,3	V	9	
Animalia	Insecta	Castniidae	I003	<i>Synemon plana</i>		Golden Sun Moth	E1	CE	2	

*Wellington Road Sewage Pump Station and Rising Main Stage 1
Review of Environmental Factors*



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